

**GOVERNMENT STRATEGIES TO REDUCE INFANT MORTALITY RATE AND MATERNAL MORTALITY RATE IN INDIA: AN EMPIRICAL ANALYSIS****Sasikala M<sup>1</sup>, Sindhu R<sup>2</sup>, Prabu D<sup>3</sup>, Raj Mohan M<sup>4</sup>, Bharathwaj V V<sup>2</sup>**

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**Abstract**

**Background:** Proper utilization of antenatal, postnatal care services plays an important role in reducing the maternal mortality rate and infant mortality rate. This paper assesses maternal and child health care programs provided by the Government of India during pregnancy, delivery and post-delivery with the primary focus on improving Infant mortality rate and maternal mortality rate.

**Aim:** This study aimed to focus on safe motherhood and childhood intervention programs and their impact on infant mortality rate and maternal mortality rate in India.

**Methods:** Data regarding infant mortality rate, maternal mortality rate, Literacy rate were obtained from Niti Aayog, Government of India. Data regarding maternal health programs, child health programs were also obtained from the Ministry of health and family welfare, National Health Mission.

**Results:** The government of India launched 15 maternal and child health programs since 1975 started with the Integrated Child Development Scheme (ICDS) Program providing immunization, nutritional supplements to pregnant women's and under 3 age group children focusing on reducing infant mortality and maternal mortality rate in India. In the year 1995 infant Mortality rate was 74 per 1000 live births shows a steady decrease in the year 2019; it was 30 per 1000 live births. Likewise, in Maternal mortality rate, it was 254 per 100000 live births in the year 2004; there was a steady decrease in the year 2019; it was 130 per 100000 live births. Also, the female literacy rate shows a definite bearing on infant and maternal mortality rates in India.

**Conclusions:** Launching more maternal and child health programs in India by the government of India shows improvement in Infant mortality rate and maternal mortality rate in India. Hence to reach sustainable development Goal Government of India should take more action to reach the

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goal by the year 2030 (reducing maternal mortality rate to 70 per 100000 live births and infant mortality rate to 12 per 1000 live births).

**Keywords:** maternal programs, child health programs, Infant mortality rate, maternal mortality rate.

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## I. Introduction

Worldwide, Maternal mortality ratio (MMR) is has been declined to 44% over the past 25 years. In 1990, 385 maternal deaths per 100,000 live births had been estimated and 216 maternal deaths per 100,000 live births over the year 2015 [1]. In 2015, approximately 99% of the global maternal deaths took place in developing countries, with 66% taking place in sub-Saharan followed by Southern Asia. More than one-third of all maternal deaths worldwide in 2015 has occurred in India and Nigeria, with approximately 19% and 15% of maternal deaths, respectively [1]. Since 1994 The Maternal mortality rate and Infant mortality rate have started to decline in India till recent years. However, we have to accomplish a lot to achieve the target mentioned in the Sustainable Developmental Goals, which was to reduce maternal mortality rate 70 per 100000 live births and infant mortality rate 12 per 1000 live births. [2].

The highest maternal death(70%)happens within the age group of 20 to 29 years. Reports state that 38% of maternal deaths were caused by haemorrhage, 11% due to sepsis, 8% due to abortion, 5% due to obstructed labour, 5% due to hypertensive disorder and 33% due to indirect cause [3], most of these can be prevented if women are regularly given antenatal care and utilization of postnatal care which ultimately helps to reduce maternal mortality and morbidity rate [4-7]. Various factors influence the utilization of maternal health services, and it requires

more intent attention. A study done in Madhya Pradesh states an association between the utilization of Antenatal care (ANC) and factors like women's education, household's standard of living, caste and religion [4]. Various studies in India have concluded socioeconomic factors and service delivery environment as important determinants influencing maternal health services [5, 6]. A study conducted by Vora et al. in 2009 showed that the proportion of institutional deliveries among women from low socioeconomic status was just 13% as compared to 84% among the highest wealth quintile [7]. It has also been shown that Antenatal care is the gateway for other healthy behaviours adopted during and after pregnancy, like institutional delivery, providing newborn care, exclusive breastfeeding, complementary feeding and many more [8].

The use of Antenatal Care (ANC) increases the likelihood of skilled attendance at delivery, which later increases the use of postnatal care (PNC). Women who received at least one Antenatal Care during pregnancy had 3.52 times higher odds of receiving skilled attendance at delivery than women who did not receive any ANC [9]. Skilled attendants have accredited health professionals such as a midwife, doctor or nurse who has been educated and trained to be proficient in the skills needed to manage normal (uncomplicated) pregnancies, childbirth. During the birth of all babies are

considered to be crucial for reducing maternal and infant mortality rate, especially in poor-resource countries [10]. With the increase in institutional delivery, maternal mortality and newborn mortality is expected to decline due to the presence of skilled birth attendants, supported by the essential infrastructure and referral services when required. The government of India has launched more programs regarding antenatal and postnatal care, which aims at reducing maternal mortality and Infant mortality rate in India.

**Materials and Method:**

Published literature regarding maternal mortality rate, infant mortality rate in India was included in this study. Original articles and research papers were obtained Medline, PubMed, Wiley, ScienceDirect, Cochrane Central Register of Controlled Trials

(CENTRAL), Scopus, and Grey literature using keywords maternal programs, child health programs, Infant mortality rate, maternal mortality rate were also taken into the study for review. Original articles and Articles related to Infant mortality rate, maternal mortality rate, Antenatal and postnatal care programs in India were included in this study and articles without open access were excluded from the study. Data regarding infant mortality rate, maternal mortality rate, Literacy rate were obtained from Niti Aayog, Government of India. Data regarding maternal health programs, child health programs were also obtained from the Ministry of health and family welfare, National Health Mission.

**Results:**

**Table 1: Intervention Program and Its Goal In India**

S.No	Program	Year	Objectives
1	Integrated Child Development Scheme	1975	TT immunization, Supplementary nutrition for pregnant women. Supplementary nutrition, immunization Health check-up for under three year age group children
2	Universal Immunisation Programme	1985	The provision of universal immunization of children against vaccine-preventable diseases is one of the major goals under this policy.
3	Child survival and safe motherhood program	1992	To reduce IMR to 60/1000 live births MMR to 2/1000 live births
4	Maternal and child health	1995	Increase utilization of quality family planning, maternal, neonatal, and child health services

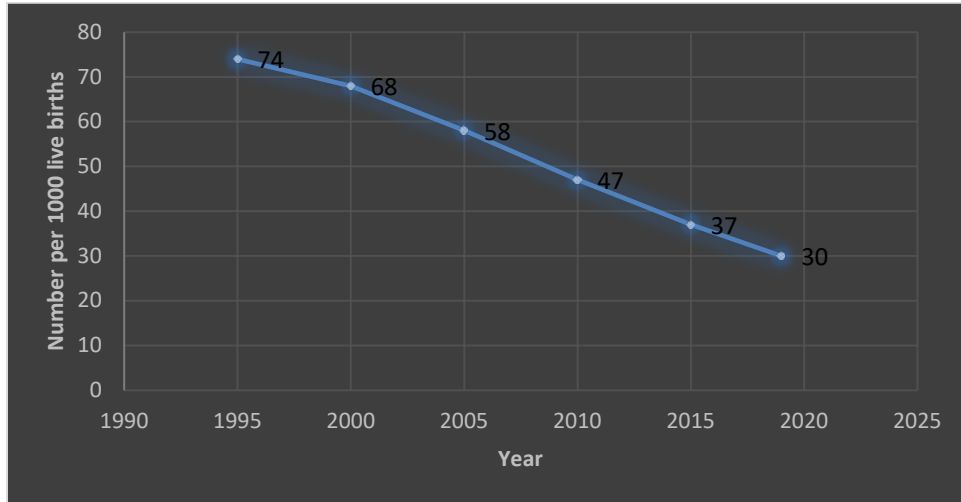
5	Reproductive and child health program	1997	Reducing total fertility rate, infant mortality rate and <b>maternal</b> mortality rate to realize the outcomes envisioned in the Millennium Development <b>Goals</b>
6	<b>Reproductive-Maternal-Neonatal-Child and Adolescent Health (RMNCH+A)</b>	1997	To Decrease Infant mortality rate (IMR) to 25 per 1000 live births by 2017 Maternal mortality rate (MMR) to 100 per 10000 live births by 2017
7	Janani Suraksha Yojana	2005	Promote institutional delivery. Promote institutional care among women in Below Poverty Line families.
8	Indira Gandhi marutva sahyog yojana	2010	A conditional cash transfer to pregnant & lactating mothers to improve their nutritional & health status
10	Janani Shishu Suraksha Karyakaram	2011	Attempt for providing cost-free deliveries. Free drugs & consumables. Free care of sick newborns
11	Najat Shishu Suraksha karyakram	2013	Aimed to train health care personnel in basic newborn care
12	Rashtriya Bal Swasthya Karyakram	2013	Defects at birth Deficiencies Diseases in children Developmental delays & disabilities
13	Adolescent Health Programme Rashtriya Kishor Swasthya Karyakram (RKSK)	2014	Adolescent nutrition: IFA supplementation Health education on reproductive health & health issues Menstrual hygiene
14	Mission Indra Dhanush	2014	To cover children who are unvaccinated or partially vaccinated against 7 vaccine-preventable diseases
15	Pradhan Mantri Matru Vandana Yojana (PMMVY) in 2017	2017	<b>Cash incentive of rupees. 5,000 is provided to pregnant women and lactating mothers</b> for fulfilling the specific maternal and child health conditions!

MMR – Maternal Mortality Rate

IMR – Infant Mortality Rate

Source: (<https://mohfw.gov.in>)

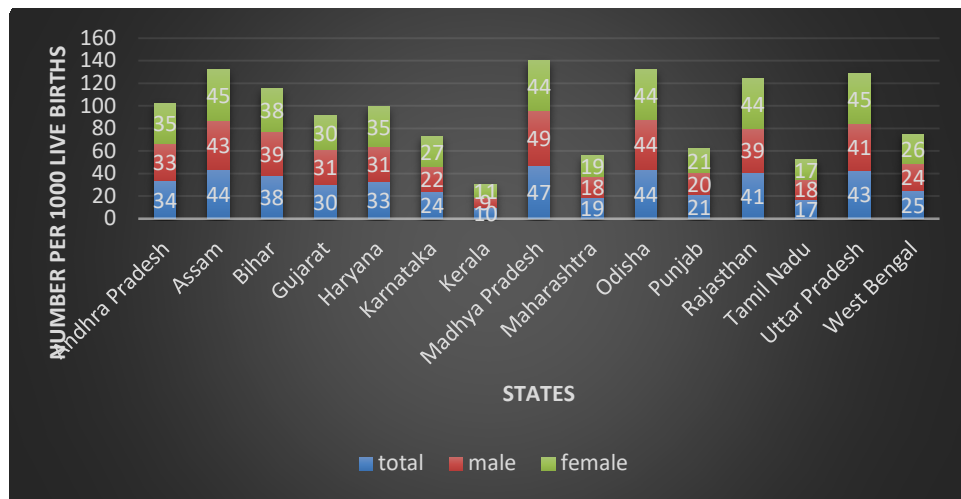
Table 1 shows that there are about 15 programs regarding maternal and child health starting from the year 1975, Integrated Child Development Scheme for immunizing pregnant women and children under 3 years till 2017 Pradhan Mantri Matru Vandana Yojana for conditional cash transfer for pregnant & lactating mothers to improve their nutritional and health status under Ministry of health and family welfare.



**Figure 1: infant mortality rate from 1994 to 2019**

**Source:** <https://niti.gov.in/>

Figure 1 shows infant mortality rate from the year 1995 to 2019, the number of infant deaths per 1000 live births, From which in the year 1995 it was 74 deaths per 1000 live births, and in the year 2019, it was 30 deaths per 1000 live births in India.

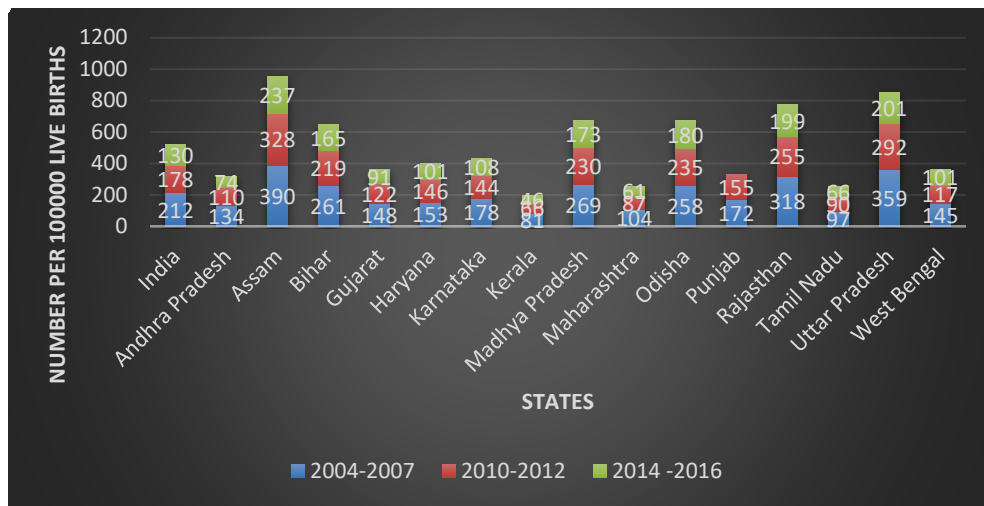


**Figure 2: Infant Mortality Rate by sex of major states in India, 2016**

**Source:** <https://niti.gov.in/>

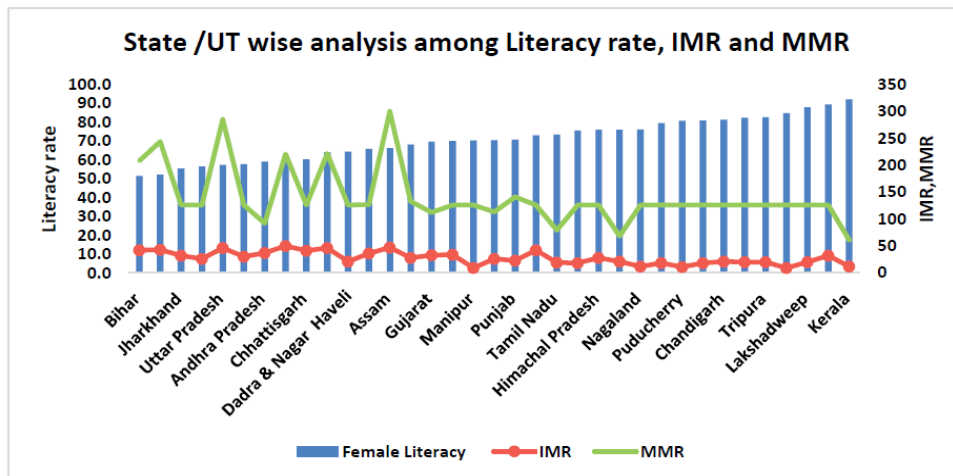
Figure 2 shows the infant mortality rate by sex of major states in India. Madhya Pradesh shows an infant mortality rate of 47 per 1000 live births with 49 male deaths per 1000 live births and 44

female deaths per 1000 live births. Also, Kerala shows an infant mortality rate of 10 per 1000 live births with nine male deaths per 1000 live births and 11 female deaths per 1000 live births in the year 2016.



**Figure 3: Maternal mortality rates of major states in India from the year 2004 to 2016**  
**Source:** <https://niti.gov.in/>

Figure 3 shows the maternal mortality rate of major states in India in the year 2004 to 2016. Assam shows a maternal mortality rate of 390 per 100000 live births in the year 2004 to 2007 and 237 per 100000 live births in the year 2014 to 2016. Also, Kerala shows a maternal mortality rate of 81 per 100000 live births in the year 2004 to 2007 and 46 per 100000 live births in the year 2014 to 2016.



**Figure 4: States / Union Territories analysis among Literacy rate, Infant Mortality Rate. Maternal Mortality Rate in India, 2016.**

**Source:** <https://niti.gov.in/>

Figure 4 shows infant mortality rate (IMR), maternal mortality rate (MMR) and Female

literacy rate in India. Kerala's achievement of 93.91% literacy rate with an infant mortality rate of 10 per 1000 live births and maternal

mortality rate of 46 per 100000 live births. Also, Bihar has achieved a literacy rate of 52%, with infant mortality rate of 16 per 1000 live births and maternal mortality rate of 62 per 100000 live births.

### **Discussion:**

The reduction in maternal mortality rate has been decelerating in association with determinants such as nutrition, poverty, and socioeconomic marginalization, over which policies have had little or no impact in India. Also, haemorrhage is considered to be the major maternal killer in India: 38% of maternal deaths were caused by haemorrhage, mostly post-partum haemorrhage, according to a recent Sample registration system analysis. The current challenge is to identify and outline the role of the government's intervention programs, maternal and infant mortality rate, strategies to improve access, delivery, and utilization of health care services [11]. Besides, there was a problem in reducing the high rate of MMR and IMR in India. This motivates to undertake a systematic assessment of trends and patterns in maternal mortality and infant mortality rate in India.

Utilization of maternal health services, which includes antenatal services, institutional delivery and postnatal services, was low. The number of contacts with the health worker in the Antenatal Care period and mass-media exposure was strongly associated with utilization of ANC and Post Natal Care services. Marginalization of women emerged as a strong determinant for the utilization of maternal health services. It is known that teenage pregnancies carry a high risk of mortality. In line with other studies, this research found that the prevalence of early marriage has a significant relationship with maternal mortality [12, 13]. This could be because early age females pelvic is not

capable of carrying a fetus, posing a higher risk for obstructed labour, and thus, its consequences may be maternal death in the worst scenario. Similarly, literacy level was found to be correlated with MMR, which could be due to multiple effects on knowledge for healthy practices and service utilization. Therefore the provision of information and health promotion about reproductive health services is important for reducing maternal mortality [14,15]

Maternal and child health (MCH) was first initiated in the early 1900s; when maternity services were improved, the rural midwives and birth attendants have received training in maternal and child health. Maternal and Child Health was voluntary work coordinated by the Maternal and Child Welfare Bureau under the Indian Red Cross Society. Madras state was the first to establish a separate Maternal Welfare section in the Office of Director of Health Services in 1931. In 1946, the Bhore Committee recommended the integration of Maternal and Child Health within General Health Services, but implementation occurred after 1955. Before 1953, MCH was unevenly distributed and delivered through maternity homes and midwives. World Health Organisation and UNICEF support contributed to the expansion of MCH services [16].

The government of India has taken several actions to reduce maternal mortality rate and Infant mortality rate. The level of Maternal Mortality Rate was improved in a relatively long time by scaling up safe motherhood interventions programs and improving access to primary and referral delivery care [17]. Also, in India, several important initiatives have been rolled out under the Reproductive and Child Health (RCH) program, **Reproductive-Maternal- Neonatal-Child**

**and Adolescent Health (RMNCH+A)**, launched by the Ministry of Health & Family to influence the key interventions for reducing maternal and child mortality rate. The RMNCH+A strategy is built upon the continuum of care concept and is holistic in design, encompassing all interventions aimed at reproductive, maternal, newborn, child, and adolescent health under a broad umbrella and focusing on the strategic lifecycle approach.

Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Health Mission. It is being implemented to reduce maternal and infant mortality by promoting institutional delivery among poor pregnant women. The scheme, launched on 12 April 2005 by the Hon'ble Prime Minister, is under implementation in all states and Union Territories (UTs) for Immunization Mission Indradhanush was launched in the year 2014 mainly to reduce infant mortality rate. This scheme seeks to drive towards 90% full immunization coverage of India and sustain the same by the year 2020.

Indira Gandhi Matritva Sahyog Yojana (IGMSY) is a maternity benefit program run by the government of India. It was introduced in 2010 and is implemented by the Ministry of Women and Child Development. It is a conditional cash transfer scheme for pregnant and lactating women of 19 years of age or above for the first two live births. It provides a partial wage compensation to women for wage loss during childbirth and childcare and provides conditions for safe delivery and good nutrition and feeding practices.

The MMR of India is declining from the year 2007 it was 212 per 100000 live births to 122 per 100000 live births in the year 2017 likewise in Infant mortality rate it is 58 per 1000 live birth to 37 per 1000 live birth in the year 2015. An absolute view of assessing the

diseases proves disadvantageous for states with lower base levels, such as Kerala, Tamil Nadu, and Maharashtra. For instance, during the year 2004–16, both Karnataka and Kerala achieved a maximum reduction in MMR and MMR. Consequently, the absolute approach ranks both states equally. However, Kerala achieved this reduction from a lower base level (MMR 46 in the year 2014–16) than Karnataka (MMR 108 in the year 2014–16). It is argued that an improvement at a higher level represents a greater achievement than an equal improvement at a lower level [17]. There are many factors that have an impact on Maternal Mortality Rate in which the education level of women plays an important role in reducing maternal mortality rate. Education enhances women's ability to access existing health care resources, including skilled attendants for childbirth, and directly leads to a reduction in her risk of dying during pregnancy and childbirth. The best example is Kerala which has the highest literacy rate (93%) with a low Infant mortality rate (10 per 1000 live births) and maternal mortality rate (46 per 100000 live births)

In India, there are huge differences in MMR and IMR across different states, ranging from 300 in Assam to 61 in Kerala and 47 in Madhya Pradesh to 10 in Kerala, respectively. This study also shows that the Female infant mortality rate is lower than male, a much-expected finding due to female's biological advantage observed in other countries of the world. This indicates potential discrimination against girl children in behavioural factors such as nutrition and healthcare in their early years of life [18]

#### **Recommendation:**

1. Quality antenatal care should be provided by Auxiliary Nurse Midwives (AMN) with the support of Accredited

Social Health Activist (ASHA) so that problems related to anaemia and blood pressure can be detected at the field level

2. . Postnatal care should be regularly carried out by Auxiliary Nurse Midwives (ANMs), which should include baby and mother both so that many complications can be detected timely during this period.
3. Specialist availability and blood storage facility should be made available at Community Health Center and civil hospital as per Indian Public Health Standards (IPHS) norms so that many high-risk cases can be dealt with at this level only and thereby decrease the load at tertiary care centres.
4. Service providers at the periphery should timely refer the high-risk patients, and transport facilities should be made available for them on time.
5. Strengthening and utilization of maternal and child health programs by pregnant women should be scrutinized by the government that will help to attain the sustainable developmental goal by 2030.

### **Conclusion:**

Maternal mortality is a major public health problem, especially in developing regions, due to its high prevalence and lower declining rate. It is associated with multiple factors like socioeconomic factors, health care system factors, disease burden and their complex interactions. Henceforth, policy and programs should be more strengthened to reduce maternal deaths and improve maternal health should consider population dynamics, socioeconomic status and health care system factors which are the major risk factors for mothers.

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