Original Article

Impact of National Health Mission (NHM) on Infant Mortality and Maternal Healthcare in India

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Abstract

India's life expectancy has significantly grown since independence, although the country has not yet realised the aim of health for everyone. In order to strengthen the health system, the National Rural Health Mission was established in 2005, along with a number of other initiatives. The mission's effectiveness was assessed in order to draw conclusions for upcoming health planning. Utilising time series data from the Health Management Information System, National Family Health Surveys, National Sample Surveys, and Sample Registration Scheme, a logical assessment framework was utilised to examine input, output, and impact indicators in a systematic manner. Despite the National Health Mission's substantial contributions, the objective of universal healthcare coverage has not yet been entirely attained. As a result, the health system's capacity must be tripled by a significant increase in funding.

Key words: Community Health System, health planning, health expenditures, maternal mortality, infant mortality, National Health Mission, India

Introduction

The primary tool used by the Union government to assist the State health systems in India is the National Health Mission (NHM). The Union government's primary and secondary health care initiatives were strengthened across Indian States by the scheme introduced in 2005 and combined with previous ones. In the first period (2005–2012), rural residents received a basic set of health services, and starting in 2013, urban residents (alongside rural residents) received a basic set of health services. It is a significant CSS that aims to offer all people access to high-quality healthcare responsive to their requirements.

Since the country's independence, indicators like fertility, and mortality have increased in India according to Ministry of Home Affairs, 1971–2003.However, the objective of achieving universal health care has not yet been attained. (WHO, 2017). Although curative services are now primarily provided by the commercial sector, the government health system increasingly offers preventive services. Because of this, out-of-pocket (OOP) health expenses have increased, impacting initiatives to end poverty (Selvaraj et al., 2018). In addition, according to Causes of Death Statistics, 2010-2013, the rising tendency of non-communicable diseases is expected to increase health expenditures.

In 2023-24 the Union Budget allocated Rs 29,085 crores to the scheme out of the total health budget of Rs 1, 06,654 crores. Before 2005, the Ministry of Health and Family Welfare oversaw several healthcare programs without integrating them, which resulted in duplication of effort and resource loss. To develop the capacity of health systems in rural areas and create a comprehensive approach combining all government health efforts, the NRHM was established. To focus on the urban disadvantaged, the NHM was launched in 2013 and merged this two missions at the same year.

Numerous attempts have been made since freedom to expand the public health structure in India, but the NHM is solitary significant initiatives carried out recently.

According to Ayushman Bharat, 2018, Examining NHM's accomplishments and challenges requires considering the historical context of the health system and the present aspirations to attain universal health coverage.

Health System in India:

Before independence, the health survey and development council had advocated for integrating preventive and curative services. The development of India's independent health structure was built on the principles laid out in this study. Assisting the Chief Medical Officer (CMO) in overseeing vertical health programmes like malaria,

Two health care assistant, both one female and male, are attached at a sub-health center (SHC) to care for a community of 5,000 people spread across 4 to 5 villages at the base of the health system pyramid. The first time you interact with them, you should expect them to provide primary care. A medical officer (MO) from PHC is in charge of the primary healthcare team. The MO is assisted in supervising the health workers of at least five sub-health centers by a male and a female health assistant. PHCs serve 30,000 people with outpatient treatment. In addition, a Senior Medical Officer (SMO) oversees four to five PHCs as the head of the health agency in a community development block.

The first referral unit, the Community Health Center (CHC), services about 100,000 people. Specialist physicians are expected to be stationed at CHC, which has about 30 beds and offers emergency services around-the-clock. Depending on the size of the populace, each district has between 5 and 10 CHCs. Additionally, a few government hospitals are in the district and sub-district divisions, each with 50–300 beds. There are numerous private medical practitioners in addition to the public health system. There are also qualified medical professionals in the towns. As a result, the government and commercial sectors of India's healthcare system coexist here.

Family planning and the prevention of infectious diseases were the primary concerns of the government health system in the first 25 years following freedom. Male health workers and auxiliary nurse midwives significantly aided the growth of primary healthcare in rural areas. After the Alma-Ata Declaration in 1978 (WHO, 1978), community health volunteers (CHVs)

were educated to provide primary healthcare in every village. Traditional birth attendants were also taught how to conduct home births in a sanitary and safe manner. 1980's (Kakkar). Under the Integrated Child Development Services Scheme (ICDS, 1975), Anganwadi Workers (AWWs) were assigned to Anganwadi Centres (AWCs) to serve about 200 households and offer non-formal preschool education, supplemental nutrition, and health checkup services to children under the age of five and their mothers.

National Health Mission of India:

The National Health Mission (NHM) of India is a program launched by the Government of India in 2013 to ensure the availability of affordable and quality healthcare services to all citizens of the country, especially those living in rural and remote areas. The program aims to address the healthcare needs of underserved communities through a range of interventions, including improving access to primary healthcare services, providing free drugs and diagnostics, promoting maternal and child health, and reducing the burden of communicable and non-communicable diseases.

The NHM integrates various national health programs, such as the National Rural Health Mission and National Urban Health Mission. It is implemented through state health departments and district-level health societies, with funding from both the central and state governments. The program also aims to strengthen health systems and improve the quality of healthcare delivery through capacity building of healthcare providers, establishing referral networks, and using information technology for observing and evaluation.

Overall, the National Health Mission of India is a remarkable initiative to attain universal health coverage and reduce health disparities.

Benefits of NHM:

The National Health Mission (NHM) was launched in India in 2013 as a flagship program to provide accessible, affordable, and quality healthcare services to all citizens, especially those living in rural and remote areas. The mission aims to address various health issues, including

maternal and child health, infectious diseases, non-communicable diseases, and mental health. Some of the benefits of the National Health Mission since its launch is:

1. Improved access to health services: The NHM has increased the availability of health facilities, health workers, and essential medicines, especially in rural and remote areas, improving access to health services for millions of people.
2. Reduction in infant and maternal mortality: The NHM has focused on improving maternal and child health services, which has significantly reduced infant and maternal mortality rates in the country.
3. Control of infectious diseases: The NHM has played a significant role in controlling and managing various contagious diseases, such as tuberculosis, malaria, and HIV/AIDS.
4. Promotion of preventive health practices: The NHM has promoted various preventive health practices such as immunization, family planning, and nutrition education, which has improved the overall health of the population.
5. Strengthening of health systems: The NHM has strengthened the health systems by improving health infrastructure, human resource development, and health information systems, among others.
6. Improved quality of healthcare services: The NHM has focused on improving the quality of healthcare services by training health workers, enhancing the availability of essential medicines, and promoting evidence-based practices.

Overall, the National Health Mission has significantly impacted the population's health, especially the most vulnerable sections of society. The federal health system has been strengthened using a variety of strategies. Participation in society is given particular attention. Every village established health, sanitation, and nutrition groups, and each government established patient welfare organizations (Rogi Kalian Samitis). These committees are made up of local council members who were chosen by the general public and representatives from civil society organizations. They are tasked with watching healthcare facilities as part of the community monitoring strategy. Having one ASHA worker per 1,000 people in each village, a middle-aged married, divorced, or widowed woman with only a primary education, also

strengthened the community aspect (ASHA, 2005). The village committee chooses ASHA among its citizens.

Infant & Maternal Mortality in India:

Infant and maternal mortality are major health challenges in India. In India, the infant mortality rate was 28.3 per 1,000 live births in 2019 and the maternal mortality rate was 113 per 100,000 live births in 2017, according to the most recent data available from the World Bank.

The causes of infant mortality in India include, low birth weight, prematurity neonatal infections, birth asphyxia, and congenital anomalies. Many of these causes can be prevented or treated with proper antenatal care, skilled attendance at delivery, and postnatal care for the mother and newborn.

Maternal mortality in India is mainly caused by complications during pregnancy and childbirth, such as hemorrhage, sepsis, and eclampsiaMaternal mortality in India is largely caused by a lack of access to high-quality prenatal care, professional labour assistance, and emergency obstetric care.

The government of India has taken various initiatives to address these issues, including the National Health Mission, which aims to provide accessible, affordable, and quality healthcare to all, and the Janani Suraksha Yojana, which offers financial incentives to women for giving birth in health facilities. However, more efforts are needed to ensure universal access to quality healthcare services and improve India's maternal and child health outcomes.

India bears a disproportionately large share of the yearly maternal, neonatal, and infant deaths worldwide.1 Of the total worldwide maternal mortality, 12per cent is due to maternal deaths in India.2 Eighty-two percent of the more than 800,000 kids who pass away before turning five do so in the first year of existence. One-sixth of all infant fatalities worldwide are attributable to these deaths in India.3 This issue is made worse by socioeconomic and regional disparities in the distribution of infant mortality. Services for maternal and infant health are still not widely used. The utilization of these services, including antenatal care (ANC),

institutional birth, and child immunization, is likely to increase with the improvement of the public health system, which may eventually result in a decrease in the rates of maternal and infant mortality. (IMRs).

Several published studies demonstrate the beneficial effects of these NHM-introduced treatments. Maternal and infant deaths have reportedly decreased as a result of NHM. Evidence shows that demand-side measures can boost institutional deliveries and lower maternal mortality. But many of these earlier investigations into the effects of NHM have analytical flaws. Numerous issues with research design, data accessibility, and data quality have been noted. Studies that only used data after NHM implementation to assess the effect have been published. Some studies failed to account for time series characteristics that could have influenced the findings, such as trend, autocorrelation, and seasonality.

Data and Methodology:

The evaluation of NHM was carried out using a Logical Framework Method. The inputs, processes, outputs, results, and effects were contrasted during the NHM implementation phase. To determine input indicators, the budget of the Indian government and rural health data were examined. Independent organizations use household sample surveys to evaluate coverages, such as the National Sample Surveys (NSS) and, National Family Health Surveys (NHFS) which are regularly performed. Analyses of the impact on maternal and neonatal mortality were conducted using information from the Sample Registration System.

Findings

The central monies granted by the Indian government for the NRHM programme since its launch have been sizable. According to MOHFW (2011a), the NRHM made about 54per cent of the entire health expenditure for the federal government in 2011. A total of 52,832 crores (US$9.8 billion at current exchange rates) were released by the central government for the NRHM between 2005 and 2011, of which 38,420 crores (US$7.1 billion) were actually spent.

Since its launch, the Indian government has allocated significant funds to NHM. According to the Ministry of Health and Family Welfare, the total budget outlay for NHM was INR 35,144 crore (approximately USD 5.3 billion) for the financial year 2020-21.(Figure-1)

Over the years, the allocation of funds to NHM has increased, indicating the government's commitment to improving healthcare in the country. For instance, the budget outlay for NHM was INR 18,115 crore (approximately USD 2.5 billion) in 2013-14, which increased to INR 27,039 crore (about USD 3.7 billion) in 2017-18.

It is worth noting that NHM is not the only program aimed at improving healthcare in India. The government also allocates funds to other initiatives and programs in the sector. However, NHM remains one of the most effective programs in terms of funding allocation and impact.

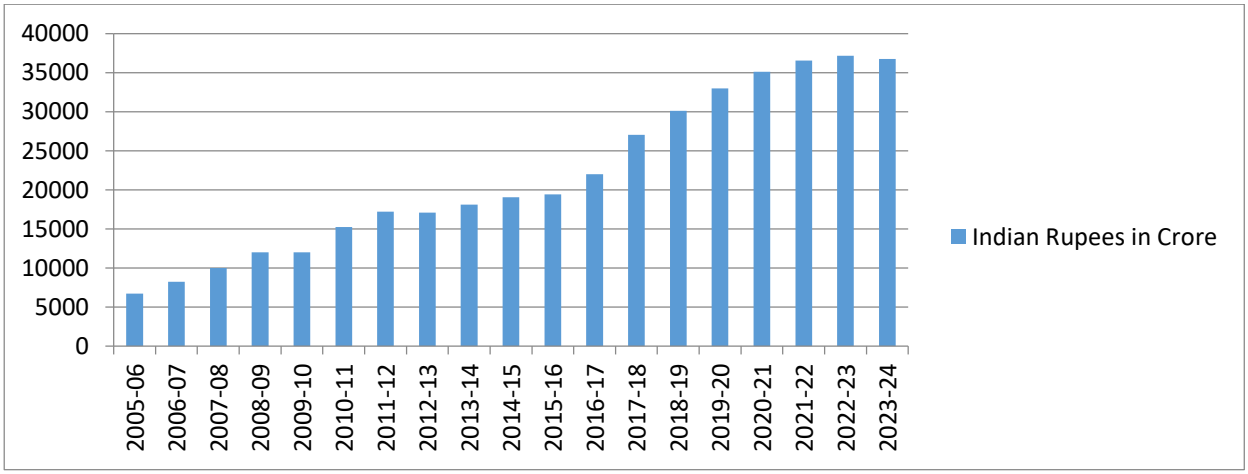

Figure 1- Fund Allocation to NHM by GOI (Indian Rupees in Crores)

Health Infrastructure

In the country, 157935 Sub Centers (SC) are available in rural areas as compare to urban areas where the number is 3894.Also there is 24935 and 6118 Primary Health Centers (PHCs), and 5480 and 584 Community Health Centers (CHCs) in rural and urban areas respectively. So, the number of health institutions and human resources have expanded during the NHM period (Table 1). (Rural Health Statistics, 2022).

Table 1- Number of Health Institutions

Health workers	2005	2010	2015	2020	2022
Accredited social health activist (ASHA)	143,167	802,656	899,685	10,33,000	10,41,000
Auxiliary nurse midwife (ANM)	133,194	166,202	193,593	212,593	207587
The nursing staff at PHCs and CHCs	28930	58450	63,938	71847	79933
Allopathic doctors at PHCs	20308	25870	27,355	28516	30640

Health Institutions (both rural & urban	2005	2010	2015	2020	2022
Sub-Health Centers(SHC)	146,026	147,069	152,326	155,404	161,829
Primary Health Centers (PHC)	23,236	23,673	25,020	24,918	31,053
Community Health Center (CHC)	3,346	4,535	5,363	5,183	6,064
Sub-district hospitals (SDH)	364	944	1,024	1,193	1,275
District Hospitals (DH)	233	635	755	810	767

Health Workers

Till 2022, 207587 ANMs is working in Sub Centres and PHCs, an increase of nearly 55.9per cent from the 133194 in 2005. The number of allopathic physicians practicing at PHCs climbed from 20308 in 2005 to 30640 in 2022, an increase of nearly 50.9per cent. 3.1per cent fewer allopathic physicians are needed in PHC than are necessary for all of India.(Table 2).

One million or so ASHA volunteers, a new category of volunteers, have now been added to every hamlet. The majority of them were assigned to the NRHM's first five years. They have linkages between the communities and the medical services.

Table 2- Number of Health workforce4

Maternal and Child Health

India's National Health Mission (NHM) significantly emphasizes maternal and child health. The NHM is a flagship program of the Ministry of Health and Family Welfare. It aims to provide affordable, accessible, and quality health care to all citizens, particularly those in rural and underserved areas.

Under the NHM, several initiatives and programs are aimed at improving maternal and child health. These include:

Janani Suraksha Yojana (JSY): To promote institutional births, this programme offers financial aid to expectant women from low-income households.

Janani Shishu Suraksha Karyakram (JSSK): This initiative provides free healthcare services to pregnant women and newborns at government health facilities.

Mother and Child Tracking System (MCTS): This online portal tracks the health of pregnant women and children up to the age of five years. The portal aims to ensure the timely delivery of services and improve the overall health outcomes of mothers and children.

Immunization: The NHM focuses on providing vaccination services to children to prevent diseases like measles, polio, and hepatitis B.

Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A): The aim of this program is to improve the health and well-being of mothers, newborns, and children by addressing various health issues, including nutrition, immunization, and maternal health.

According to National Family Health Surveys (NFHS, 5; Table 3), maternal and child health indicators are now more widely covered. Delivery through institutions has significantly increased.

From 43.5per cent to 76.4per cent of children in the 12- to 23-month age range were fully immunized in 2019-2021. Treatment for acute respiratory infections (ARI) or fever in children under five has increased from 69.6per cent to 73.2 per cent in 2015-16 but declined to 69per cent in 2021, while oral rehydration solution use in diarrhea has gone up from 26per cent to

60.6per cent. Additionally, drop in numbers have been seen in childhood undernourishment.(Table-3).

Table 3- Maternal and Child Health Indicators

Indicators	2005-06 (per cent)	2015-16 (per cent)	2019-21 (per cent)
Childbirth in Health institutions	38.7	78.9	88.6
Post-natal care	34.6	62.4	78
Antenatal care	37.0	57.2	58.1
full immunization coverage of children	43.5	62.0	76.4
Received BCG vaccine	78.2	91.9	95.2
received three doses of the DPT vaccine	55.3	78.4	86.7
Stunting (height for age)	48.0	38.4	35.5
Diarrhea in the last two weeks who received oral rehydration salts	26.0	51.0	60.6
Underweight (weight for age)	42.5	35.7	32.1
Received measles vaccine	58.8	81.1	87.9
Fever or ARI in last two weeks taken to a health facility	69.6	73.2	69

The NHM's initiatives and programs have significantly improved India's maternal and child health outcomes. However, there is still a long way to go, and efforts are ongoing to ensure all citizens have access to quality healthcare services.

Infant Mortality rate (IMR) and Maternal Mortality Rate in India:

Maternal mortality is a significant public health issue in India. Despite progress made in recent years, the maternal mortality rate (MMR) in India remains high compared to other countries.

According to the World Health Organization (WHO), India had an estimated MMR of 113 per 100,000 live births in 2017. This significantly improved from the estimated MMR of 556 per 100,000 live births in 1990. However, India still accounts for many maternal deaths worldwide, with an estimated 34,000 maternal deaths in 2019.

The leading causes of maternal mortality in India include hemorrhage, hypertensive disorders, sepsis, unsafe abortions, and obstructed labor. These issues are often exacerbated by poverty, lack of access to healthcare, and poor quality of care.

The Indian government has launched several initiatives to reduce maternal mortality, such as the NHM and the Janani Suraksha Yojana, which provides financial incentives to women for delivering in health facilities. Improved access to high-quality maternal healthcare services, such as family planning, professional labour assistance, and emergency obstetric care, has also received more attention.

While progress has been made, addressing maternal mortality in India remains a complex and ongoing challenge that requires continued investment and efforts from both the government and civil society.

Although India's maternal mortality rate (MMR) has decreased over time, it remains a major cause for worry. MMR stands for maternal mortality rate and is a crucial gauge of the standard of healthcare services offered to women during pregnancy and childbirth. It measures the number of maternal deaths per 100,000 live births.

According to the latest available data from the Sample Registration System (SRS) released by the Registrar General of India, the MMR in India was 113 per 100,000 live births in 2016, a significant decline from 167 in 2011-2013.

Furthermore, the Indian government launched the National Health Mission in 2013, which has significantly reduced MMR. The mission focuses on strengthening health systems and increasing access to quality maternal and child health facility, especially in remote and rural areas.

However, despite these improvements, India still accounts for a significant proportion of maternal deaths globally. The MMR varies significantly between states, with some states having much higher rates than others. Social and economic factors such as poverty, lack of education, inadequate nutrition, and poor access to healthcare continue to be significant challenges.

Therefore, while the declining trend in MMR in India is encouraging, more efforts are needed to ensure that all women have access to quality maternal health services, regardless of their location or socioeconomic status.

Maternal Health after NHM

One of the critical goals of NHM is to reduce maternal mortality and improve maternal health outcomes in the country.

Maternal mortality is the phrase used to describe the death of a woman owing to any cause connected to or aggravated by the pregnancy or its management during pregnancy, childbirth, within 42 days of delivery, or termination of pregnancy.

The MMR in India decreased over time, from 130 in 2014–2016 to 122 in 2015–17 to 113 in 2016–18 to 103 in 2017–19, according to the most recent statistics from the Sample Registration System (SRS) Statistical Report 2019.

This is a significant improvement and indicates that the efforts made under NHM to improve maternal health have been successful to some extent.

However, maternal mortality remains a major public health concern in India, and more must be done to further reduce the MMR. The causes of maternal mortality in India are largely preventable, including lack of skilled birth attendants, inadequate access to quality maternal health services, and poor infrastructure.

Under NHM, several initiatives have been launched to improve maternal health outcomes in India. These include the Janani Suraksha Yojana (JSY), which provides financial assistance to pregnant women for institutional delivery, and the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), which provides free antenatal checkups to pregnant women.

In addition, NHM has focused on strengthening the health system and improving the quality of maternal health services by deploying skilled birth attendants, providing essential drugs and supplies, and improving the infrastructure of health facilities.

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Figure-2 Trends in Maternal Mortality Rate in India

Overall, while there has been some progress in reducing maternal mortality in India after NHM, more needs to be done to ensure that every woman has access to quality maternal health services and that preventable maternal deaths are eliminated

Infant Mortality Rate in India

As of 2021, India's infant mortality rate (IMR) is 28 deaths per 1,000 live births. This represents a significant improvement from the IMR of 38 in 2015 and 66 in 2000. However, India still has a high infant mortality rate compared to many other countries, and the government has significant disparities.

The trend in IMR in India has been positive in recent years, with a steady decline observed over the past two decades. The government of India has implemented several initiatives to improve maternal and child health, such as the National Health Mission and the Pradhan Mantri Matru Vandana Yojana, which provide financial assistance to pregnant women and mothers. Additionally, there has been an increase in the use of healthcare services, such as institutional deliveries and antenatal care.

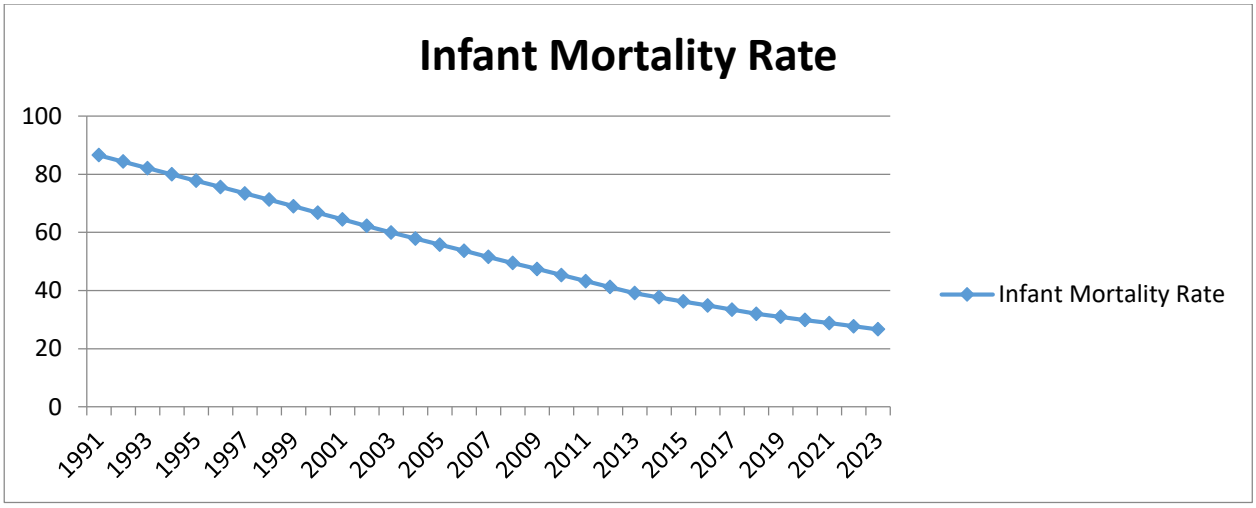

Figure-3 (Trends in Infant Mortality Rate in India

However, despite these improvements, India still faces significant challenges in reducing infant mortality. Factors contributing to high infant mortality in India include poor access to

healthcare services, malnutrition, inadequate sanitation and hygiene, and limited education and awareness about maternal and child health. Moreover, there are significant regional and socioeconomic disparities in infant mortality, with higher rates observed in rural areas and among marginalized communities.

One of the critical goals of NHM is to reduce the infant mortality rate (IMR) in India. According to the latest available data from 2019, the infant mortality rate in India is 30 deaths per 1,000 live births. This is a significant improvement from the IMR of 57 in 2005(Figure 3), the year NHM was launched. Over the years, NHM has implemented various strategies and initiatives to reduce infant mortality, including promoting institutional deliveries, improving maternal and child health services, providing immunization services, and strengthening the healthcare infrastructure in rural areas.

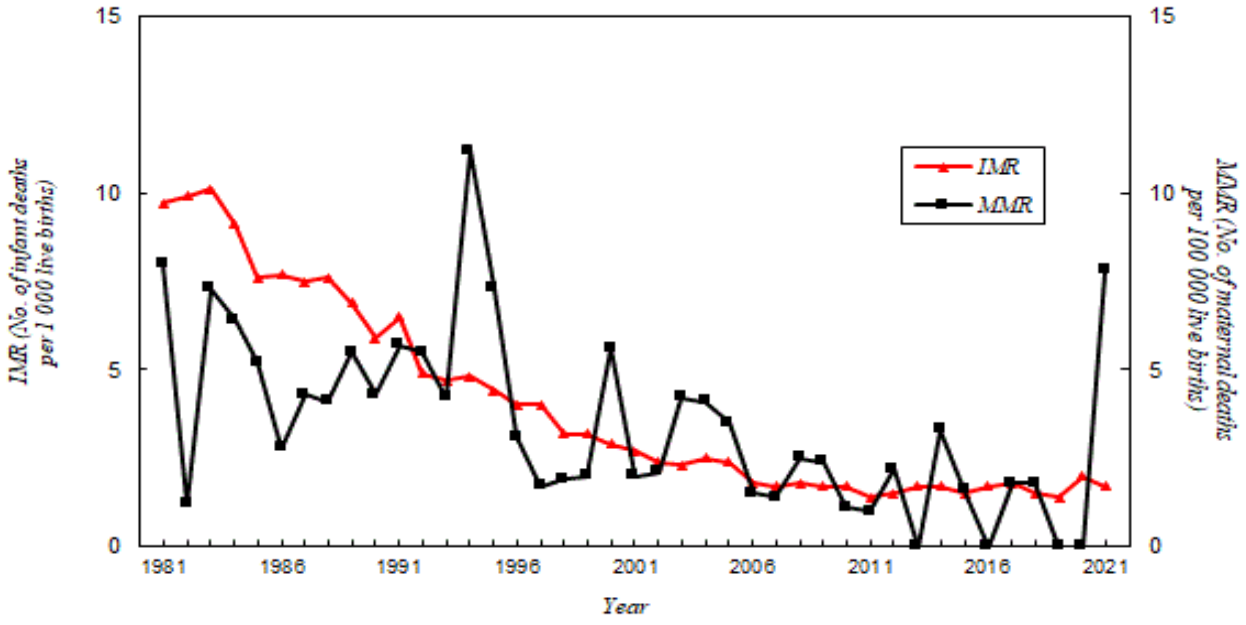

Figure 4- Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR), 1981 - 2021

Despite these efforts, India still has a high infant mortality rate compared to many other countries. The government continues to work towards further reducing IMR through various initiatives such as the Pradhan Mantri Matru Vandana Yojana (PMMVY) which provides financial assistance to pregnant women and lactating mothers, and the Janani Shishu Suraksha Karyakram (JSSK) which provides free healthcare services to mothers and newborns at government health facilities.

While the maternal death ratio has ranged between 0 and 11.2 per 100,000 live births over the past 41 years, the infant mortality rate has reduced from 9.7 per 1,000 live births in 1981 to 1.7 in 2021. (Figure 4).

Conclusion:

Even though there were significant differences in how different states performed, it is reasonable to say that the NHM successfully quickened India's rate of IMR decline. A few states have not been able to show much of a change from the pre-NHM period, despite the fact that the bulk of states have demonstrated a greater rate of IMR drop. It is necessary to pinpoint the factors that influence state-level variation and try to remove obstacles. To ensure that the most vulnerable populations are effectively served, NHM needs to be developed further.

To ensure effective service delivery and affordable services for all, it is necessary to investigate the governance of the healthcare and health financing systems in low-performing states.

When formulating future policy, socio-cultural-economic-political differences across the states and persistent geographic inequities caused by various health system-related factors must be taken into consideration.

Although the National Health Mission has made tremendous strides in improving the public health system, leading to a faster drop in newborn and maternal mortality, OOP spending is still quite high. As a result, public health spending needs to rise to around 5per cent of GDP to expand NHM and provide UHC at a reasonable cost.

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