Recent Shifts in Infant Mortality in India
An Exploration

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The pace of decline in infant mortality in India has quickened in recent years after the introduction of the National Rural Health Mission. However, the post-neonatal deaths have declined faster than the neonatal deaths despite the emphasis on preventing the latter in the health mission. Apart from a number of reasons, this is linked to the poor quality of the public health services in general, and the undernourishment and anaemia levels of pregnant women in particular.

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Reduction in infant mortality has been the major focus of the maternal and child health programmes in India from their inception. Inadequate progress in child survival remained a matter of grave concern for many decades. Despite several efforts, the targets set in the subsequent five-year plans to reduce infant mortality rate (IMR) failed. Globally, India accounts for a significant proportion of infant deaths which are around 1.3 million in 2011. At the same time, there has been some optimism on the child survival in recent years due to a consistent decline in infant mortality. Although studies in the past concluded that India is unlikely to achieve the Millennium Development Goals (MDG) of reaching the under-five mortality rate of 38 by 2015, recent projections show that India would more or less reach close to the level (Kulkarni 2013; NIMS, ICMR and UNICEF 2012; Ram et al 2013; Reddy et al 2012).

The recent reduction in the IMR has attracted the attention of the media. A number of news reports appeared on the dip in the IMR but with both optimistic and neutral headlines (*The Hindu* 2011; *The Times of India* 2013). Moreover, the Ministry of Health, Government of India (GOI) makes it a point to publicise the IMR results as and when the Registrar General of India brings out the figures for the year as the reduction is attributed to the success of the various programmes implemented through the National Rural Health Mission (NRHM).

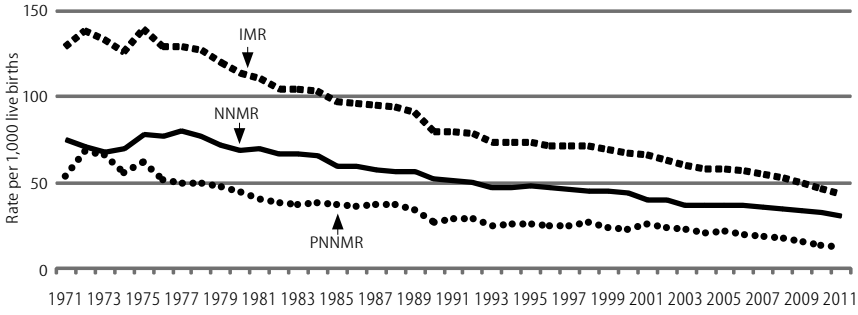
Undoubtedly, the NRHM introduced has provided renewed focus on reducing IMR. It was introduced nationally in 2005 with special focus on the nine backward states of Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand. Several components of the NRHM directly address the enhancement of child survival. More importantly, it aims at increasing the government allocation to the health sector which was abysmally low at 0.9% to between 2% and 3% of the gross domestic product (GDP). The continuous decline in the rate of IMR since the introduction of the NRHM is often considered and attributed to the successful implementation of the mission. However, the veracity of such claims requires more detailed investigation. This article examines the trends of IMR in different decades to understand the pace and magnitude of the decline particularly in the last few years. This is not an exhaustive attempt to bring out the causality between programme intervention and the infant mortality outcome which necessitates much deeper analysis given the larger socio-economic and demographic changes taking place in the country and which has its own effect on reducing the IMR. However, the current pace against the past trends will provide sufficient clues on the programme effect on IMR as well. The data for infant mortality are taken from the Sample Registration System (SRS) which provides the information on an annual basis since 1971.

Trends in Infant Mortality Rate

Figure 1 (p 15) presents the SRS-based estimates of IMR since 1971. The figure also presents trends in two components of infant mortality, viz, neonatal mortality (NNMR) which constitutes deaths within one month of live births and post-neonatal mortality (PNNMR) constituting deaths from one month to 11 months. The NNMR has close connection with the maternal factors as well as the quality of healthcare services while the PNNMR is linked more closely with environmental factors that include diseases like diarrhoea and acute respiratory infections which are some of the major causes of mortality among children in India.

Over the last 40 years, the IMR has declined nearly to the tune of 85 points from 129 in 1971 to 44 by 2011. It has further come down by two points to 42 in 2012. The IMR was close to 60 around 2005 when the NRHM was implemented.

Figure 1: Infant, Neonatal and Post-neonatal Mortality Rates in India (1971-2011)



Source: Sample Registration System, various years.

For a country like India with faster economic growth and rapid fertility transition with fertility level reaching 2.4 children per woman in 2011, neither the overall decline nor the current level is of acceptable limit. There is also a significant rural-urban difference in IMR in the country to the tune of around 18 points. In 2012, while the rural IMR is around 46, the urban rate is only 28. As such, renewed focus on reducing the IMR through NRHM was the need of the hour not only as recognition of the criticism of lack of public spending on India's healthcare system but also the desire to keep up the commitment made at the UN on realising MDG.

The figure also shows that the major share of infant mortality comes from the neonatal stage. Therefore, controlling neonatal mortality is of utmost importance in achieving reduction in infant deaths and thereby achieving health goals. Of the two components of IMR, the neonatal mortality constitutes nearly 70% of the infant deaths. This share has increased around 10 percentage points since 2001. At the same time, the figure indicates a much steeper decline in IMR, NNMR and PNNMR since the second half of the last decade. In order to examine this further, we have computed the rate of decline in the IMR over the period since 1971 for every decade.

Table 1: Percentage Decline in Infant, Neonatal and Post-neonatal Mortality Rates in Different Period, India (1971-2012)

Period	Per Cent Decline (Exponential)		
	IMR	NNMR	PNNMR
1971-80	-1.45	0.18	-3.72
1981-90	-2.85	-3.02	-2.62
1991-2000	-1.57	-1.48	-2.09
2001-06	-2.97	-1.78	-4.75
2007-12*	-5.62	-3.58	-10.10
1971-2012*	-2.79	-2.34	-3.44

*NNMR and PNNMR are up to 2011 only.
Source: Computed based on data from Sample Registration System, various years.

Table 1 presents the rate of decline in IMR, NNMR and PNNMR from 1971 to 2012 for every decade. The last decade is divided into two subgroups to find out the performance during the period of NRHM programme.

Undoubtedly, the largest decline in the IMR is recorded in the last six years compared to any other period since 1971. During the entire 42-year period since 1971, the average decline was to the tune of 3% a year while in the last six years the rate of decline has nearly doubled to 6%. It appears, therefore, that the NRHM programme has, indeed, made some impact on the IMR decline. At the same time, the rate of decline in the components of IMR, viz, in the NNMR and PNNMR shows that the major decline was in PNNMR and not in NNMR. This is surprising given the fact that the major emphasis of the NRHM programme was to ensure institutional delivery and providing newborn care. The decline in neonatal mortality critically depends on improving the conditions of mothers as well as providing quality healthcare facility for delivery and newborn care. The health of the mother is of serious concern for India since the level of undernourishment and anaemia are one of the highest in the world.

At the same time, there have been several initiatives under the NRHM to enhance the delivery and provide better newborn care. The Accredited Social Health Activists (ASHA) act as a link between the community and the public healthcare system by ensuring provision of all the necessary antenatal care services, making sure the delivery take place in institutions and providing necessary newborn care. Moreover, through the introduction of the Janani-Shishu Suraksha Karyakram (JSSK), programme under the NRHM, pregnant women are provided with free transport, food and drugs and diagnostics in addition to the cash transfer to meet additional expenses. In addition, the government intended to set up facilities such as the special newborn care units, new born stabilisation units and newborn baby corners at the rate of at least one a district. All these measures are expected to increase institutional delivery and significantly bring down the neonatal mortality. But it appears that the reduction in neonatal mortality is modest. At the same time, the PNNMR mortality recorded significant reduction in the last six years. The PNNMR is more a function of infectious diseases like diarrhoea and acute respiratory infection (ARI) in India and interventions are easier than in the NNMR. An examination of trends in the under-five mortality in India also indicated that the decline in mortality between the ages of one and five was faster than that in the ages of less than one year (Kulkarni 2013).

On the whole, therefore, it appears that while the IMR has declined significantly during the NRHM period, it was mainly due to reduction in the post-neonatal mortality rather than neonatal mortality. This is despite the fact that the major emphasis under the NRHM was to directly address the NNMR by enhancing institutional delivery, providing better newborn care, etc. Nevertheless, it is important to point out that the rate of decline has gone up even in the case of NNMR during the NRHM period although its pace was not at the desired level.

State-Level Trends

India's huge diversity across different demographic indicators is well documented and IMR is not an exception to this (James 2011). Studies also point out a considerable lag that may occur among states in achieving the MDG of under-five mortality due to the demographic heterogeneity in India (Kulkarni 2013; Ram et al 2013). In 2012, IMR varies from 56 in Madhya Pradesh to 12 in Kerala. Nevertheless, it is important to point out

that the decline in IMR has embraced most states in the country and is not restricted to any particular region.

As a strategy to achieve faster decline in the IMR, the GoI has identified nine states needing special focus known as the empowered action group (EAG) states. It is important to find out how far the IMR has responded in these states during the NRHM period. Table 2 presents the percentage decline in IMR as well as the progress in institutional delivery in the nine focused states.

Table 2: Decline in IMR and Institutional Delivery in EAG States of India (in %)

EAG States	Per Cent Decline (Exponential) 2007-12	Institutional Delivery (%) 2006	2011
Assam	-4.05	25.1	61.8
Bihar	-6.57	22.4	48.4
Chhattisgarh	-4.88	24.1	54.1
Jharkhand	-9.25	12.8	36.3
Madhya Pradesh	-5.28	22.8	66.6
Odisha	-6.00	26.6	62.6
Rajasthan	-5.88	24.1	76.6
Uttar Pradesh	-5.25	15	48.4
Uttarakhand	-6.86	-	-
India	-5.62	34.9	66.6

Source: Computed based on data from Sample Registration System, various years.

The table indicates that the rate of decline in IMR has been impressive in the high focused states. All these states recorded a percentage decline of over 4% in the last six years. None of the states record rate of decline far below the national average indicating that the emphasis placed on these states has produced dividends in reducing the IMR in these states.

As the major focus of the NRHM was on ensuring institutional delivery, it is also important to examine its progress in the high focus states. The Janani Suraksha Yojana (JSY) programme has provided incentives to women delivering at a health facility. It also provided incentives to ASHAs for ensuring institutional delivery of pregnant women in their community. It later added other important components such as free food, transportation, medicine and diagnostics under the umbrella of the JSSK. The data shows impressive performance of all the nine high focused states in the case of institutional delivery. Perhaps, one of the major achievements of the NRHM was in enhancing the percentage of pregnant women delivering in institutions. Between 2006 and 2011 the percentage of women delivering at the health institutions has more than doubled in all these nine states. However, some of these states like Jharkhand have a long way to go in ensuring near universal institutional delivery.

Discussion

Undoubtedly, the pace of decline in infant mortality has quickened in recent years after the introduction of the NRHM. The pace of the decline observed in the last six years is the highest observed since 1971. However, within IMR, the post-neonatal deaths (deaths of infants between the ages of one month and 12 months) have declined faster resulting in faster IMR decline. On the other hand, the neonatal deaths (deaths within one month) recorded only a modest reduction. This is surprising given the fact that the NRHM has provided major emphasis on the reduction of neonatal mortality. Moreover, neonatal deaths constitute more than 70% of the IMR in recent times. This may be due to several reasons.

First, there has been a significant increase in institutional deliveries since the introduction of the NRHM all over the country. However, neonatal deaths did not adequately responde to this change. Perhaps this indicates that the mere enhancement of institutional delivery may not bring down neonatal deaths as it has to be accompanied by quality public healthcare services. The public health system in the country is marred by several issues which need attention to enhance reduction in neonatal deaths. Controlling neonatal deaths necessitates advanced healthcare which often the public health system is unable to provide.

Second, widespread undernourishment and anaemia levels among pregnant women in the country lead to the birth of a considerable proportion of underweight children. Most public health facilities are unable to cope with such children as they lack the specialised newborn care facilities needed. Undernutrition among pregnant women in India is a larger public health issue and cannot be addressed by the NRHM alone. It appears that even the Integrated Child Development Services (ICDS) could not make a significant dent in addressing this issue.

Third, although the aim of the GoI has been to enhance the public spending on health from 0.9% prior to the NRHM to 2% to 3% in the coming years, it has only gone up marginally to 1.2% of the GDP. While the share of the central government's expenditure has gone up in recent years that of the state has come down (Hooda 2013). In other words, state governments started substituting increased central share for meeting the state expenditures on health services. Perhaps, the current level of neonatal mortality indicates that to achieve considerable reduction in neonatal mortality, there is a need to further enhance the health spending by the government. The public health spending in India remains one of the lowest in the world despite increased allocation during the NRHM period.

Fourth, the public health system is marred by severe shortage of health functionaries, particularly specialist doctors. Vacant positions of doctors and paramedical staff are almost a norm in many states in the country and regular appointments are often either neglected or delayed unduly. Although the NRHM has provided an opportunity for the state governments to appoint health functionaries on contract basis using the fund transferred by the central government, it has resulted only in state governments ignoring their duties of appointing regular staff for ensuring better services.

Finally, the recent changes in the IMR provide several lessons as well. They show that even a modest increase in public spending is able to provide considerable dividends in terms of enhancing infant survival. Therefore, it appears that there is no substitute to enhanced public funding for achieving the desired goals of the IMR and the MDG.

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