

CHANGES IN IMR IN RAJASTHAN OVER 25 YEARS

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ABSTRACT

A consistently high level of Infant Mortality Rate (IMR) in India, particularly in the northern states, is a serious concern for the health policy-makers, programme managers and academia in India. The authors had published a paper on Infant Mortality Rates and Causes of Deaths among Infants in the journal Indian Paediatrics in 1981. This paper is a follow-up study after 25 years that was conducted in 2005 to find the changes and the causes of IMR in the same group of villages. This is a cross-sectional study conducted in villages of Jaipur in Rajasthan, India. Data on infant deaths have been analysed at two different points in the same population with an interval of 25 years. Same methods were adopted for both the studies. Significant decline in IMR has been observed over a period of two-and-half decades. While IMR was 124 in 1980, the figure was 55.4 in 2005. The study findings show an increase in the proportion of neo-natal mortality (within 7 days) which was 87.5 per cent in 2005 in comparison to 51.6 per cent in 1981. While proportional mortality due to diarrhoea, severe malnutrition, fever and rashes has decreased; proportional mortality due to pre-maturity, low-birth weight, asphyxia, birth-injuries and congenital injuries has increased over the years. The current interventions for reducing IMR mainly focused on post-neo-natal period of infancy such as immunization, promoting ORS use for diarrhoeal cases and management of ARIs are not enough for reducing the IMR. Strategies should also focus on redesigning interventions for safe-delivery and child-birth, improved coverage and quality ante-natal care, and nutrition supplementation among pregnant women.

Key Words: Infant Mortality Rate (IMR), Neo-natal, Child Survival, Diarrhoea, Delivery.

In spite of technical advances that have increased the rate of survival of children in developing countries, infant mortality rates (IMRs) are still at least 10 times higher in developing countries than in developed countries. Reduction in infant and child mortality is a major concern for achieving health for all. One of the objectives of the Millennium Development Goals is monitoring of Infant Mortality Rate (IMR) and the Under-Five Mortality Rate (U5MR), the reduction of child mortality by two-thirds in the period between 1990 and

2015. Mortality rates among children aged less than five years in developing countries have declined over the past years consequent to improvements in the socio-economic conditions and child-survival programmes¹. Infant mortality has also declined in most settings. A consistently high level of Infant Mortality Rate in India, particularly in the northern states is a serious concern for the health policy-makers, programme managers and academic research community India. Infant deaths account for about one-

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fourth of the total deaths, while the population of infants is only about two to three per cent of total population.

Trends in IMR in India have shown a gradual decline from an average 110/1000 live births in the year 1981 to 55/1000 live births. There are wide variations in infant mortality in India. The states of Rajasthan, Uttar Pradesh, Bihar, Madhya Pradesh, and Orissa, experience a high Infant Mortality Rate compared to the national average of 55 per 1000 live births. Moreover, IMR is alarming in many of these states, particularly in Rajasthan. The proportion of neo-natal deaths to total infant mortality has been rising for the last one decade. The slow decline of IMR and increasing proportion of neo-natal deaths possibly imply that the current strategies and interventions are not effective in further reduction of infant deaths.

The present study is a follow-up study in the same group of villages in Rajasthan to examine the infant mortality rates and analyze the causes of deaths. The purpose of the study was to analyze the changes in the infant mortality rate and causes of deaths.

METHODOLOGY

The first study was conducted in 1980 in a group of villages of Jamwa Ramgarh panchayat samiti in the Jaipur district of Rajasthan. The study measured infant mortality and assessed the causes of deaths. It also included information on parity, birth-order, spacing, maternal care, delivery characteristics of women. The study was published in *Indian Pediatrics*². A follow-up study based on cross-sectional survey was conducted covering the same villages after a gap of almost 25 years in 2005. Additional neighbouring villages were also included to make up the desired

sample size. The design of the follow-up study, in terms of study area and methodology was similar to that of the earlier study. In addition to the cross-sectional survey, analysis of published reports and records was also undertaken.

The villages covered under the original as well as follow-up study were Naunpura, Papad, Khatepura, Booz, Naniyabaas, Sarjauli, Chavandiya and Nayla of Jamwa Ramgarh panchayat samiti in the Jaipur district of Rajasthan. It first study covered a total of 2268 households and found 499 births and 62 infant deaths. The follow-up survey covered 2753 households. However, it considered a reference period of two years preceding the survey for enumeration of births and deaths. Hence, with a reference period of two years, it found a total of 1496 births and 72 infant deaths. The data of infant deaths have been analyzed at two different points of time in the same population with an interval of 25 years.

It allowed the researchers to investigate some of the challenges associated with improving infant health in a developing country like India which is facing epidemiological and demographic transitions. The investigators tried to describe trends in infant mortality; particularly it's neo-natal and post-neo-natal components, ante-natal care, delivery conditions and causes of infant mortality and other associated factors. They have also analyzed how these outcomes might have been affected by changes in health-care practices, with emphasis on the role of the changing health system in India.

FINDINGS

IMR in India and Rajasthan has been declining over the past decade (Figure 1). However, the decline has

been slow but steady in the country as well as in Rajasthan, although the state maintained higher levels than

the national average through out the corresponding period. IMR in Rajasthan almost remained 85 in the decade 1991-

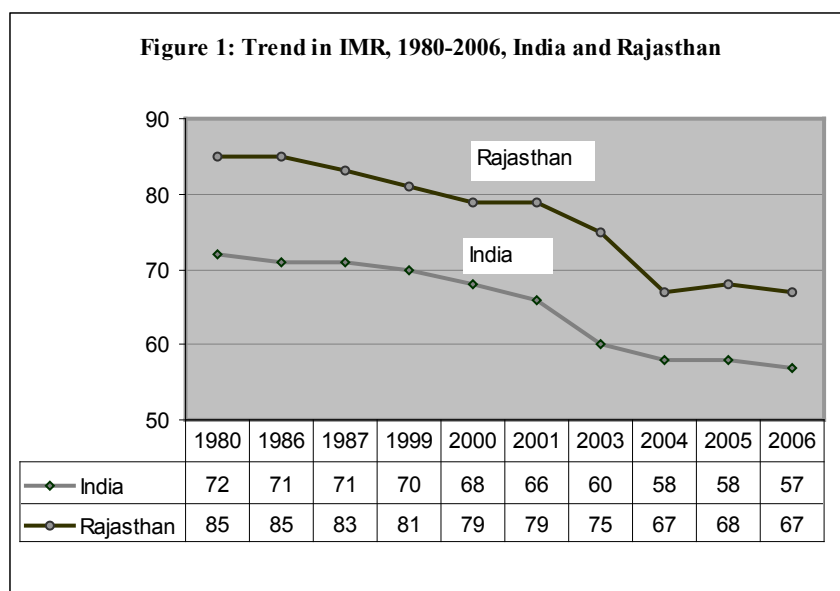


TABLE 1
INFANT AND NEO-NATAL MORTALITY IN 1980 AND 2005

Items	1980	2005
	n=62	n=72
Infant Mortality Rate	124.0	55.4
Per cent distribution of infant deaths by period		
Neo-natal deaths	50.3	66.7
Post-neo-natal deaths	49.7	33.3
Per cent distribution of neo-natal deaths by period		
Within 7 days	51.6	87.5
After 7 days	48.4	12.5
Place of Delivery		
Institution	4.0	62.5
Home	96.0	37.5
Assistance during Delivery		
Doctor/Health worker	14.2	66.7
Dai/Traditional birth attendant	80.0	29.2
Family Members	5.8	4.2

2000. The decline in IMR was gradual till 2003, and thereafter, it showed a sharp reduction of 8 points, from 75 in 2003 to 67 in 2004. Thereafter, it again became stagnant after 2004. The IMR of India as a whole remained at a lower level as compared to Rajasthan, but the trend in the change in IMR over the years remained almost similar to the trend observed in case of Rajasthan.

The study findings show three important changes over the years: significant reduction in IMR to less than half; increase in the proportion of neo-natal deaths to total infant deaths; and change in the pattern of causes of infant deaths. There has been a substantial and significant decline in the IMR over a period of two-and-half decades. The 1980 study showed IMR as 124² while the 2005 research showed IMR of 55.4, a reduction by less than a half, which is statistically significant.

Another change in pattern of infant deaths was the increasing proportion of neo-natal deaths. The distribution of infant deaths by age showed an increase in the proportion of neo-natal deaths as compared to those occurring in the post-natal period. Neo-natal

deaths which accounted for almost 50 per cent of the total infant deaths in 1980 study, increased to two-thirds of infant deaths in 2005. Most marked changes were seen in early neo-natal mortality (within 7 days), that accounted for 87.5 per cent of neo-natal deaths in 2005, compared to 51.6 per cent in 1980.

Causes of Deaths

Change in patterns of causes of deaths which has direct implications for child survival policies and strategies were also reported. The comparison of causes of infant deaths between the first study and the follow-up study showed a changing pattern of causes over a period of 25 years (Table 2). The proportion mortality due to diarrhoea has declined substantially from 14.5 per cent to 8.3 per cent during the period. Percentage of deaths due to fever and rashes which also included measles, have gone down from 16.1 per cent to 5.6 per cent. Similar was the pattern for deaths associated with severe malnutrition, with a 57.2 per cent decline from 19.4 per cent. However, pneumonia deaths remained unchanged and continued to be a major cause of death. About one-fourth of deaths were due to pneumonia.

TABLE 2
CHANGING PATTERNS OF CAUSES OF DEATHS OVER A PERIOD OF 25 YEARS

Causes of Deaths	1980	2005
Pneumonia	25.8	27.8
Diarrhoea	14.5	8.3
Severe malnutrition	19.4	8.3
Rashes/fever	16.1	5.6
Prematurely/LBW	12.9	19.4
Asphyxia	9.7	19.4
Birth injury	1.6	5.6
Congenital anomalies	0.0	5.6
Total	100.0	100

While there has been a decline in proportional mortality due to diarrhoea, severe malnutrition and fever/rashes, the proportional mortality due to prematurity and low birth weight, asphyxia, birth injuries and congenital anomalies have increased over the period. This was mainly due to increased proportion of neo-natal mortality in infancy.

DISCUSSION

The authors have attempted to present the change in infant mortality rates, neo-natal mortality and causes of deaths over a period of 25 years. The study findings show a reduction of 55.4 per cent in the infant mortality rate in three decades. However, the decline has been slow and at times, stagnant in different phases of time periods. The major question to be answered is that what has contributed to this decline? Whether technology and improved child care, or is it the overall development in terms socio-economic change, access to health care, availability and increased safe drinking water, improved supplementary nutrition and raised levels of education? The slow declining trends suggest that it was not technology alone and exclusively but seems to be the result of a combination of the two. Over the past twenty five years, there has been a phenomenal expansion of health care facilities and services, disease-specific health interventions, and success of developmental programmes such as water and sanitation, education and poverty reduction measures.

Health seeking behaviour of the women especially during pregnancy has an important role to play for the health of the newborn³. An important factor for reduction in infant mortality may be improvement in the coverage with ante-natal care, iron folic supplements and tetanus toxoid vaccine provided under

the RCH programme. At the time of the first study 25 years ago, knowledge and utilization of ANC was quite low. Only 35 per cent of the pregnant women got the required ANC services (3 ANC check-ups with IFA and TT). The utilization is quite high now and more than 80 per cent of the women reported getting ANC services in the follow-up study. The follow-up study indicated that the proportion of institutional deliveries has also increased dramatically, from mere 4 per cent in 1980 to 62 per cent in 2005. Access to skilled birth attendants (doctors/health workers) has also increased from 14.2 per cent to 66.7 per cent during the period. A reduction in the mortality due to diarrhoeal diseases over the years represents a positive result of the efforts made during last two decades for the promotion of ORS. Availability and use of ORS or home available fluids (HAF) for diarrhoea has become near universal in the study area. According to NFHS, nearly three-fourths of the women in Rajasthan were aware of ORS for treatment of diarrhoea⁴. In 1980, there was no such programme. In early 1980s, there was no ICDS in the area which has become universal now. Universal immunization programme followed by child survival and safe motherhood programme during 1985-'96 has made a significant change in child survival strategies.

One would expect that a significant improvement in women's educational attainments played an important role in reducing mortality. Rajasthan's achievement in respect of literacy has been spectacular in the last two decades. It has recorded the highest percentage increase in literacy rate among the Indian States. The proportion of literates among the females aged seven and above has risen from 14 per cent in 1981 to 44 per cent in 2001, more than three-fold increase in just two decades.

Improvements of roads and transportation facilities may have had an effect leading to easy access to health care facilities thereby reducing child mortality. Nayar (1985)⁵ in his study suggested that access to good roads in Kerala contributed to lower mortality as compared to the other states in which accessibility was inadequate. Another study reported that communes (administrative districts) with better access to road had a childhood mortality rate of 18 which was quite lower than that of communes with no access to roads when all other variables were held constant⁶. This could have been a contributing factor in the reduction of infant mortality in the current study area. Until early 1980s, only the main village Naila was connected to national highway through coaltar road but all other villages did not have road connectivity. Public transport was non-existent and the means of transportation was camel carts. Since then, the situation has improved remarkably. All the villages are now connected with coaltar roads, public and private transportation facilities are available in all the villages, all the villages have now electricity and availability of drinking water has improved.

The present study has shown a significant increase in the proportion of neo-natal deaths to total infant deaths. This may be due to the fact that for the last more than two decades, the major emphasis of child survival interventions remained on reducing child mortality, particularly infant mortality, largely through immunization, oral rehydration and control of acute respiratory infections. Consequently, deaths among children over one month of age have declined in the last few decades⁷. These changes, however, did not have a marked impact among neo-nates, leading to the shifting of mortality

in early days of infancy. Most child health interventions mainly effected post-neo-natal mortality. As a result, the contribution of neo-natal mortality to IMR has shown a significant rise. There has been a perceptible change in the distribution of causes of deaths. Predominantly, these were birth asphyxia, birth injuries, low birth weight, prematurity and congenital anomalies. This has been the experience in most countries worldwide⁸. This study corroborates these observations.

IMPLICATIONS

It is a follow-up study of the same population over 25 years and presents evidence on new challenges for policy-makers and child survival strategists to design strategies and programmes that address reduction in neo-natal mortality in order to reach the Millennium Development Goals. The current focus on reducing post-neo-natal mortality alone by increasing coverage with immunization, promoting ORS use in diarrhoeas and management of ARIs would not suffice. Strategies would require redesigning interventions for safe delivery and child birth, improved coverage and quality of ante-natal care, and nutrition supplementation among the pregnant women. This study suggests that an effective reduction in infant mortality would occur with reduction in neo-natal deaths as it constitutes over two-thirds to three-fourths of all infant deaths. Low birth weight is an important determinant of neo-natal mortality; thus, would required special emphasis on strategies to improve birth weight. The on-going National Rural Health Mission with a focus on safe delivery at the institutions, newborn care and improved nutrition has a great promise for future reduction in maternal and child mortality in order to achieve MDGs.

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