

## Improving child survival under National Health Mission in India: Where do we stand?

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### Abstract

India contributes to around one-fifth of the global under-five mortality and also maternal mortality besides one-third of the neonatal mortality. Since any reduction in child mortality in India is crucial for the global decline, therefore, the Indian Government decided to undertake massive correction of the health system. This led to the launch of National Rural Health Mission in the year 2005. Since then, significant progress has been made and child mortality rates have shown a sharp decline. On comparing the progress made by the world toward Millennium Development Goals, India fares better by showing a decline of 46.5% in comparison to 41% for the entire world during the same period. In order to assess the state-wise reduction, data from sample registration system of the Registrar General of India which is available for most of the States/Union Territories (UTs) have been analyzed. States such as Maharashtra, Tamil Nadu, and Kerala have shown an impressive decline but some states such as Himachal Pradesh, Punjab, Mizoram, and Delhi still have a long way to go to reach the state specific goals and targets. Any further decline would only be possible by addressing inter-district variations that are still lagging behind and focused efforts need to be made, in order to reach these desired goals. This analysis would be valuable in planning future program implementation plans.

**Key words:** *Child mortality rates, India, Millennium development goals, National Health Mission*

**G**lobally around 69 lakh children (6.9 million) died in year 2011 before reaching their first birthday with five countries *viz.* India, Nigeria, Democratic Republic of Congo, Pakistan, and China collectively accounting for half of these deaths. India alone accounted for about 20% of these deaths. Similarly, India carries the highest share of neonatal deaths in the world with around 30% of the global neonatal deaths [1]. The global child mortality rate (under-five mortality rate [U5MR]) decreased by 41.3% (from 87 in 1990 to 51 per thousand live births in 2011) but at a faster pace in India *i.e.* by 46.5% (from 114 to 61 per thousand live births during the same period). Furthermore, the global neonatal mortality rate (NMR) decreased by 31% (from 32 in 1990 to 22 in 2011) and at a similar pace in India *i.e.* by 32% (from 47 to 32 during the same period) [2-3].

National Rural Health Mission (NRHM) was launched on April 12, 2005 in order to provide accessible, affordable, and accountable quality health services to the poorest households in remotest rural regions. The detailed framework was approved by the Union Cabinet in July 2006. Certain states with poor indicators in terms of infant mortality rate (IMR), maternal mortality ratio, and total fertility rate with high focus on the 18 states, including

8 empowered action group states (Uttar Pradesh, Bihar, Madhya Pradesh, Orissa, Jharkhand, Uttaranchal, Rajasthan, and Chhattisgarh), 8 North East States (Sikkim, Assam, Arunachal Pradesh, Nagaland, Manipur, Tripura, Meghalaya, and Mizoram), Jammu and Kashmir and Himachal Pradesh [4].

Many initiatives were launched over the last years under the mission *i.e.* from 2005 to 2012, therefore, scaling up of existing programs and introduction of new programs would yield rich dividends. NRHM aimed to bridge gaps in rural health care through increased community ownership, decentralization of the programs to the district level, intersectoral convergence at all levels to ensure simultaneous action on a wide range of determinants of health (such as water, sanitation, education, nutrition, social, and gender equality) and the National Health Policy through improved access to affordable, accountable, and reliable primary health care services [4].

### Objective

The aim of this article was to analyze point and percentage decline made in child mortality rates from the year 2005 to

date using published data from sample registration system of the Registrar General of India. This analysis would be valuable not only for academicians but also for policy makers at national and state levels.

## METHODOLOGY AND RESULTS

The available data from SRS were analyzed for calculating point and percent decline in U5MR, IMR, NMR, and early NMR. We present analysis at the national level and also state levels beside urban and rural rates and also for males and females. The analysis of the Table 1 and results are as below.

### U5MR

U5MR declined from 76 to 49 (SRS 2008, 2013 for India), indicating a point decline of 27 and percentage decline of 36%. The maximum point decline is seen in Uttar Pradesh and Rajasthan (33 and 31 points) and minimum in Kerala (2 points). The maximum percentage decline is seen in Maharashtra (47%) and minimum in Kerala (14%). It is ironical that NRHM was launched to address rural health; however, the higher reduction is being noted in urban rates.

### IMR

IMR declined from 58 to 40 (SRS 2005, 2013) for India indicating a point decline of 18 and a percentage decline of 31%. The maximum point decline is seen in Orissa (24 points) and minimum in Mizoram (increased by 15 points). The maximum percentage decline is seen in Tamil Nadu (43%) and minimum in Mizoram (increased by 75%).

### Neonatal Mortality Rate

NMR declined from 37 to 28 (SRS 2005, 2013) for India indicating a point decline of 9 and percentage decline of 24%. The maximum point decline is seen in Orissa and Chhattisgarh (16 and 14 points, respectively) and minimum in Jharkhand (2 point). The maximum percentage decline is seen in Punjab (47%) and minimum in Jharkhand (7%).

### Early NMR (ENMR)

ENMR declined from 28 to 22 (SRS 2005, 2013) for India indicating a point decline of 6 and percentage decline of 21%. The maximum point decline is seen in Orissa (13 points) and minimum in Himachal Pradesh and Jharkhand (2 and 0 point each). The maximum percentage decline is seen in Kerala (56%) and minimum in Himachal Pradesh and Jharkhand (11% and 0%). As noted in other rates, there has been a higher reduction in urban rates as comparison to rural. Surprisingly, ENMR (urban) in Punjab is actually increased by 50%.

## DISCUSSION

There are wide variations in all of the indicators from state to state. As NRHM focused on reduction in rural mortality rates, a significant reduction in rural mortality rates is observed. Unfortunately, some states have shown increased mortality rates instead of reduction e.g. States of Himachal Pradesh (U5MR male), Mizoram (IMR), Delhi and Andhra Pradesh (NMR), Delhi and Punjab (NMR). These states should take appropriate steps and assess the reasons for the same.

A good public health program can run on three pillars *viz.* Availability of trained health personnel, regular supply of drugs and equipment and adequate advocacy and communication to change behaviors by way of information, education and communications campaigns using all possible forms of media. These pillars need to be backed by monitoring and evaluation measures and analysis of data collected for future planning. The possible reasons for variations in this reduction could be attributed to actual causes of neonatal and child mortality e.g. even if institutional deliveries have increased, still they do not translate into reduction in neonatal mortality because of poor quality of care at birth. Therefore, the government considered few high impact evidence-based approaches to meet desired goals to reduce child mortality.

A key area was to address care during delivery as one of the most crucial steps under NRHM. A conditional cash transfer scheme Janani Suraksha Yojana was launched, to motivate women to deliver at the health facilities. This scheme proved quite effective and led to huge demand generation, which required strengthening of public health facilities. As the years passed, significant infrastructure strengthening along with recruitment of human resources took place and rate of institutional delivery now stands at 73% including 26% deliveries taking place at private sectors. Home deliveries (23%) are still an area of concern although Auxillary Nurse Midwives (ANMs) have now been trained in skilled birth attendance training and are catering to such deliveries. This translates to around 7.5 million women who still deliver at home considering an annual birth cohort of around 26 million [5].

In order to address the issue of out of pocket expenses by pregnant women, Janani Shishu Suraksha Karyakram (JSSK) was launched in 2011. JSSK entitles all pregnant women to absolutely free and zero expense delivery including caesarean section operation in government health facilities and provides for free food, blood, drugs and diagnostics, and referral transport (from home to facility, facility to higher facility in case of referral and from facility to home). Similar entitlements have also been put in place for sick neonates [6]. These entitlements have now been extended to all infants in the country.

India already has a community-based program of 8.6 lakh Accredited Social Health Activists (ASHAs) as well as a

Table 1: States with maximum and minimum point and % decline in child health indicator

Indicators	Reference period	India point decline (% decline)	State with maximum point (decline)	State with minimum point (decline)	State with maximum (% decline)	State with minimum (% decline)	Remarks (data available)
U5MR	2008, 2013	27 points (36)	Uttar Pradesh (33 points)	Kerala (2 point)	Maharashtra (47)	Kerala (14)	20 out of 35 state/ UTs
U5MR rural	2008, 2013	14 points (20)	Uttar Pradesh (23 points)	Delhi (0 point)	Karnataka (31)	Delhi (0)	20 out of 35 state/UTs
U5MR urban	2008, 2013	14 points (33)	Madhya Pradesh (22 points)	Kerala (3 points each)	Tamil Nadu (45)	Himachal Pradesh (18)	20 out of 35 state/UTs
U5MR female	2008, 2013	20 points (27)	Uttar Pradesh (30 points)	Kerala (1 point)	Maharashtra and Karnataka (36)	Kerala (7)	20 out of 35 state /UTs
U5MR male	2008, 2013	17 points, 27%	Madhya Pradesh (25 Points)	Himachal Pradesh (0 points)	Punjab (42%)	Himachal Pradesh (0%)	20 out of 35 state/UTs
IMR	2005, 2013	18 points (31)	Orissa (24 points)	Mizoram (increased by 15 points)	Tamil Nadu (43)	Mizoram (increased by 75)	35 state/UTs
IMR rural	2005, 2013	20 points, (31.25)	Orissa (25 points)	Mizoram (increased by 18 points)	Goa (50)	Mizoram (increased by 69)	35 state/UTs
IMR urban	2005, 2013	13 points, (33)	Madhya Pradesh, Orissa, Tamil Nadu (17 points in each)	Mizoram (increased by 9 points)	Tamil Nadu (50)	Mizoram (increased by 90)	35 state/UTs
IMR female	2007, 2013	14 points, (25)	Orissa (20 points)	Mizoram (increased by 12 points)	Pondicherry (46)	Mizoram (increased by 48)	35 state/UTs
IMR male	2007, 2013	16 points, (29)	Madhya Pradesh Orissa (20 points in each)	Mizoram (increased by 12 points)	Tamil Nadu, Tripura (41 points)	Mizoram (increased by 57)	35 state/UTs
NMR	2005, 2013	9 points (24)	Orissa (16 points)	Jharkhand (2 points)	Punjab (47)	Jharkhand (7)	35 state/UTs
NMR rural	2005, 2013	10 points (24)	Punjab (18 points)	Delhi (increased by 7 points)	Punjab (55)	Delhi (increased by 41)	20 out of 35 state/UTs
NMR Urban	2005, 2013	8 points (35)	Jammu and Kashmir, Madhya Pradesh and Uttar Pradesh (13 points each)	Andhra Pradesh (1 point each)	Kerala (70)	Andhra Pradesh (9)	20 out of 35 state/UTs
ENMR	2005, 2013	6 points (21)	Orissa (13 points)	Jharkhand (0 point)	Kerala (56)	Jharkhand (0)	20 out of 35 state/UTs
ENMR rural	2005, 2013	6 points (19)	Orissa (15 points)	Delhi (increased by 3 points)	Punjab (54)	Delhi (increased by 30)	20 out of 35 state/UTs
ENMR urban	2005, 2013	5 points (31)	Madhya Pradesh (10 points)	Orissa and Punjab (increased by 4 points each)	Kerala (70)	Punjab (increased by 50)	20 out of 35 state/UTs

USMR: Under 5 mortality rate, IMR: Infant mortality rate, NMR: Neonatal mortality rate, ENMR: Early neonatal mortality rate

three-tiered health system in place [7]. ASHAs are trained in Module 6 and 7 of ASHA training and are conducting series of home visits under Home Based Newborn Care scheme that entitles them to an incentive of Rs. 250 per newborn [8]. These visits are aimed at early recognition of danger signs and prompt referral through JSSK.

Neonatal mortality contributes to more than half of U5MR (U5MR: 55, NMR: 31 as per SRS 2011), therefore targeted interventions aimed at preventing deaths in the 1<sup>st</sup> month of life is critical [9]. 70% of the neonatal deaths could be prevented if evidence-based interventions are implemented effectively with high coverage [10] and also facility based interventions can decrease neonatal mortality by 23-50% in variable settings. Therefore, under NRHM, Facility Based Newborn Care (FBNC) program was launched in 2011 to improve the newborn survival in India [11]. Under this program, special newborn care units (SNCUs) are being operationalized at all district hospitals and in health facility in public sector with more than 3000 deliveries per year, newborn stabilization units (NBSUs) at the level of Community Health Centres and/or First Referral Units and Newborn Care Corners (NBCCs) at all delivery points [12] to provide essential newborn care. There are around 418 SNCUs, 1554 NBSUs, and 13167 NBCCs operational in the country [13].

Rashtriya Bal Swasthya Karyakram (RBSK) has been envisaged to screen and manage a set of health conditions including defects at birth, deficiencies, diseases, and developmental delays including disability and aims to cover more than 27 crore children in the group of 0-18 years in a phased manner. All newborns born at public health facilities and home would be screened for birth defects by health personnel and ASHA, respectively, 6 weeks to 6 years at Anganwadi centres and 6-18 years enrolled in government and government-aided schools. These children would then be referred to the appropriate facility for further management [14].

India Newborn Action Plan launched in 2014 with an aim to reduce NMR to <10 by 2030 is a step in the right direction [15]. This has brought interventions aimed at reducing NMR at top priority and would go a long way toward improving the overall health system of the country. A new scheme has been launched to incentivize ASHAs to encourage the delay of the first birth in newly married couples and ensure spacing of 3 years between the first and second childbirths [16]. This would indirectly help in reducing number of births and also the incidence of prematurity and low birth weight babies.

Analysis of Annual Health Survey (2010-11) from 284 districts across these nine states shows that there is a wide inter-district variation. For example, Madhya Pradesh, a state with high U5MR has an inter-district variation of 89 points between Indore (51) and Panna (140) while Uttar Pradesh has a 90 point variation between the two districts of Kanpur Nagar (52) and Shravasti (142) [17].

Recently a strategic approach to Reproductive, Maternal, Newborn, Child Health and Adolescent Health (RMNCH+A) has been launched on February 7, 2013 during the National Child Survival and development - A call to action summit, aimed at incorporating evidence-based approaches and packaging them into available programs aimed toward a faster reduction of U5MR [18].

### Addressing Under-nutrition

Malnutrition is a contributory factor in about one-third to one-half of the child deaths under 5 years of age. As shown in Fig 1, wasting has improved slightly in 2011 in comparison to the situation during 2005-2006 [19,20]. The following actions are being undertaken in order to reduce malnutrition in the country:

1. Detection of children with severe acute malnutrition (SAM) at community level and referral to appropriate level of care [21]
2. Facility based management of children with malnutrition having complications at nutrition rehabilitation centres
3. Convergence with women and child department for community-based management of children with SAM and moderate acute malnutrition
4. Early initiation of breastfeeding for newborn delivered at health facilities, counseling and communication for exclusive breastfeeding during home visits
5. Promotion of optimal Infant and Young Child Feeding (IYCF) practices has been recognized as an important intervention not only for preserving the nutritional status of children but also for child survival
6. Detection of early growth faltering through community and facility-based approaches
7. Iron and folic acid (IFA) supplementation for children 6 months to 10 years and vitamin supplementation for children 6 months to 5 years. Recently, national iron plus initiative has been launched to provide IFA supplementation to children between 6 months and 5 years, 5-10 years,

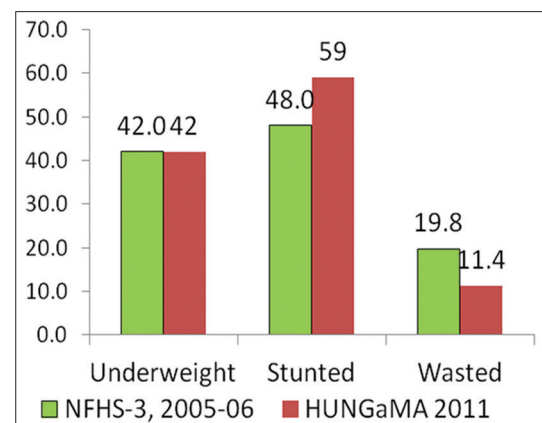


Figure 1: Status of malnutrition levels between 2005-2006 and 2011 in Children under 5 years of age

10-19 years, pregnant and lactating women, and women in the reproductive age group [22].

### Reducing Deaths Due to Diarrhea and Acute Respiratory Illness (ARI)

Currently, only 34% of the children with diarrhea receive oral rehydrating solution (ORS) and 82.6% children with ARI or fever sought treatment/advice [19].

The following actions are being undertaken to reduce deaths due to diarrhea and ARI:

1. Increasing availability of ORS and zinc and promoting its use
2. Behavioral interventions to improve hygiene and care seeking practices
3. Training of health care providers in integrated management of neonatal and childhood illnesses
4. Early diagnosis of pneumonia, administration of antibiotics (cotrimoxazole) by ASHA and ANM, recognition of danger signs and prompt referral to health facility.

### Immunization

All children under 15 years of age are protected for seven vaccine-preventable diseases *viz.* tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, measles, and hepatitis B. Full immunization coverage in India has increased from 35.5 [23] in 1992 to 61% (5) in 2009 and is showing an upward trend.

Around 26 million newborns are targeted for immunization each year and around 9 million sessions are held annually [24]. There are 22,394 vaccine stores in the country [25]. Around 172 million children are immunized in National Immunization Days (NIDs) and around 550 million in NIDs and Sub NIDs for polio. A catch-up campaign for measles targeting 134 million children has been initiated in the country [26-28]. In addition, Japanese Encephalitis vaccination campaigns have been conducted in 113 endemic districts and additional 63 districts have been identified [29]. Further, *Haemophilus influenzae* Type b containing pentavalent vaccine was introduced in two states and is being expanded to other states [30]. No polio case has been seen in the country since January 2011, and neonatal tetanus has been eliminated in 18 states in India [31,32].

### Way Forward

In order to hasten the reduction of U5MR in the country, it is essential that States/Union Territories must focus on the following:

1. Strengthening of infrastructure and rolling out FBNC as a key strategic intervention and should be prioritized in high focus districts

2. As sepsis is one of the biggest killers in the neonatal period, it is essential to follow strict clinical management protocols and infection control practices
3. Quality of care should be prioritized with a regular monitoring of facilities for service utilization
4. The entitlements under JSSK should be made available with a focus at delivery points and IECs to create demand generation and claim rights since in many cases people are not aware and hesitate to seek care
5. Improving access to medicines for diarrhea, ARI, and other common childhood diseases
6. Promotion of IYCF practices for reducing incidence of malnutrition and improvement of child survival
7. Behavior change communication aiming at better health and hygiene practices including improving hand washing practices
8. RBSK while being aimed at screening and treatment should focus on preventive approaches to reduce the incidence of birth defects so as to yield rich dividends and appropriate use of financial resources [33].

### CONCLUSION

Although there is a varied reduction, but initiatives launched under the mission are beginning to show results and there are high chances that at this current rate of reduction, India would meet Millennium Development Goals goal for reducing child mortality and also the 12<sup>th</sup> plan goals.

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