

## Trends of undernutrition in children under 5 years of age

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As mentioned in the earlier research projects undertaken by Inclusive Media for Change, mainstream media's coverage of undernutrition is miniscule. We have also seen that the coverage of related issues such as farmers' suicides, maternal and child health etc. is also far from adequate<sup>1</sup>. It was particularly clear in the months following the Union Budget 2015 when budgetary allocations for Integrated Child Development Services (ICDS) scheme was cut to half along with severe reduction in the Mid Day Meal (MDMS) scheme fund<sup>2</sup>, this was not adequately reflected in the mainstream media coverage. Rather media reports were more concerned about steps undertaken for economic reforms.

The present research takes into account inadequacy in the media coverage of undernutrition. The attempt in this research is to bring together all those publications and reports brought out by expert committees, multilateral agencies and government ministries in such a way that the data is reanalyzed, juxtaposed and compiled to get a clearer picture of the emerging trends. The most important part of this research is to first make a sense of the available government data and subsequently present it in ways helpful to the reporters of mainstream media. This is an ongoing work and every attempt has been made to collect feedback in order to improve it further.

### About the study

The present study analyses the trends of undernutrition among children below 5 years in 17 states between 2005-06 and 2012-13. These states are Andhra Pradesh, Arunachal Pradesh, Goa, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Tamil Nadu, Tripura and West Bengal. The study relies on National Family Health Survey (NFHS-3) data on undernutrition in the year 2005-06. The undernutrition data for the year 2012-13 is sourced from District Level Household and Facility Survey (DLHS-4). It must be noted that no comparable data between NFHS-3 and DLHS-4 is available for Andaman & Nicobar Islands, Chandigarh, Puducherry and Telengana.

The present study also attempts to find whether the rural-urban disparity in terms of various measures of undernutrition in 18 states and 3 Union Territories (UTs) during 2012-13 is statistically significant.

The various measures of undernutrition considered in the current study are: moderate stunting (height for age- below 2 SD), severe stunting (height for age- below 3 SD), moderate wasting (weight for height- below 2 SD), severe wasting (weight for height- below 3 SD), moderate underweight (weight for age- below 2 SD) and severe underweight (weight for age- below 3 SD).

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<sup>1</sup> Mudgal, Vipul, 2015: Framing the 2014 Elections: The Curious Absence of Development, Television & New Media, Sage Journals, <http://tvn.sagepub.com/content/16/4/354.full.pdf+html>

Mudgal, Vipul, 2011: Rural Coverage in the Hindi and English Dailies, EPW, Vol - XLVI No. 35, August 27, 2011, [http://www.im4change.org/docs/rural\\_coverage\\_hindiand\\_english\\_apers.pdf](http://www.im4change.org/docs/rural_coverage_hindiand_english_apers.pdf)

<sup>2</sup> Mander, Harsh (2015): Modi government: one year of dismantling the welfare state, Hindustan Times, 20 May, <http://www.hindustantimes.com/analysis/modi-government-one-year-of-dismantling-the-welfare-state/article1-1349116.aspx>

## Research perspective

Various studies and reports indicate that India is the centre of malnutrition and hunger. According to the report entitled: *The State of Food Insecurity in the World 2014: Strengthening the Enabling Environment for Food Security and Nutrition* (FAO, IFAD and WFP, 2014), the highest number of undernourished people (who are in a state, lasting for at least one year, of inability to acquire enough food, defined as a level of food intake insufficient to meet dietary energy requirements) in the entire South Asia are found in India i.e. 190.7 million in 2012-14.

The report entitled *Global Hunger Index 2014: The Challenge of Hidden Hunger* (IFPRI, Welthungerhilfe and Concern Worldwide 2014) shows that India currently ranks 55th out of 76 countries, ahead of Bangladesh and Pakistan, but still trails behind neighbouring Nepal (rank 44) and Sri Lanka (rank 39). Although the country is no longer in the “alarming” category, its hunger status is still classified as “serious” by the Global Hunger Index report.

The report entitled *Improving Child Nutrition: The Achievable Imperative for Global Progress* (UNICEF, 2013) informs that undernourished girls have a greater likelihood of becoming undernourished mothers who in turn have a greater chance of giving birth to low birthweight babies, perpetuating an intergenerational cycle. The same report cautions that poor nutrition in the first 1,000 days of children’s lives can have irreversible consequences. From a life-cycle perspective, the most crucial time to meet a child’s nutritional requirements is in the 1,000 days including the period of pregnancy and ending with the child’s second birthday.

Regarding data, it must be clarified that the Government of India is yet to disclose all the findings of the 2013–2014 Rapid Survey on Children (RSOC) particularly at the state-level. The new national survey, covering all 29 states in India, relies on data collected by the Ministry of Women and Child Development in partnership with UNICEF India. Similar data was made available last by the National Family Health Survey-3 (NFHS-3) in 2005-06, which makes the two dataset i.e. NFHS-3 and RSOC comparable.

However, RSOC's data and methodologies have not yet been reviewed by international agencies like WHO and UNICEF, and the survey results do not yet appear in the WHO’s Global Database on Child Growth and Malnutrition.

A news report by Rema Nagarajan in *The Times of India* (dated: 11 March 2015) also confirms that the RSOC data was sent from the Ministry of Women & Child Development to the Ministry of Health & Family Welfare and also to the Ministry of Statistics and Programme Implementation for reviewing during September 2014. However, there has been no progress since then due to which the RSOC data of all states could not be made public.

The RSOC data at the national level gives the provisional undernutrition figures for children below 5 years. For example, the prevalence of stunting among children below 5 years age has reduced from 47.9% in 2005-06 (NFHS-3) to 38.8% in 2013-14. The prevalence of wasting among children below 5 years of age has reduced from 20% in 2005-06 to 15% in 2013-14. The prevalence of underweight children below 5 years fell by almost 13 percentage points between 43.5% in 2005–2006 and 30.7% in 2013–2014.

However, researchers and advocacy groups need the undernutrition data for children below 3 years for

various states and UTs so that the data can be compared with NFHS previous rounds. Since India uses the indicator 'prevalence of underweight children under 3 years of age' for measuring progress to achieve target 2 (under MDG 1) i.e. halving the proportion of people who suffer from hunger, it becomes all the more important to know whether RSOC has the requisite figures. One can, therefore, only remain hopeful for the time being that the RSOC has collected and is willing to present undernutrition data for various age groups of children in different states and UTs of India.

Since the state-wise malnutrition figures based on the Rapid Survey on Children (RSOC), conducted by the Ministry of Women and Child Development in partnership with UNICEF India, is not yet available in the public domain, the publication of the DLHS-4 data providing updated nutritional trends in a few select states is definitely a welcome step.

### **Methodology and sources**

The present study relies on the DLHS-4 for undernutrition data pertaining to 2012-13 whereas for the 2005-06 data NFHS-3 data is used. No comparable data between NFHS-3 and DLHS-4 is available for Andaman & Nicobar Islands, Chandigarh, Puducherry and Telengana since the NFHS-3 does not provide any information on undernutrition in these states and UTs.

Since the DLHS-3 done in 2007-08 (and published in 2010) did not provide information on the 6 measures of undernutrition we are concerned about, DLHS-4 can be straightway compared with NFHS-3 for the states whose latest nutritional data is available now.

Apart from comparing the undernutrition situation in various states/ UTs between 2005-06 and 2012-13, inter-state comparison has also been done for children below 5 years in terms of moderate stunting (height for age- below 2 SD), severe stunting (height for age- below 3 SD), moderate wasting (weight for height- below 2 SD), severe wasting (weight for height- below 3 SD), moderate underweight (weight for age- below 2 SD) and severe underweight (weight for age- below 3 SD).

In order to check whether there is a statistically significant difference in various measures of undernutrition between the urban and rural areas of 18 states and 3 UTs during 2012-13, independent sample t-test (2-tailed) has been done.

### **Results: Situation in 2012-13**

The results from the analyses of DLHS-4 data shows that among the 18 states and 3 UTs, the percentage of moderate wasting for children below 5 years is highest in Maharashtra (i.e. 34.1 percent).

Similarly, in the case of severe wasting and moderate underweight, the situation is worst in Maharashtra as compared to the rest (as shown in the chart below).

The above outcomes may be shocking for those who were rather pleased with the state's reported decent performance in reducing stunting (too short for age) among children under 2 years, and expected similar trends for the other two indicators of nutrition levels, namely wasting (too thin for height) and underweight (too thin for age).

Earlier, the provisional results of the Comprehensive Nutrition Survey (CNS) in Maharashtra during 2012, conducted jointly by the state's Department of Women and Child Development, International Institute for Population Sciences (IIPS) and UNICEF, found that the percentage of children below 2

years affected by stunting came down drastically to 22.8 percent in 2012 (under CNS) from 39.0 percent in 2005-06 (under the NFHS-3).

Since the publication of the CNS results, many international reports, authored by renowned economists and health experts, had praised the state for reducing malnutrition among children, although there were some critical reports, too, by the media on high malnutrition levels prevailing particularly among tribal children in parts of Melghat in Amravati, Jawahar and Mokhada in Thane and urban slums of Mankhurd and Shivajinagar in Mumbai.

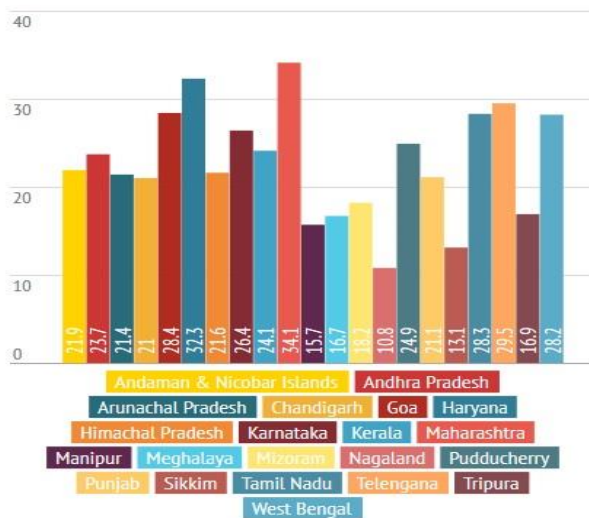
According to the Performance Audit Report No. 4 of 2015 of General and Social Sector, Government of Maharashtra by the Comptroller and Auditor General (CAG) of India, the percentage of girls moderately underweight vis-à-vis total girls weighed in Anganwadi Centres of Maharashtra during 2010-2014 was 14.01% whereas the percentage of girls severely underweight vis-à-vis total girls weighed was 2.26% (age group 0-6 years).

The same CAG report informs that during 2010-14, against the state average of 16.27%, the percentage of moderately/severely underweight girls vis-à-vis total girls weighed in the tribal districts of Nandurbar and Gadchiroli was 33.98% and 27.02%, respectively. On top of it, of the total number of deceased girls (42,647) in Maharashtra during 2010-14, 63% of the deceased girls (26,869) were malnourished while in the 8 selected districts of Thane, Nandurbar, Mumbai, Buldhana, Gadchiroli, Beed, Nanded and Solapur, 66% of the deceased girls were malnourished. In the tribal district of Nandurbar, 79% of the deceased girls were malnourished during 2010-14.

#### *Performance of various states under DLHS-4*

In terms of prevalence of 'moderate wasting,' among 18 states and 3 UTs, Maharashtra (34.1 percent) performs the worst and Nagaland (10.8 percent) performs the best (see chart 1). Except for Andhra Pradesh, Arunachal Pradesh, Kerala, Nagaland and Sikkim, the prevalence of 'moderate wasting' is higher in rural areas as compared to urban areas. The rural-urban divide is maximum in Andaman and Nicobar Islands.

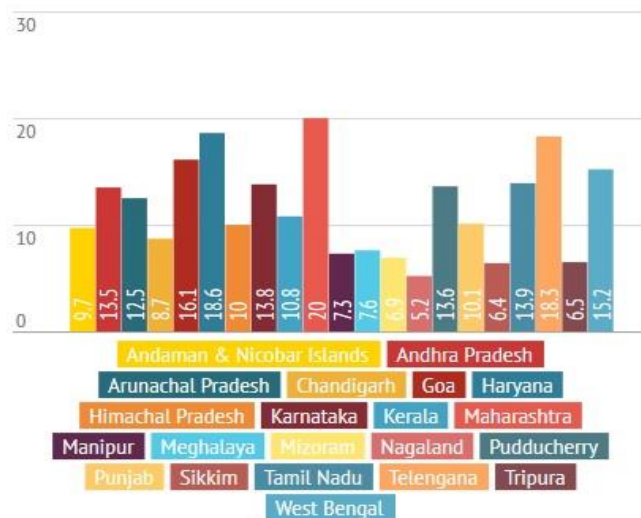
#### **Chart 1: Percentage of children below 5 years suffering from moderate wasting in DLHS-4**



**Source:** District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

From chart 2, we get that the percentage of 'severe wasting' is highest in Maharashtra (20.0 percent) and lowest in Nagaland (5.2 percent). The prevalence of 'severe wasting' is higher in rural areas as compared to urban areas, except for Himachal Pradesh, Kerala, Nagaland and Sikkim. The rural-urban divide is maximum in Puducherry.

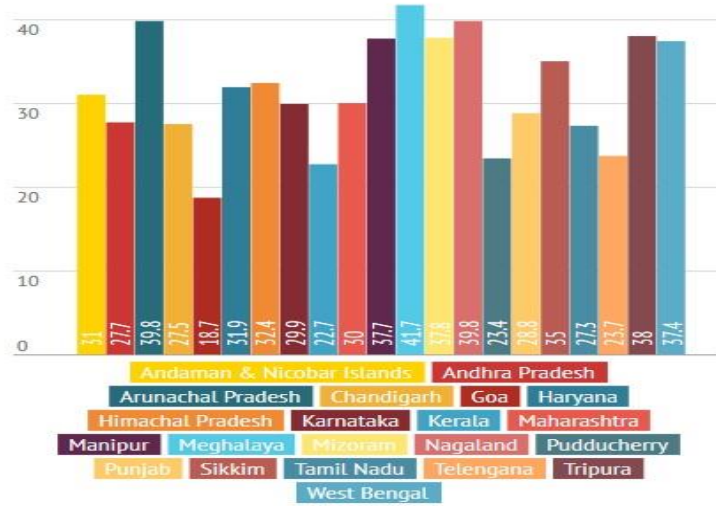
**Chart 2: Percentage of children below 5 years suffering from severe wasting in DLHS-4**



**Source:** District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

n terms of prevalence of 'moderate stunting', Meghalaya (41.7 percent) performs the worst and Goa (18.7 percent) performs the best. Except for Goa, Himachal Pradesh, Karnataka, Maharashtra, Puducherry and Telangana, the prevalence of 'moderate stunting' is higher in rural areas as compared to urban areas. The rural-urban divide is maximum in Tripura.

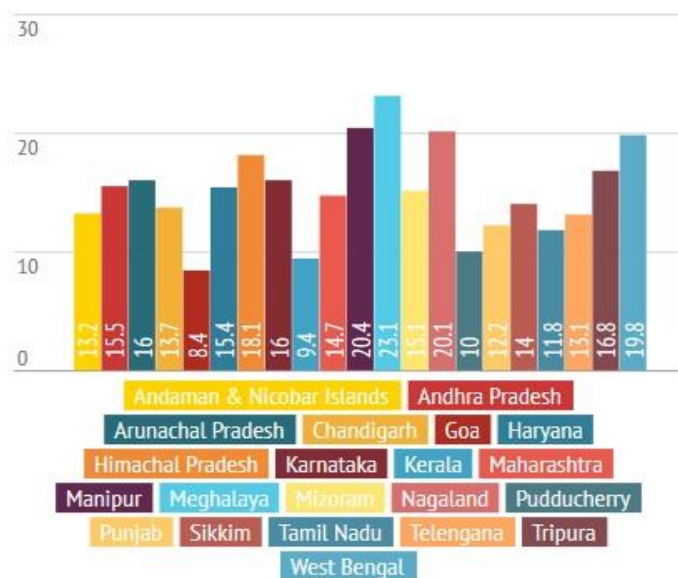
**Chart 3: Percentage of children below 5 years suffering from moderate stunting in DLHS-4**



*Source: District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>*

From chart 4, we get that the percentage of 'severe stunting' is highest in Meghalaya (23.1 percent) and lowest in Goa (8.4 percent). The prevalence of 'severe stunting' is higher in rural areas as compared to urban areas, except for Andaman and Nicobar Islands, Arunachal Pradesh, Goa, Haryana, Karnataka, Punjab, Sikkim and Telengana. The rural-urban divide is maximum in Meghalaya.

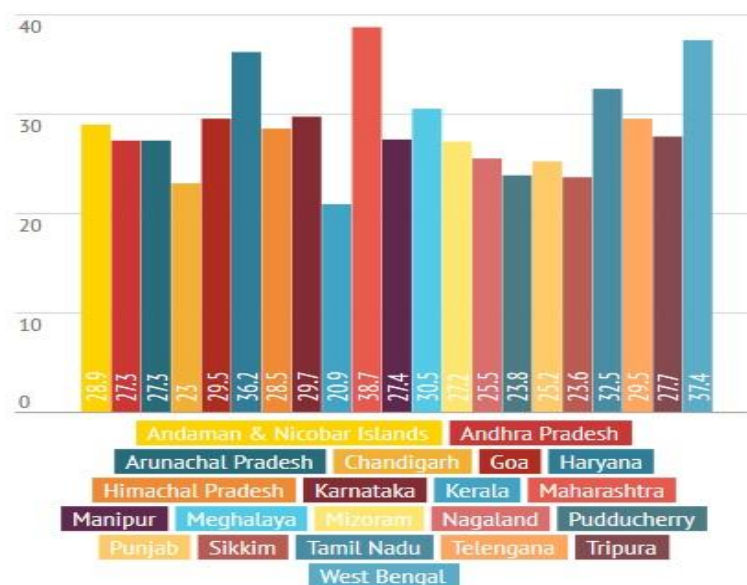
**Chart 4: Percentage of children below 5 years suffering from severe stunting in DLHS-4**



**Source:** District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

In terms of prevalence of 'moderate underweight', Maharashtra (38.7 percent) performs the worst and Kerala (20.9 percent) performs the best (see chart 5). Except for Karnataka, the prevalence of 'moderate underweight' is higher in rural areas as compared to urban areas. The rural-urban divide is maximum in Andaman and Nicobar Islands.

**Chart 5: Percentage of children below 5 years suffering from moderate underweight in DLHS-4**

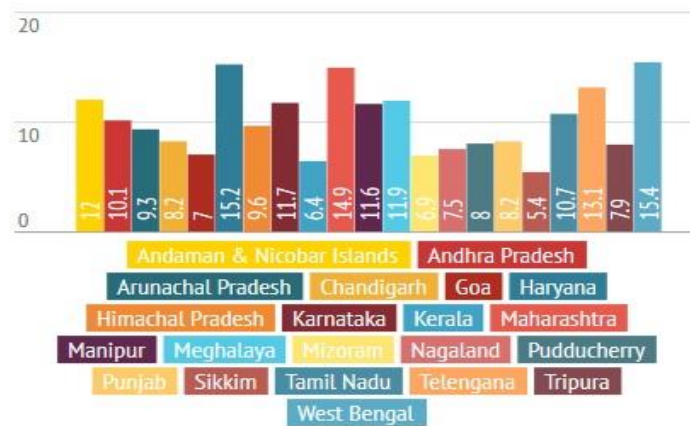


**Source:** District Level Household and Facility Survey-4 (DLHS-4) in 2012-13,

<https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

From chart 6, we get that the percentage of 'severe underweight' is highest in West Bengal (15.4 percent) and lowest in Sikkim (5.4 percent). The prevalence of 'severe underweight' is higher in rural areas as compared to urban areas, except for Goa. The rural-urban divide is maximum in Andaman and Nicobar Islands.

**Chart 6: Percentage of children below 5 years suffering from severe underweight in DLHS-4**



*Source: District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>*

**Is the undernutrition situation better in 2012-13 as compared to 2005-06?**

We find that moderate stunting among children below 5 years in Maharashtra has reduced from 46.2 percent in 2005-06 (NFHS-3) to 30 percent in 2012-13 (DLHS-4) while severe stunting came down from 19.1 percent to 14.7 percent during the same duration.

However, prevalence of moderate wasting nearly doubled and that of severe wasting quadrupled in the 7-year span for children below 5 years in Maharashtra.

Although prevalence of moderate underweight children under 5 years in the state remained almost the same between NFHS-3 and DLHS-4, those severely underweight in the same category increased slightly over the same time period in Maharashtra.

**Table 1: Comparison of NFHS-3 and DLHS-4 undernutrition data**



	Percentage of Children below 5 with Moderate Wasting		Percentage of Children below 5 with Severe Wasting		Percentage of Children below 5 with Moderate Stunting		Percentage of Children below 5 with Severe Stunting		Percentage of Children below 5 with Moderate Underweight		Percentage of Children below 5 with Severe Underweight	
	DLHS4	NFHS3	DLHS4	NFHS3	DLHS4	NFHS3	DLHS4	NFHS3	DLHS4	NFHS3	DLHS4	NFHS3
Andaman & Nicobar Islands	21.9		9.7		31		13.2		28.9		12	
Andhra Pradesh	23.7	12.2	13.5	3.5	27.7	42.7	15.5	18.7	27.3	32.5	10.1	9.9
Arunachal Pradesh	21.4	15.3	12.5	6.1	39.8	43.3	16	21.7	27.3	32.5	9.3	11.1
Chandigarh	21		8.7		27.5		13.7		23		8.2	
Goa	28.4	14.1	16.1	5.6	18.7	25.6	8.4	10.21	29.5	25.0	7	6.7
Haryana	32.3	19.1	18.6	5.0	31.9	45.7	15.4	19.4	36.2	39.7	15.2	14.2
Himachal Pradesh	21.6	19.3	10	5.5	32.4	38.6	18.1	15.99	28.5	36.5	9.6	11.4
Karnataka	26.4	17.6	13.8	5.9	29.9	43.7	16	20.54	29.7	37.6	11.7	12.8
Kerala	24.1	15.9	10.8	4.1	22.7	24.5	9.4	6.48	20.9	22.9	6.4	4.7
Maharashtra	34.1	16.5	20	5.2	30	46.2	14.7	19.06	38.7	37.0	14.9	11.9
Manipur	15.7	9.1	7.3	2.1	37.7	35.6	20.4	13.12	27.4	22.2	11.6	4.7
Meghalaya	16.7	30.7	7.6	19.9	41.7	55.2	23.1	29.82	30.5	48.8	11.9	27.6
Mizoram	18.2	9.0	6.9	3.5	37.8	39.8	15.1	17.66	27.2	19.9	6.9	5.4
Nagaland	10.8	13.3	5.2	5.2	39.8	38.8	20.1	19.24	25.5	25.1	7.5	7.1
Puducherry	24.9		13.6		23.4		10		23.8		8	
Punjab	21.1	9.2	10.1	2.2	28.8	36.6	12.2	17.3	25.2	24.9	8.2	8.0
Sikkim	13.1	9.7	6.4	3.3	35	38.3	14	17.88	23.6	19.7	5.4	4.9
Tamil Nadu	28.3	22.1	13.9	8.9	27.3	30.9	11.8	10.9	32.5	29.8	10.7	6.4
Telangana	29.5		18.3		23.7		13.1		29.5		13.1	
Tripura	16.9	24.6	6.5	8.7	38	35.7	16.8	14.71	27.7	39.5	7.9	15.7
West Bengal	28.2	16.9	15.2	4.4	37.4	44.6	19.8	17.81	37.4	38.7	15.4	11.1

**Source:** District Level Household and Facility Survey-4 (DLHS-4) in 2012-13,  
<https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

National Family Health Survey-3 (NFHS-3) in 2005-06,  
<http://www.rchiips.org/nfhs/report.shtml>

From table 1, we get that in 14 out of 17 states, percentage of children below 5 years age with moderate wasting increased between NFHS-3 and DLHS-4. Similarly, in 14 out of 17 states, percentage of children below 5 years age with severe wasting increased between NFHS-3 and DLHS-4.

In 3 out of 17 states, percentage of children below 5 years age with moderate stunting increased between NFHS-3 and DLHS-4. In 7 out of 17 states, percentage of children below 5 years age with severe stunting increased between NFHS-3 and DLHS-4.

In 8 out of 17 states, percentage of children below 5 years age with moderate underweight increased between NFHS-3 and DLHS-4. In 12 out of 17 states, percentage of children below 5 years age with severe underweight increased between NFHS-3 and DLHS-4.

### Lessons from Maharashtra

Although nothing definite can be said about reduction of malnutrition among children under the age of 5 years between NFHS-3 and DLHS-4, there are some important lessons that can be learnt from Maharashtra.

A commentary published in the Economic and Political Weekly by Sunny Jose and KS Hari (2015) informs that nutritional interventions through the Rajmata Jijau Mother-Child Health and Nutrition Mission, which began in 2005, played a crucial role in reducing the prevalence of stunting among children below 2 years in Maharashtra.

However, the decline in malnutrition levels was confined largely to children belonging to two or three age groups and while the interventions helped reduce stunting significantly, the impact was not as much on wasting and underweight children.

Jose and Hari (2015) have observed that in the 6-year span between NFHS-3 and CNS, stunting among children below 2 years belonging to the ST households declined by 25.3 percentage points: from 52.9 percent in 2005-06 to 27.6 percent in 2012.

However, stunting among children below 2 years from SC and Other Backward Caste OBC households declined by much less than among ST children. A similar trend could be observed in the case of underweight children.

In the case of wasting, the decline was highest among children from SC households.

Girls have performed better than boys (in the below 2 years group) in terms of declining stunting, wasting and underweight between 2005-06 and 2012.

Jose and Hari (2015) inform us that the nutrition and health mission of Maharashtra launched a dedicated programme to bring down child undernutrition through a menu of interconnected measures, ranging from monitoring the nutritional status of pregnant women to Infant and Young Child Feeding (IYCF) practices and vaccination, among others.

In a note given in the Global Nutrition Report 2014 of the International Food Policy Research Institute (IFPRI), Professor Lawrence Haddad from IDS Sussex has explained the following key factors that helped in reducing stunting among children under the age of 2 years in Maharashtra:

- Economic growth and poverty reduction helped in reducing malnutrition in the state. Maharashtra has a modest track record in transparency, anti-corruption efforts, and service delivery.
- Spending on nutrition doubled from a low level, and vacancies among frontline workers in the Integrated Child Development Services (ICDS) scheme dropped dramatically.
- The determinants that improved the most between the NFHS-3 and CNS surveys were the age of mother at first birth, maternal underweight, maternal literacy, coverage of antenatal visits, delivery in the presence of birth attendants, child feeding practices, and access to ICDS.
- Underlying determinants were reasonably supportive: women's decision-making status inside and outside the home was high, the Public Distribution System (PDS), which distributes subsidized food to poor people, suffered from slightly less leakage than the all-India average, and female education rates were high and rising.
- The state's Nutrition Mission was seen as a signal of high-level political commitment to nutrition improvements and helped coordinate different sectors at village and policy levels.

The Performance Audit Report No. 4 of 2015 of General and Social Sector, Government of Maharashtra by CAG has found that the percentage of girl children (aged 6 months to 6 years) who were provided supplementary nutrition for less than 25 days in the Anganwadi Centres of Maharashtra was 26.92% during 2009-14. But there has been reduction in the percentage of girls who were provided supplementary nutrition for less than 25 days between 2009-10 and 2013-14.

However, the CAG report has also found a number of irregularities in the implementation of Integrated Child Development Services (ICDS) scheme. For example, although the number of functioning Anganwadi Centres in Maharashtra rose from 95,335 in March 2012 to 97,155 in March 2014, nearly 53% of Anganwadi Centres did not have toilet facilities while 84% such centres had no electricity supply, as of March 2014.

### **Rural-urban difference in undernutrition**

Under the independent sample t-test for equality of means, the null hypothesis (for the 6 different measures of undernutrition i.e moderate wasting, severe wasting, moderate stunting, severe stunting, moderate underweight, severe underweight) is that the means for the two groups i.e. rural and urban are equal.

Under the Levene's test for equality of variances, the sub hypothesis (for the 6 different measures of undernutrition i.e moderate wasting, severe wasting, moderate stunting, severe stunting, moderate underweight, severe underweight) is that the variances for the two groups i.e. rural and urban are equal.

	<b>Rural Mean (N=21)</b>	<b>Rural S.D.</b>	<b>Urban Mean (N=21)</b>	<b>Urban S.D.</b>	<b>P value for Levene's test for equality of variances</b>	<b>P value for t-test for Equality of Means (2-tailed)</b>
Percentage of children below 5 years with Moderate Wasting	24.52	7.52	20.82	6.9	0.689>0.05	.105>0.05
Percentage of children below 5 years with Severe Wasting	13.17	5.71	10.44	4.53	0.312>0.05	0.09>0.05
Percentage of children below 5 years with Moderate Stunting	32.39	7.52	28.91	4.43	0.044<p=0.05	0.075>0.05
Percentage of children below 5 years with Severe Stunting	15.58	4.05	14.05	2.93	0.303>0.05	0.17>0.05
Percentage of children below 5 years with Moderate Underweight	30.52	4.91	24.63	5.75	0.417>0.05	0.001<p=0.01
Percentage of children below 5 years with Severe Underweight	11.12	3.38	7.76	3.26	0.756>0.05	0.002<p=0.01

**Note:** Calculated from District Level Household and Facility Survey-4 (DLHS-4) in 2012-13, <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx>

For moderate wasting, there is no significant difference in terms of variances or means between the two groups –rural and urban.

For severe wasting, there is no significant difference in terms of variances or means between the two groups –rural and urban.

For moderate stunting, there is significant difference in terms of variances but no significant difference in terms of means between the two groups –rural and urban.

For severe stunting, there is no significant difference in terms of variances or means between the two groups –rural and urban.

For moderate underweight, there is no significant difference in terms of variances but there is significant difference in terms of means between the two groups –rural and urban.

For severe underweight, there is no significant difference in terms of variances but significant difference in terms of means between the two groups – rural and urban.

### **Caveat: Data comparability**

One thing that readers must note about the DLHS-4 findings is that the data provided by it on stunting, wasting and underweight does not take into account the data from those (big) states where malnutrition levels have traditionally been higher (such as Bihar, Madhya Pradesh etc), as shown by the last three National Family Health Surveys (NFHS).

The DLHS-4 data is based on a much smaller survey (in terms of sample size) in comparison to DLHS-3. The former has covered the better performing states but left out 9 such states where most malnourished children of India are concentrated (as reported by the NFHS previous rounds).

The DLHS-3 did not provide information on the 6 measures of nutrition i.e. moderate wasting, severe wasting, moderate stunting, severe stunting, moderate underweight, severe underweight.

Of course, as many media reports have suggested, the publication of NFHS-4 would have done justice to the absence of comprehensive and comparable data since 2005-06. The report by Rema Nagarajan in The Times of India (dated: 5 April 2015) informs that data collection under NFHS-4 is still on and it might take sometime for the NFHS latest data to be available in the public domain.

### **Shortcomings of DLHS-4**

The title 'District Level Household and Facility Survey (DLHS-4)' is actually a misnomer since one cannot get the district level data on the 6 measures of undernutrition considered in the present study from the official website <https://nrhm-mis.nic.in/SitePages/DLHS-4.aspx> . One gets only the aggregated data at the state-level for these measures from DLHS-4 official website.

A news report by Rema Nagarajan in The Times of India (dated: 5 April 2015) confirms that the district

level data on various measures of undernutrition was last available in DLHS-2 during 2002-04. Various nutrition, health and food security related schemes and interventions are planned and implemented based on state-level data on undernutrition, without taking into account the large variation within a state in terms of nutrition and health.

The DLHS-4 does not provide gender disaggregated data on various measures of undernutrition considered in the present study. It also does not provide data on various measures of undernutrition among children below 5 years belonging to Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC). Therefore, it becomes difficult to check whether social background affects one's nutritional status.

The availability of DLHS-4 information in pdf format only instead of excel or comma-separated values (CSV) format makes it quite difficult for researchers to access and analyze nutrition related data.

Unlike the NFHS-3, one does not get data on various measures of nutrition birth order-wise from the DLHS-4. Therefore, it becomes difficult to say based on DLHS-4 that the nutritional status of children deteriorates with rise in their birth order i.e. the 1<sup>st</sup> child is likely to have better nutritional status than the 3<sup>rd</sup> or 4<sup>th</sup> child in a household. For example, under the NFHS-3 prevalence of moderate stunting among children below 5 years in Maharashtra stood at 53.1% with birth order 4-5 whereas the same stood at 41.1% with birth order 1.

Having said so, it needs to be mentioned that the present DLHS-4 data at the district level for the 18 states and 3 Union Territories (UTs) during 2012-13 provides information on various other measures of nutrition and health such as: mean age of marriage of women, fertility status of women, family planning, antenatal care, delivery care, child immunization, access to Janani Suraksha Yojana, child feeding practices, birth weight, anaemia status of children and women (various age groups), utilization of government health services etc. However, in the present analysis we have not considered them.

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