

Examining Inter-state Disparities in child Malnutrition in India

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Abstract—The aim of this paper is to examine the extent of disparities in malnourishment among children (particularly moderate or severe stunting) in 15 different states of India and to explain the observed inter-state differences using the data from National Family Health survey 1998-99 (NFHS-2) and 2005-06 (NFHS-3). The analysis of the magnitude and direction of the state relative measure of degree of malnourishment has clearly revealed the existence of considerable inter-state disparities. While some states like Kerala, Tamil Nadu and Sikkim have performed better in terms of child nourishment, the worst relative position is of the states like Madhya Pradesh, Bihar and Uttar Pradesh. The analysis of Pearson's correlation coefficient between the explanatory factors and malnourishment using SPSS reveals that inter-state differentials do not vary with the extent of poverty prevalent among the people of the state but factors like maternal health, education, ante-natal care, exposure to mass media and existence of sanitation facilities. Thus, there is a need to extend schemes like the Integrated Child Development Services (ICDS) to ensure the reduction of child malnourishment in India.

Keywords: Child Malnutrition, Height for Age, regional disparities, India, stunting, ICDS

1. INTRODUCTION

The Government of India calls children one of India's "supremely important assets" and makes improving child nutrition one of its major goals (UNICEF 2007). Malnutrition in infancy or childhood impairs the development of vital organs and the cognitive ability of the afflicted child as well as reducing labour productivity in adulthood (UNICEF 1997). The government's efforts notwithstanding, child malnutrition remains persistently high in India. As per the World Bank Report, India suffers significant direct and indirect economic losses due to under-nutrition with direct productivity losses estimated at more than 10 percent of lifetime individual earnings and about 2-3 percent loss of GDP. Indirect losses are due to poor mental development and schooling, and increased costs of healthcare. A study by Gragnolati et al (2006) and Shiva Kumar (2007), reveals that economic growth alone is insufficient to bring about significant reductions in the prevalence of malnourishment among children.

A marked feature of child nutrition outcomes in India and their evolution is their substantial heterogeneity across states.

The National Family Health Survey 2005 data (NFHS-3) show that stunting prevalence among under-fives ranges from 24% in Kerala to 57% in Uttar Pradesh. This paper is an attempt to explain inter-state disparities in child malnourishment. This study is carried out with three objectives in view.

- 1) To have a detailed picture of the extent of disparities in malnourishment among children in the different states of India.
- 2) To analyze the manner of change in these disparities between two points of time.
- 3) To explain the factors responsible for inter-state differences in the extent of malnourishment among children.

2. SCOPE AND METHODOLOGY

Data for this study is drawn from National Family Health Survey (NFHS) II and III which were carried out in India during 1998-99 and 2005-06 respectively. The survey collected information from a nationally representative sample of 109,041 households and 124,385 women of age 15-49 years.

There are three anthropometric measures of child nutritional status based on measurements of height and weight combined with the child's age: height for age (HFA, stunting), weight for height (WFH, wasting) and height for weight (HFW, malnutrition). Low height for age is a cumulative indicator of past and present nutritional deficiencies and therefore a good measure of long-run social conditions.

Thus, Height for age (HFA) is the most appropriate measure to use in analyzing the determinants of child nutrition. But the simple measure of HFA is not itself a useful indicator of child nutritional status. To be meaningful it has to be compared to the height and weight of a healthy, well nourished reference population as recommended by the WHO (1983). The norm is to transform HFA into z scores, ie, to standardize the measure as its deviation from the median of the reference population for that age in months and sex divided by the standard deviation from the reference population for that age and sex. According to WHO new child growth standards, children with z-scores between -2 and -3 are classified as moderately

malnourished (underweight / stunted); and those with z-scores less than -3 are classified as severely malnourished. Since our study attempts to identify the determinants of malnutrition (moderate + severe), therefore a cutoff of -2 for z-score is chosen. This means that a child is considered malnourished if his/her z-score is less than -2.

Our dependent variable is HFA- which measures the extent of malnourishment among children (% of children whose height for age z score is less than -2)

We then find the state relatives SM - for state "s" being defined as follows:

$$SM_s = 100 \times (HFA_s / HFA_n)$$

with sub-scripts s and n standing for states and the nation as a whole respectively.

To facilitate the analysis, the possible explanatory variables considered are state's income, maternal education, maternal health, sanitation facilities, exposure to mass media: **BPL**- Percentage of people below the poverty line as estimated by the planning commission. It is an indicator of the level of living of the people in a state which might affect the health of children; **WIL** = percentage of women respondents between the ages 15 and 49 years with no education; **EMM** = percentage of women aged between 15 and 49 years not exposed to radio, TV or newspapers at least once a week; **MED**= median age at first birth for women aged 25-49 years; **BMI** = percentage of ever married women between the ages 15 and 49 years, whose body mass index was below normal; **ANC** = percentage of mothers who received antenatal care; **SAN**= percentage of households with sanitation facilities; **BRF**- percentage of children under 3 years breastfed within one hour of birth.

The data for BPL is obtained from planning commission and rest was available from NFHS data.

3. RESULTS:

Table 1 gives the values of SM for the 15 states of India in years 1998-99 and 2005-06. It also gives the percentage change in SM in each state between the two points of time.

Table 1

	Height for Age (%)	Value of SM	Height for Age	Value of SM	% Change
	NFHS - 2005-06	NFHS- 2005-06	NFHS 1998-99	NFHS 1998-99	in SM
HARYANA	45.7	95.21	50	109.89	-13.3
PUNJAB	36.7	76.46	39.2	86.15	-11.2
RAJASTHAN	43.7	91.04	52	114.28	-20.3
MADHYA PRADESH	50	104.17	51	112.09	-7.1

UTTAR PRADESH	56.8	118.33	55.5	121.98	-2.9
BIHAR	55.6	115.83	53.7	118.02	-1.8
ORISSA	45	93.75	44	96.7	-3.1
WEST BENGAL	44.6	92.92	41.5	91.21	1.9
MANIPUR	35.6	74.17	31.3	68.79	7.8
SIKKIM	38.3	79.79	31.7	69.67	14.5
GUJARAT	51.7	107.71	43.6	95.82	12.4
MAHARASHTRA	46.3	96.46	39.9	87.69	10
ANDHRA PRADESH	42.7	88.96	38.6	84.83	4.9
KERELA	24.5	51.04	21.9	48.13	6
TAMIL NADU	30.9	64.38	29.4	64.62	-0.4

Kerala is the better off among the Indian states in terms of child nourishment in the year 1998-99 and 2005-06. The percentage of malnourished children in the state in 1998-99 and 2005-06 is almost half that for the nation as a whole. The worst relative position in terms of child nourishment in 1998-99 is that of Uttar Pradesh where the percentage of malnourished children is 22 per cent more than that for India as a whole. Uttar Pradesh, Bihar, Madhya Pradesh are the states with values of SM higher than 100 and are thus worse off than the nation as a whole in 1998-99 as well as 2005-06. Largest relative deterioration in malnutrition between 1998-99 and 2005-06 has taken place in Sikkim, closely followed by Gujarat. The biggest improvement in the relative position took place in Rajasthan with Haryana on its heels.

Table 2

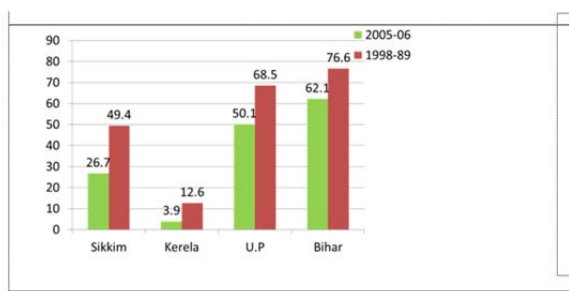
Coefficient of	1998-99	2005-06
Correlation of HAZ		
BPL	0.49 (0.064)	0.49 (0.064)
WIL	0.852** (0.000)	0.788** (0.000)
EMM	0.850** (0.000)	0.798** (0.000)
MED	-(0.683)** (0.005)	-(0.728)** (0.002)
BMI	-(0.6) (0.018)	-(0.795)** (0.000)
ANC	-(0.802)** (0.000)	-(0.754)** (0.001)
SAN	-(0.754)** (0.001)	-(0.677)** (0.006)
BRF	-(0.828)** (0.000)	-(0.653)** (0.008)

The coefficients of correlation of HAZ, the extent of child malnourishment, with the possible explanatory variables considered, are given in Table 2. The signs of the coefficients are along expected lines. While prevalence of poverty, illiteracy of women and exposure to mass media have positive correlation with degree of malnourishment among children,

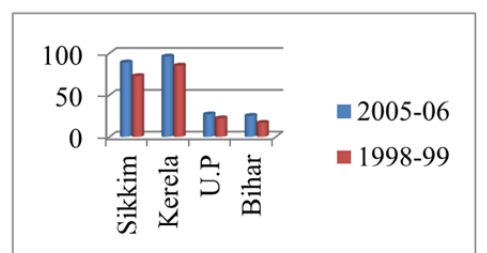
reverse is true when breast feeding starts early; when age of first birth increases; the mothers are healthy in terms of body mass index; households have access to sanitation facilities and mothers receive antenatal care. But if we consider the magnitude and significance of the coefficients, some interesting facts also come to light. The highest value of the coefficient of correlation with HAZ is not for BPL, with the coefficient not being significant in 1998-99 and 2005-06. Of all the variables considered, WIL(Women illiteracy)and EMM (Exposure to Mass Media) are the variables that have significant coefficient of correlation.

This detailed state-wise analysis of the prevalence of child malnourishment in India has clearly revealed the existence of considerable inter-state disparities. While states like Kerala, Tamil Nadu and Sikkim are better off than other states, the less economically developed regions like Uttar Pradesh, Bihar and Madhya Pradesh have worst relative position. This is bound to stand in the way of sustainable development of the nation. It does not seem, from the analysis that reduction of poverty per se would automatically lead to a reduction in the extent of malnourishment among children. This is hardly surprising because the study has shown that factors other than poverty like the age of women at first child birth, prevalence of early breast feeding of children, education, access to sanitation facilities and awareness among women about factors affecting health, which are being increasingly recognised as having a strong impact on child malnourishment, are important in this regard at the regional level.

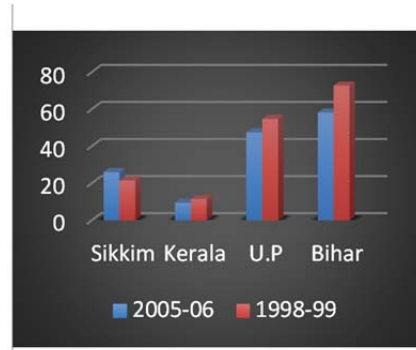
4. GRAPHICAL REPRESENTATION OF FACTORS INFLUENCING INTERSTATE DISPARITIES:



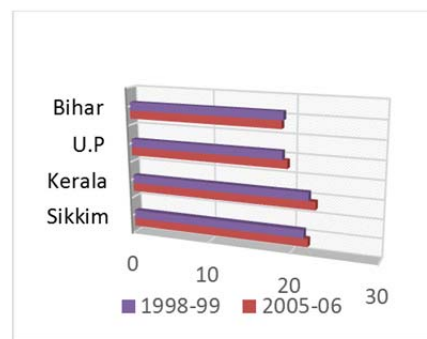
Graph 1: Illiteracy of women across states



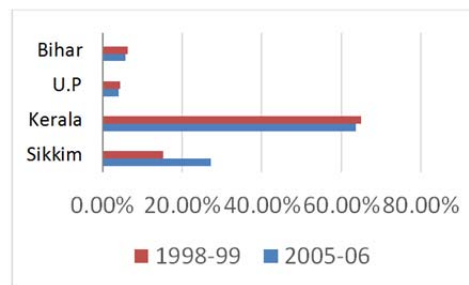
Graph 2: Sanitation across States



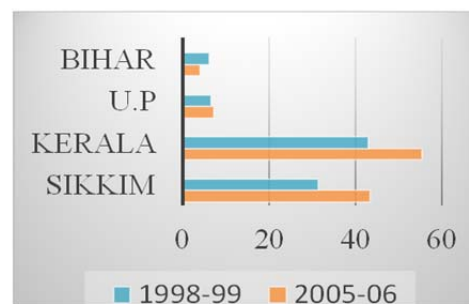
Graph 3: Lack of Exposure to mass media



Graph 4: Age of Mother at time of first birth



Graph 5: Ante-natal care across states



Graph 6: Breastfed children across States

Source of Graphs: Authors analysis of NFHS data

The graphs clearly show that states – Sikkim and Kerala in comparison to Bihar and UP have low rates of women illiteracy, have more access to sanitation facilities, more exposure to mass media, median age of mothers is higher, receive ante-natal care and more percentage of children are breastfed, thus have low degree of child malnutrition.

5. POLICIES IMPLEMENTED TO REDUCE INTER-STATE DISPARITIES:

The Government has accorded high priority to the issue of malnutrition in the country and is implementing several schemes/programmes under different Ministries/Departments through State Governments/UT Administrations. The schemes/programmes include the Integrated Child Development Services (ICDS), National Health Mission (NHM), Mid-Day Meal Scheme, Rajiv Gandhi Schemes for Empowerment of Adolescent Girls (RGSEAG) namely SABLA, Indira Gandhi Matritva Sahyog Yojna (IGMSY) as direct targeted interventions. Besides, indirect Multi-sectoral interventions include Targeted Public Distribution System (TPDS), National Horticulture Mission, National Food Security Mission, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swachh Bharat Abhiyan, National Rural Drinking Water Programme etc. All these schemes address one or other aspect of nutrition.

The specific interventions are targeted towards the vulnerable groups include children below 6 years. The main schemes/programmes of Ministry of Women and Child Development which have a bearing on the nutritional status

includes the Integrated Child Development Services (ICDS) Scheme which provides a package of six services namely supplementary nutrition, pre-school non-formal education, nutrition & health education, immunization, health check-up and referral services.

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