# Beyond the Great Indian Nutrition Debate

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Taking on the argument that malnutrition in India is caused by forces that respond only partially to policy interventions, this article points out that it is important to look at the role of disease conditions – shaped by inadequate water, poor sanitation, and insufficient public health measures – in poor nutrition. Moreover, the relationship between disease and food intake is multiplicative rather than additive, and omission of disease conditions from the discourse biases any arguments made about income, caloric intake and nutrition. A holistic view shows that there is room to hope that the nutritional status of children in India will improve with the right policy emphasis.

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With Arvind Panagariya's "Does India Really Suffer from Worse Child Malnutrition Than Sub-Saharan Africa?" (EPW, 4 May 2013) a great Indian nutrition debate appears to have begun, which may well echo the great Indian poverty debate that occupied many pages earlier, and seems to recur periodically (Deaton and Kozel 2005). It is our contention that indulging in a standards debate at a time when the nation seems ready to leap into a massive food security programme, via the National Food Security Act (NFSA), will draw attention away from important policy questions.

Panagariya's article contains deep scepticism about calls to address malnutrition. The scepticism seems to arise from two claims. First, that malnutrition estimates are exaggerated; and, second, that malnutrition is caused by forces that respond only partially to policy interventions (Panagariya 2013). He argues that malnutrition estimates are invalid since international standards of height and weight are not applicable to India and ends with a call to develop indigenous standards for anthropometric outcomes. This argument has been made before. Beginning with a large study undertaken by the Indian Council of Medical Research (ICMR) in 1956, calls to develop indigenous standards have emerged time and again. However, these efforts have floundered due to the difficulty of using an appropriate reference population in an era when the nutritional profile of the nation is changing (for a discussion of the benefits and challenges of local versus international anthropometric standards (Onis and Yip 1996). For the present, however, it suffices to say that while calculating appropriate national standards for height and weight may provide an occupation for an army of epidemiologists, it is not very relevant when it comes to developing policies to address malnutrition in India. Even if malnutrition rates are overestimated by as much as 20%, India is still home to a staggering number of undernourished children.

Panagariya's second line of attack, however, deserves greater empirical investigation. He suggests that any malnutrition is attributable to three processes through which nutritional outcomes are shaped – food intake; inheritability of poor nutrition across generations; and genetic predisposition towards a shorter stature. While the first is a function of household income and food prices, and can be seen as a function of public policy, the other two are beyond the reach of public policy, at least in the medium term. Consequently, the larger the component of malnutrition that can be attributed to the latter two processes, the lower the need for aggressive policy interventions.

So we need to ask ourselves, when it comes to addressing malnutrition, how large is the role of factors that are amenable to policy intervention vis-à-vis those that are exogenous? In particular, two issues deserve attention. First, whether the list of determinants of

nutrition identified by Panagariya is exhaustive. Second, whether omission of some of the determinants of malnutrition influences the relationship between food intake and nutrition. We argue that for a holistic understanding of malnutrition challenges, it is important to look at the role of disease conditions shaped by water and sanitation, and public health measures. Moreover, the relationship between disease and food intake is multiplicative rather than additive, and omission of disease conditions from the discourse biases any arguments made about income, caloric intake and nutrition. This is of particular importance in a society undergoing rapid transformation where a variety of determinants of nutritional status are changing simultaneously.

## Between 1992-93 and 2005-06

A re-examination of the National Family Health Surveys (NFHS) 1 and 3, conducted in 1992-93 and 2005-06, respectively, is helpful in understanding the contours of malnutrition among Indian children. Given the critiques advanced by Panagariya, in our initial discussion of NFHS data, we present both raw height and weight data as well as rates of stunting and underweight based on National Centre for Health Statistics (NCHS) standards that result in lower rates of malnutrition than the revised World Health Organisation (WHO) standards (however, use of WHO standards provides a similar pattern). While the standardised measures take into account age and sex variation in height and weight, raw data on height and weight does not. Hence, in presenting raw height and weight, the results are shown separately for boys and girls.

Figures 1 and 2 plot median heights for boys and girls separately, comparing growth in height between 0 and 36 months for the NCHS reference population and sample of children from NFHS-1 and NFHS-3. The results are quite instructive. Median heights between these three populations hardly vary until around six months of age and then the lines diverge sharply. This suggests that pre-birth differences in these populations are relatively minor. However, differences begin to emerge at an age where children

**Figure 1: Comparison of Median Heights between NCHS Reference Population, NHFS-I and NFHS-III for Boys**

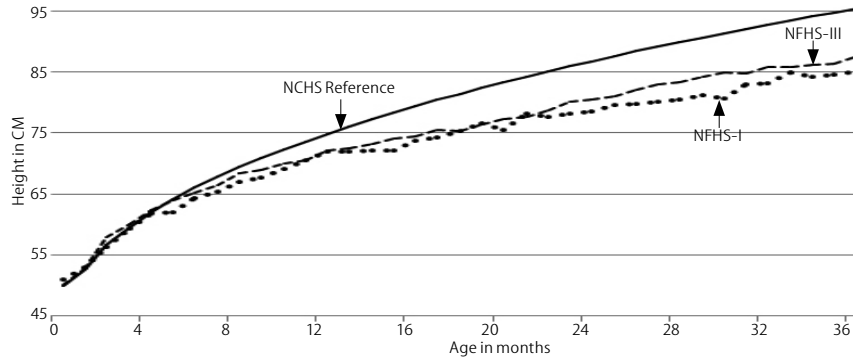
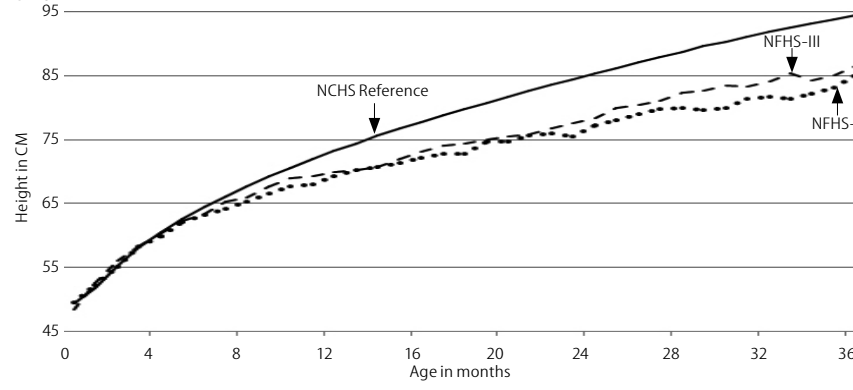



**Figure 2: Comparison of Median Heights between NCHS Reference Population, NHFS-I and NFHS-III for Girls**




start supplemental feeding. It seems likely that either the quality or the quantity of supplemental food is not adequate or that supplemental food increases children's susceptibility to diseases, particularly gastrointestinal diseases, which retard growth, an issue to which we return.

We see this pattern of increasing under-nutrition with age repeated for other anthropometric measures, including standardised measures of stunting and underweight. Table 1 shows that the percentage of children who are stunted or underweight rises sharply in the second year of life, when few children solely rely on breast milk for nourishment. Interestingly, improvement in nutrition between 1992-93 and 2005-06 has taken place mostly at 12 months and above, especially for height. This suggests a greater role of post-birth factors than genetic factors or intergenerational inheritance. However, this observation still leaves us with two potential drivers of malnutrition – calorie intake or food diversity, and disease prevalence. A wide range of the literature suggests that both these forces shape malnutrition and often act together. An examination of changes in nutrition for different income groups

**Table 1: Height, Weight, Stunting and Underweight in Children Ages 0-4 for NHFS-1 and NFHS-3**

| Age in | Height in Cm | | | Weight in Kg | | | Stunted (<2 SD) | | | Underweight (<2 SD) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boys | | | Boys | | | Boys (%) | | Percentage | Boys (%) | | Percentage |
| | 1992-93 | 2005-06 | Change (Cm) | 1992-93 | 2005-06 | Change (Kg) | 1992-93 | 2005-06 | Point Change | 1992-93 | 2005-06 | Point Change |
| Boys | | | | | | | | | | | | |
| < 12 | 62.2 | 63.6 | 1.5 | 6.1 | 6.4 | 0.3 | 18 | 11 | 7 | 27 | 19 | 8 |
| 12-13 | 74.3 | 75.6 | 1.3 | 8.5 | 8.9 | 0.4 | 47 | 36 | 10 | 57 | 50 | 7 |
| 24-35 | 81.4 | 84.1 | 2.8 | 10.3 | 10.7 | 0.3 | 58 | 46 | 12 | 59 | 42 | 17 |
| 36-48 | 87.8 | 90.9 | 3.1 | 11.9 | 12.2 | 0.3 | 62 | 44 | 18 | 66 | 47 | 19 |
| Girls | | | | | | | | | | | | |
| < 12 | 60.9 | 62.0 | 1.1 | 5.7 | 5.9 | 0.2 | 14 | 10 | 4 | 23 | 18 | 5 |
| 12-13 | 72.4 | 74.0 | 1.5 | 8.0 | 8.2 | 0.2 | 42 | 35 | 7 | 56 | 54 | 3 |
| 24-25 | 80.0 | 82.6 | 2.6 | 9.8 | 10.1 | 0.3 | 62 | 52 | 10 | 62 | 46 | 16 |
| 36-48 | 86.6 | 89.7 | 3.0 | 11.4 | 11.8 | 0.4 | 64 | 48 | 17 | 68 | 51 | 17 |

Stunting and underweight calculated using NCHS standards.

provides an interesting vantage point from which to evaluate this synergy.

### New Inequalities, New Opportunities

Table 2 documents changes in the prevalence of stunting and underweight separately for the five wealth quintiles during the two NHFS surveys. These wealth quintiles are summary statistics computed using ownership of a variety of consumer durables as well as housing conditions. The results show that while each of the outcomes improved between NHFS-1 and NHFS-3, the improvement is far greater for richer households than for poorer households. Whereas the proportion of children stunted in the bottom quintile went from 60% in 1992-93 to 53% in 2005-06, the corresponding drop was from 35% to 21% for the top quintile. The difference is even starker for the proportion who were underweight, where almost all the improvements are concentrated in upper-income groups. As a result, the gap in being stunted and underweight between different economic groups has increased over time.

**Table 2: Changes in Proportion Stunted and Underweight between 1992-93 and 2005-06 by Wealth Quintile** (%)

| Age | 1st Quintile | | 2nd Quintile | | 3rd Quintile | | 4th Quintile | | Top Quintile | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1992-93 | 2005-06 | 1992-93 | 2005-06 | 1992-93 | 2005-06 | 1992-93 | 2005-06 | 1992-93 | 2005-06 |
| Proportion stunted | | | | | | | | | | |
| < 12 | 32 | 24 | 28 | 22 | 25 | 19 | 22 | 14 | 15 | 10 |
| 13-23 | 65 | 65 | 64 | 56 | 59 | 54 | 52 | 46 | 38 | 28 |
| 24-35 | 71 | 59 | 69 | 53 | 62 | 41 | 57 | 34 | 40 | 18 |
| 36-48 | 75 | 62 | 74 | 54 | 72 | 50 | 63 | 41 | 45 | 24 |
| All ages | 60 | 53 | 59 | 47 | 55 | 42 | 48 | 34 | 35 | 21 |
| Proportion underweight | | | | | | | | | | |
| < 12 | 39 | 35 | 36 | 30 | 32 | 22 | 25 | 17 | 18 | 11 |
| 13-23 | 73 | 74 | 73 | 62 | 70 | 57 | 57 | 47 | 42 | 31 |
| 24-35 | 70 | 70 | 72 | 64 | 68 | 52 | 59 | 46 | 42 | 30 |
| 36-48 | 66 | 65 | 67 | 56 | 63 | 52 | 54 | 44 | 40 | 29 |
| All ages | 62 | 61 | 61 | 54 | 58 | 46 | 49 | 39 | 35 | 26 |

We should not see these increasing wealth inequalities in nutrition as a cause for concern but as an opportunity. For the wealthiest quintile, we have seen a 40% decline in stunting and a 27% decline in being underweight over a period of 13 years. This is quite an achievement, and it suggests that there is no reason for us to settle for slow improvement in nutrition – either because we think that Indians are genetically doomed to have a shorter stature or because of the need for catching up over several generations. At the same time, we need a better understanding of the causes of this differential improvement for upper-income households.

Much of the discussion regarding the relationship between wealth and nutritional outcomes in India took place following the publication of NFHS-1 results where the lack of correlation between the two was particularly striking. Since then, while moderate improvement in malnutrition has been recognised, little attention has been

paid to the subgroups for which this decline has taken place.

The paradox of rising overall incomes without proportional decrease in malnutrition has given rise to strident debates on the nature of Indian economic growth (Deaton and Drèze 2009; Patnaik 2010). However, Indian evidence as well as international studies suggest a far weaker link between income and undernutrition than one might expect (Deaton 2008; Haddad et al 2003; Nair 2007). This weak correlation between household incomes has been interpreted from two diametrically opposite perspectives.

The first interpretation, reflected in the article by Panagariya, uses this lack of correlation to suggest that estimates of under-nutrition in India are inflated and, consequently, even rich households contain children who are classified as "malnourished" using international standards but may well be perfectly healthy if appropriate Indian standards are used.

The second interpretation suggests that income may be less important for shaping nutritional outcomes than the disease environment (Burger and Esry 1995). According to this argument, poor quality water and sanitation leads to a high prevalence of diseases like diarrhoea, which in turn retards food absorption and affects nutritional outcomes. Since the disease climate is a function of broader environmental conditions, it affects both the rich and the poor, and weakens the benefits of income and associated ability to buy more food of higher quality.

So where do the results presented in Table 2 fit in this discussion? Why was the relationship between wealth and nutritional outcomes relatively flat in 1992-93 and why did it become stronger in 2005-06? To explore this, we need to understand the way in which the disease environment is structured in India.

## Geography as Destiny?

The disease environment in India is deeply rooted in geography. Past research on different indicators of human development notes that inequalities in human development are arrayed against two axes – one reflects household background, such as caste, religion, education and income; the other reflects the characteristics of the area the respondents live in, as characterised by urban or rural residence, level of infrastructure development, and state of residence. While both sets of inequalities are reflected in most indicators of human development, their relative importance varies. When examining health outcomes and healthcare, it is striking how regional inequalities dwarf inequalities in household background. A poor, illiterate dalit labourer in Kochi or Chennai is less likely to suffer from short- and long-term illnesses and has greater access to medical care than a college-educated, forward-caste, large landowner in rural Uttar Pradesh. Social inequalities matter, but their importance is overwhelmed by state and rural-urban differences (Desai et al 2010: 97). The disease environment also varies from community to community. Proximity to a dirty pond in one village in Uttar Pradesh may lead to high rates of diarrhoea, while another village in the same district may not suffer in the same way.

Research in a variety of countries has found that gastrointestinal diseases associated with inadequate access to water and sanitation systems are implicated in aggravating malnutrition, particularly among children (Burger and Esry 1995). Only 25% of Indian households have access to indoor piped water and, of that, barely 37% have uninterrupted water supply for at least three hours per day. Only 23% have access to a flush toilet (Desai et al 2010). Nearly half of India's households have no access to toilets and engage in public defecation. Dismal as these statistics are, there has been substantial improvement in sanitation over time, particularly in access to flush toilets. Census 2011 lists about 36% households with water closets, compared to only 18% in 2001. One would also expect some improvement in disease conditions with an increased availability of toilets.

The role of the disease environment is one of the prime reasons why the income effects on nutrition may be overshadowed by neighbourhood effects. Research on access to water and sanitation documents that rich households buy more consumer durables, have better homes, and are more likely to invest in household amenities. However, a household's own wealth is often not enough to obtain access to many amenities. Many amenities are provided by the state. Households can build a flush toilet if a sewage system connection is available; if they need to build a whole septic system, the cost may be considerably higher (Desai et al 2010). Moreover the spillover effects of the disease environment are such that having a toilet in the household is of little use if neighbours do not have access to a toilet and diseases spread through contamination and flies.

Hence, it is important to examine whether increasing linkages between income and nutrition are accompanied by a declining correlation between geography and nutrition. If our expectation that the disease environment overrides the income-nutrition linkage is correct, in situations where income is increasingly important in shaping nutritional outcomes, geographic clustering of under-nutrition should decline. In Table 3 we examine variance in stunting within and across communities using the two NFHS surveys to see if this pattern applies.

**Table 3: Decomposition of Variance across Communities and States for NFHS 1 and NFHS 3**

| | Height-for-Age Standardised Score | | Weight-for-Age Standardised Score | |
|---|---|---|---|---|
| | 1992-93 | 2005-06 | 1992-93 | 2005-06 |
| Across state variance | 0.039 | 0.028 | 0.057 | 0.056 |
| Variance across villages/urban blocks | 0.174 | 0.106 | 0.189 | 0.149 |

This three-level analysis based on a hierarchical linear model, estimated using XTMIXED routine in STATA, partitions the variance in standardised scores for height-for-age and weight-for-age in three categories, within villages or urban blocks, across villages or urban blocks, and between states.

The results presented in Table 3, indicate a declining role of geography in shaping nutritional outcomes, particularly in height-for-age. After controlling for age and gender of the child, in 1992-93, 4% of the variance in height-for-age is explained by state-level variation and

about 17% is explained by inclusion of the random effect for villages or urban blocks. By 2005-06, the across-state variance declined to 2% and community-level variance declined to 11%. The decline in community-level variance in weight-for-age is somewhat smaller, from 19% to 15%, but this is consistent with slower growth in weight of the richest quintile in Table 2.

These results present an intriguing opportunity for improving nutritional outcomes. If the dominance of the disease climate is declining, which is likely to accelerate given the policy emphasis on sanitation in recent years, and the role of household wealth and associated food availability is increasing, and we are able to see the effect of these changes on the nutritional status of children from wealthy households, there is cause for hope that these gains can be extended to poorer households. If the nutritional security of poor households can be ensured through the NFSA, we can hope to see a faster decline in malnutrition among them. Without it, we may be entering an era of increasing nutritional inequality.

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