Are Child Malnutrition Figures for India Exaggerated?

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In his paper Arvind Panagariya argues that the current World Health Organisation (WHO)-recommended international growth standards exaggerate the extent of stunting in India. He points out that while the prevalence of stunting by current norms is higher in India than many poorer Sub-Saharan African countries, it has much lower mortality rates than them and a better record of economic growth. He deals his cards deftly, giving examples of Japan, Singapore, the US, Germany, Netherlands, Chad, Nigeria and Sub-Saharan Africa. In short, countries from all corners of the world, and data on heights, all in pursuit of just one agenda to say India's figures for malnutrition cannot be so high.

Panagariya argues that the child malnutrition estimates of India are based on a flawed measurement methodology which need correction. With this aim, he painstakingly builds a case for generating national nutrition standards for heights and weights (as opposed to the present WHO standards). Armed with the "logic" of an economist, he uses numbers such as rates, proportions, and percentages selectively to drive home the point that the Indian story of malnutrition needs to be recast and retold.

Our response attempts to go beyond numbers, and get to the root of the problem of hunger and malnutrition, and highlights the complexity of relationships that produce "stunted bodies" in India. As we understand it, low weights and heights, which are associated with malnutrition and hunger, are a result of multiple factors. These include structural factors such as poverty; low status of women; poor public programmes that result in distal and proximal factors like the inability of households to buy adequate quantity and quality of food; sub-optimal breastfeeding; inadequate frequency of infant and child feeding; and poor quality and low calorie density at each feed. Poor health of mothers during pregnancy results in low birth weights of about 30% of babies in India. Repeated infections, non-availability of safe drinking water, and poor sanitation are some of the factors that keep the cycle of malnutrition alive. Instead of investigating the ground realities of the lives of the poor and marginalised in relation to each of these, Panagariya (2013) simplistically reduces malnutrition to a phenomenon that can be done away with by changing the standards by which it is measured.

Panagariya's primary source of anxiety is that he is not able to draw a linear relationship between "successful" economic reforms in India and reduction of malnutrition. The other side of India's story – one of continuing widespread poverty, increasing inequality, the lack of commensurate improvements in health and education, and a complete lack of sanitation facilities – is ignored. What perhaps need a relook is not so much the malnutrition standards, but the "growth" story itself. Instead, Panagariya advocates an overhaul of the discipline of nutrition, which has stood the test of time, and warns the nation of impending famine based on measurements of heights, weights, and diet surveys, year after year. In doing so, he selectively uses published data to prove his point and ignores large data sets that do not support his argument, such as National Nutrition Monitoring Bureau (NNMB) reports.

Before going into details, it must be mentioned that the WHO standards do take into account differences that might exist in populations from different regions. This was precisely one of the reasons for shifting from the previous National Centre for Health Statistics (NCHS) standards that were based on measurements of the US population. It was soon

realised that children in the US sample had been bottle-fed, and may have gained weight disproportionately. The WHO has tried to set this right by considering children from six countries, including India, making sure that they were entirely breastfed for the first five months. Interestingly, the new standards show that the weights are slightly lower, but heights are better.

Heights, Weights, and Mortality Relationships: One of Panagariya's central arguments is that Indian malnutrition figures are much higher than would be expected, given its child and infant mortality levels. This he shows using data related to every conceivable parameter such as life expectancy, neonatal mortality rates, and infant, child, and maternal mortality rates, very often out of context, and attempting to shock readers into rethinking India's performance on nutrition.

However, it is important to note that not all under-nutrition leads to death. Death is dependent on many factors such as the nature and duration of illness before a child dies, and access to healthcare and health facilities, especially emergency care. Public health measures such as the state of immunisation, and water supply are also important. It is an unfortunate truth that while curative care in India does not address the problem of malnutrition, it does save malnourished children if they land up at a hospital in time. In his article, Panagariya does not appreciate the importance of medical facilities in explaining better mortality figures. Surely he knows that India is a nation in transition, with poor food intake and widespread hunger on the one hand, and relatively well-established healthcare services, especially emergency care, on the other.

Problem of Scarce Resources and Childhood Obesity: The danger of overstating under-nutrition, according to Panagariya, is twofold. One is that disproportionate resources get allocated to tackling the problem (Panagariya 2013: 99). Two, he is worried that classifying children who are "normal" in the undernourished category will result in overfeeding them and hence obesity (ibid).

First, it is surprising that in a turnaround from his assertion that India shines, he talks of allocating scarce resources among competing social objectives in a "poor" country. Second, he once again betrays his simplistic understanding of the relation between food intake and nutrition outcomes. A misclassified healthy, well-fed child (if such a category exists in rural areas) does not put on weight easily. She uses the "extra" energy to play, invent games with sticks and stones, take care of domestic animals, and may be run errands for her mother. These activities use up a lot of energy, but are a desirable part of growing up if children are to develop well-rounded personalities. All these activities need energy, which comes from food. Children, even when they are undernourished, do not give up on activity. They may be underweight and hungry, but continue their search for new experiences. Children give up on activity only when they fall ill, and are on the downward slope to severe malnutrition. It is the hopes of these children that will be betrayed if they are denied more food because of the fear of causing obesity.

By making such flimsy arguments, Panagariya exposes his ignorance of India's vast countryside. While the obesity he talks of is a result of a myopic view from Delhi, it is also true that obesity among the undernourished merits another write-up. Such obesity is caused primarily because there is excess intake of carbohydrates and nothing else (mostly because people cannot afford diverse foods). But we will leave that for another day.

Identifying the Malnourished: Medical Problem or Inadequate Food Intake? Panagariya claims that the current enhanced interest in anthropometry (and therefore measuring heights and weights) is a fallout of the Millennium Development Goals (MDGs) and the WHO's international growth standards, and also because it is easy and simple to measure without any specialised skills. Such an argument undermines decades of research in India and outside that has shown heights and weights to be good indicators of nutrition status, which he does not refer to at all. Measuring heights and weights is not new, and the NNMB in India has been measuring populations for their nutrition status since the 1970s, and this includes heights and weights (NNMB 1974-present).

Panagariya suggests a classification of malnutrition into two as if the categories are mutually exclusive.

> Malnutrition…may be divided into protein energy malnutrition and micronutrient deficiency. The former manifests itself most prominently in poor gains in height, weight…and micronutrient deficiency results from inadequate levels of iron, folate, iodine, and various vitamins, including A, B6, D, and E, in the body. These deficiencies lead to anaemia, goitre, bone deformities, and night blindness (ibid).

There are multiple problems with this kind of classification. For one, it does not serve Panagariya's purpose of showing smaller malnutrition numbers. He argues that instead of heights and weights, medical check-ups must be done to determine whether a child is malnourished or not (ibid). A medical check-up would presumably identify "micronutrient deficiency". Panagariya would be disappointed to know that a medical examination will only show that more than 70% of children are anaemic, more than 50%-60% have serum Vitamin A levels below the acceptable cut-off level of 20ug/dl (NNMB 2005), and many have one or more vitamin B complex deficiency.

Diet surveys, that is, recording details of all foods eaten by children and calculating the nutrients present in these foods, provide a more detailed picture of food adequacy and possible reasons for malnutrition. For example, sample results from a diet survey are given in Tables 1a and 1b (p 75). They show that children (one-three years) from tribal areas are not just calorie and protein deficient, but also deficient in every nutrient. The little food they get provides only 675 kilocalories when compared to their requirement of 1,240 kcals, and even this is largely cereal (more than 70% of calories come from carbohydrates) with negligible amounts of protective foods such as milk, eggs, and fruits. As a result they consume less than 50% of their requirement of most nutrients.

It is therefore not possible to classify protein and calorie deficiency or micronutrient deficiency into compartments as suggested by Panagariya. This classification is neither physiologically identifiable

Table 1a: Average Intake of Foods (Grams/Day) among Children 1-3 Years

Foods	Recommended Dietary Intake (RDI)	Actual Intake	Intake as % of RDI
Cereals and millets	175	149	85
Pulses and legumes	35	15.5	44.3
Green leafy vegetables	40	9.8	24.5
Other vegetables	20	15.1	75
Roots and tubers	10	17.2	>100
Nuts and oilseeds	Nil	2.0	NA
Condiments and spices	Nil	4.8	NA
Fruits	Nil	9.5	NA
Fish and flesh foods	Nil	3.6	NA
Milk and milk products	300	16.6	5.4
Fats and oils	15	4.3	28.7
Sugar and jaggery	30	5.7	19
Eggs	Nil	–	NA

Nil - There is no RDI for these foods; NA - not applicable. All nutrients, even for children, were to be derived from cheap foods.
Source: NNMB (2009).

Table 1b: Average Intake of Nutrients a Day among Children 1-3 Years

Nutrient	RDI	Intake	Intake as % of RDI
Protein (g)	22	16.8	76.4
Total fat (g)	27	7.1	26.3
Energy (kcals)	1,240	675.0	54.4
Calcium (mg)	400	95.0	23.8
Iron (mg)	12	3.8	31.7
Vitamin A (ug)	400	32.3	8.1
Thiamin (mg)	0.6	0.4	66.7
Riboflavin (mg)	0.7	0.2	28.6
Niacin (mg)	8.0	4.9	61.3
Vitamin C (mg)	40	7.2	18.0
Folic acid (ug)	80	16.3	< 20

Source: NNMB (2009).

nor practically useful for the rehabilitation of a person. It is important to state that malnutrition results from insufficient food intake, which makes the child deficient in all nutrients such as proteins, calories, multiple vitamins, and minerals (the so-called micronutrients). Nutrient deficiencies very rarely exist in isolation. The only solution is to make sure that people get their calories and proteins from diverse sources (or all the food groups) – cereals such as rice, wheat and millets, pulses, oils, potatoes, fruits such as bananas, fresh vegetables, milk, eggs, nuts, meat, and so on. It is easy to understand how each of these foods, while providing calories and proteins, also contributes vitamins and minerals. Of course some foods have more of one nutrient than the other. An important publication of the National Institute of Nutrition (NIN), *Nutrient Requirements and Recommended Dietary Allowances for Indians* (2010), categorically states:

> Humans need a wide range of nutrients to lead a healthy and active life. The required nutrients for different physiological groups can only be derived from a variety of foods. Components of the diet must be chosen judiciously to provide all the nutrients.

It is laughable that a child who gets only 16.6 millilitres of milk a day on average can be called merely calcium deficient (a cup of tea in India usually contains 75-100 ml of milk) or a child who gets 9.8 gm of green leafy vegetables is called merely vitamin A deficient (Table 1a). This child with a weight of about 7 or 8 kilograms is severely underweight for its age (desirable weight 12.9 kg), and needs extra calories from oil, eggs, fruits, vegetables, nuts, milk, and flesh foods to the extent of 565 kcals, spread over three to four times a day. This will also make sure that the child gets good-quality proteins, vitamins, and minerals.

Medicalisation of Malnutrition: But Panagariya's classification promotes the view that malnutrition in India is not about insufficient access to good-quality food, but the absence of a few micronutrients. The implication of this is that the absence can easily be addressed by distribution of micronutrients in the form of supplements, or by fortifying staples. As seen above, the diets of poor children in India are woefully inadequate. Micronutrients play the role of metabolising food calories in the body. In the absence of food, excess micronutrients can cause oxidative damage – like any drug, they induce free ions in the body, with serious consequences. Given in excess, micronutrients like vitamins A and D will be stored in the body and can be toxic. In marginalised households in India where people usually eat only roti or rice with salt, or raw onions and chutney, children are not just underweight, but also are deficient in vitamins and minerals (or micronutrient deficient). These children need adequate food from diverse sources to help combat all deficiencies, and not just micronutrients. It is after we have been able to provide a diverse and balanced diet to the entire population that we can talk about medicalised supplements for any micronutrient deficiency that a few may have. This would be based on investigations and be given to those who require it.

A disproportionate focus on micronutrient deficiencies will lead to the medicalisation of hunger, commercialisation of nutrition, and probable harm to the bodies of undernourished people in India. Panagariya's classification will only help micronutrient lobbies promote commercial products in public programmes such as the Integrated Child Development Services (ICDS), public distribution system (PDS), and school mid-day meals. The number of foods eaten by children is already shrinking, with diet surveys from rural areas over the last 30 years showing a monotonous pattern (NNMB 1974-present). Questioning the extent of malnutrition and advocating food supplements will only strengthen the hands of commercial interests promoting a medicalised understanding of malnutrition and centralised production of food. A careful study of actual food intake and its relationship to heights and weights, with further disaggregation by class, rural, urban, tribal, non-tribal, and so on, would have lent some rigour to Panagariya's paper. NNMB data sets provide plenty of information for anyone willing to soil their hands.

The Meaning of Balanced Diet in the Indian Context: Panagariya sets great store by the "balanced diet" and shows how it will help move a hypothetical population of five-year-old boys in a given year from height Distribution 1 to 3 (2013: 103, Figure 10). In this context, it is important to remember the history and politics of defining a balanced diet in our country. After food shortages and famines in the pre-Independence period, Indian scientists constructed a desirable balanced diet (2,400 kcals), which was low cost, "scientific", and provided the desired nutrients derived largely from cereals and some pulses. Over time, this diet was reduced to a bare minimum, with no reference daily intake (RDI) or even a mention of eggs, fish, nuts, fruits, and meat. In addition, lab-based evidence showed that if people ate cereals and pulses in a ration of 4:1 or some such figure at every meal, they could reach the desired protein quality in the RDI. Based on this evidence, Indian nutritionists felt that the country did not have a problem of protein inadequacy, but just food

inadequacy, and announced this to the nutrition fraternity calling it the "myth of protein gap" (Gopalan 1970).

In the historical sequence of events, cereals begin to find a central place in all government programmes such as the PDS, ICDS and school meals. The responsibility of finding and eating pulses in the right proportion at each meal was left to the poor. With a largely cereal-based diet supplemented with pulses, oil, vegetables, milk, and sugar in small measures, the diversity necessary for many protective nutrients, including antioxidants and flavonoids, disappeared (Table 2). Unfortunately, it was much later that the relationship of cereal overload to nutrition depletion and increased blood fats (triglycerides) was recognised, making the population prone to diabetes and other chronic diseases.

Table 2: Least Cost Balanced Diet Recommended for a Sedentary Man Per Day (2,400 kcals)

	Grams/Day
Cereals	460
Pulses	40
Other vegetables	60
Green leafy vegetables	40
Root vegetables	50
Milk	150
Visible fat	20
Sugar	30
Fish and flesh foods	nil
Nuts	nil
Fruits	nil
Condiments	nil
Eggs	nil

Source: NIN (2011): Nutritive Value of Indian Foods.

The epidemic of stunting and undernutrition in India may be traced to cereal overload. This has to do with children's inability to eat much cereal because their diets must be diverse. About 40%-50% calories must be from fat, and substantial amounts of milk, eggs, nuts, fruits and coloured vegetables must be included to provide all the nutrients necessary for rapid growth, according to WHO.

Panagariya uses the term "balanced diet" as if it were the diet of a population that has reached the maximum potential for height. The balanced diet in India has been defined as a least-cost scientifically constructed cereal-based diet. People in his hypothetical Distribution 1 and 2 actually consume this scientific diet. If this population were to move to Distribution 3 and 4, they must abandon the "balanced" diet and eat foods such as meat, eggs, fish, fruits and nuts, which are consumed by the wealthy. Therefore the poor height of the Indian people, rather than being a genetic trait, is the result of their consumption of the "balanced" diet designed by the government nutrition programme.

Milk Intake, Food Diversity and Children's Height: It is now well known that milk is an important source of proteins for children for gaining height and for an increase in muscle mass because it contains a substance called IgF-1. For many years, scientists ignored the link between milk intake to growth retardation and stunting (despite the knowledge that milk is necessary for putting on height). It is now known that childhood stunting and adult onset of chronic diseases may be related, and this is called Barker's Hypothesis (Barker and Osmond 1986). It is at this stage that the claim that genetics is responsible for the stunting in Indians is put forward by an economist of the standing of Panagariya, who is neither aware of the need for milk for children nor completely aware of the history of the RDI of calcium (Shatrugna 2010).

Controlled studies by the NIN, Hyderabad, which provided milk during the growth phase to children, have shown significant height increases in normal and undernourished kids (Shatrugna et al 2006; Radhakrishna et al 2010). It is not surprising that a low calorie intake and a largely cereal diet with a near absence of milk has resulted in an epidemic of stunting. Mamidi et al (2011) analyse the large 2005-06 National Family Health Survey (NFHS-3) data set and find that high socio-economic status associated with milk consumption has a positive association with height in men ($r = 0.69$, $p < .001$) and women ($r = 0.63$, $p < .001$) in different states. The normative diet even among middle- and upper-income groups has become "vegetarian" and largely cereal and pulses based. It is not surprising therefore that Tarozzi (2008) who sought out families in the high wealth category found stunting prevalent in 15%-20%.

Low Birth Weight and Fetal Programming: India has one of the highest rates of low birth weights with more than 30% of newborn children weighing less than 2.5 kg. This is said to be due to intrauterine growth restriction (IUGR). The intrauterine environment's contribution to low weights and stunting needs some elaboration. When an embryo grows in an environment of plenty (that is, nutrition), its tissues are programmed to thrive in abundance even in later life. However, most women from low socio-economic backgrounds have poor nutritional reserves and access to nutrient-rich foods during pregnancy is virtually absent.[1] Embryos growing in such an environment seem to shrink their own metabolic machinery to cope with adversity. This adaptation to famine-like conditions makes these children less capable of handling excess nutrition later in life, and any excess food intake triggers the possibility of hypertension or diabetes.

The children seem trapped because of an intrauterine insult, but the effect of this should be reversible. Unfortunately, these children continue to consume just cereals with little fruits, flesh foods, milk or eggs. Only protective foods are capable of providing nutrients to heal the cellular or molecular insult. Nutritionists and economists in India can change the metabolic rules of the game if they are serious and work on a diet that can address this insult. This would mean that Panagariya gives up his obsession with changing standards for heights. It must be recognised that the US, the biggest opponent of subsidies, treats its pregnant women with some concern. The supplementary programme for women, infants and children (popularly known as the WIC programme) in that country provides foods such as milk, cheese, bread, fruit, eggs, and vegetables to pregnant women, lactating mothers, and infants and children who are unable to fend for themselves.

Conclusions

There have been two interesting responses to high levels of stunting in India. One cautions the country about feeding undernourished stunted children because of the fear that the weight gained will be largely fat, thus making them prone to diabetes and hypertension in adult life.

The assumption is that the children can be given only cereals (which will not add muscle mass or increase height) and excess intake will add to fat mass. The second is Panagariya's, which recommends changing the reference standard. The nature of both these responses highlights a vacuum in elite intellectual circles. They take no responsibility to work on a diet that contributes to an increase in muscle mass and height in children in the age group of two to 16 years.

There are facts related to nutrition in India that truly need to bother all of us. By 1977, more than 14 tribal groups were losing height, that is, there was a negative secular change in height (Ganguly 1977). In addition, there is no secular increase in height among the poor, but adult heights increase as you go up the class ladder (Shatrugna and Rao 1987; Mamidi et al 2011). As mentioned, the diets of the poor are largely cereal based and hardly sufficient to provide the required nutrients.

We have put forward arguments to show that the diets and food intake of the people in India are not sufficient and high levels of malnutrition are therefore not really surprising. Questioning the standards we believe is just a diversionary tactic because we are not able to deal with this national "shame" in a comprehensive manner. Academics should rather focus their energies on understanding the context in which the poor in our country live and what their experience of the recent economic reforms and growth has been.

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NOTE

[All the authors except R Srivatsan of Anveshi Reseach Centre for Women's Studies, Hyderabad, are members of the Working Group for Children under Six of the Right to Food Campaign and Jan Swasthya Abhiyan.]

1 Women with poor nutrition reserves may be defined as those who have pre-pregnancy weights that are less than 42 kg, heights less than 145 cm, body mass index less than 18.5, and weight gain during pregnancy around 5 to 6 kg.

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