Stunting among Children
Facts and Implications

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Indian children are very short, on average, compared with children living in other countries. Because height reflects early life health and net nutrition, and because good early life health also helps brains to grow and capabilities to develop, widespread growth faltering is a human development disaster. Panagariya acknowledges these facts, but argues that Indian children are particularly short because they are genetically programmed to be so. In consequence, the higher prevalence of stunting among Indian children than among children in much poorer countries in Sub-Saharan Africa comes from using inappropriate common standards, and is not in itself a concern. However, Panagariya does little more than assert this conclusion, disregarding the long-held general understanding among nutritionists and economists, as well as important facts and theories in the literature.

Panagariya discusses a number of puzzling facts about child and adult anthropometrics. Most, although not all, of these have been known for a long time. Scholars who have written about these puzzles have indeed noted that some of the facts have no ready explanation, for example, that Indians have higher average incomes and lower infant mortality rates than most of Africa, but that Africans are taller. What Panagariya claims to contribute is the answer to these puzzles: that they can all be explained by "genetics". *All* of his argument about the role of genetics is by residual: if we cannot think of anything else, it must be genetics. *There is no direct evidence on genetics anywhere in the paper.* Genetics might be the answer, or part of it, but any argument by residual is obviously sensitive to having missed something, or to having overlooked some evidence.

Importance of Disease Environment

Perhaps the most important point that is missed by Panagariya – and it is a huge,

obvious, and, in the rest of the literature, well-understood omission – is the importance of the disease environment. There are passing mentions of health and medical care, but healthcare is *much* less important for health status than the toll on children's growth that comes from constant struggling with disease. In the past, economists were taken to task for assuming that food, primarily driven by real income, is the key to human nutritional status. Food is obviously important, but so is disease, and food and disease interact in key ways. All of this has been well understood for a long time, especially in the interpretation of the historical mortality decline and of the historical increase in heights. The story of increasing longevity, and of people growing taller over time cannot be told in terms of income and food alone; it is as much or more a story of the understanding and conquest of disease. The debate on food solo versus food *and* disease is an old one but has been over for some time (see Deaton 2013, Chapters 2-4 for a recent account).

We cannot look at food alone, whether we are trying to explain the history of human anthropometrics, or the differences among populations today. For much of human history, the rich – in spite of their wealth, their palatial homes, and their sometimes-vast intakes of food – lost as many of their children as did the poor. Neither income nor an adequate diet could protect them against infectious disease.

Panagariya appears to endorse a one-dimensional theory of health, in which different health indicators are expected to be ranked in a similar way across countries and to move in much the same way over time, with richer countries generally having lower infant mortality and taller populations. But this is false as a theory of health: as shown in Deaton (2007), the average heights of countries' populations are *negatively* correlated with those countries' average incomes around

the poor world. There were large declines in infant mortality around the world after 1945 even in countries with little or no economic growth. The astonishing and historically unprecedented acceleration of Chinese economic growth in the mid-1970s did nothing to accelerate rates of improvement in infant and child mortality, indeed quite the reverse.

Moreover, because different diseases are qualitatively different in their effects, it is possible for some places to suffer higher mortality rates while others experience worse stunting. For example, alcohol-related increases in mortality in Russia (Bhattacharya et al 2012) would not be expected to decrease anybody's height though there were dramatic effects on death rates, especially among men. Once we recognise the multidimensionality of health, and the multiple factors that cause different aspects of health – of which disease and diet are only the two most obvious – it is entirely possible for infant and child mortality rates to move differently from child anthropometrics, or for income to move differently from either.

One difference between Sub-Saharan Africa and India that can explain some of the difference in mortality rates is their different disease profiles. Malaria and HIV/AIDS are far more prevalent in Sub-Saharan Africa and influence mortality much more than they influence nutrition. Widespread availability of antibiotics and other medications in India may help Indian children to survive diseases that would kill African children.

Impact of Open Defecation

Enteric or intestinal infection, by contrast, is a disease that is likely to have a greater effect on height than on mortality.[1] Open defecation is widespread in India and population density is very high, meaning that open defecation often happens near where children live. Children who grow up in high population density environments without sanitation are exposed to more fecal pathogens than children who do not. According to Demographic and Health Survey data as well as census data, open defecation is much more common in India – where half of all people worldwide who defecate without using a toilet or latrine live – than in

Sub-Saharan Africa. A large fraction of the difference in average child heights between Africa and India can be explained by the prevalence of open defecation (Spears 2013).

An illustration may help. Panagariya points out that the incidence of stunting among children (based on WHO standards) is higher in India than in Chad, in spite of infant mortality being much lower in India, and holds this to be implausible. However, while a statistically average child in Chad is exposed to about seven neighbours who defecate in the open per square kilometre, on average in India over 200 people per square kilometre defecate in the open. Another telling comparison, highlighted by Spears (2013) is that the average child in China is about a height-for-age standard deviation taller than the average child in India; according to UNICEF and WHO Joint Monitoring Programme data, only about 1% of people in China defecate in the open.

This work on sanitation and child height is new, and the biological mechanisms – diarrhoea (Checkley et al 2008) and especially subclinical environmental enteropathy (Humphrey 2009; Lin et al 2013) – are still being unravelled, but this is a good example of the sort of mechanism that is being ignored by Panagariya and which results in the overestimation of any possible residual role of genetics.

Women's Status

The status of women in India relative to sub-Saharan Africa may also play a role in the relative heights of their children. At least since Ramalingaswami et al (1996), researchers have hypothesised that the low status and poor health of Indian women could directly affect their children's anthropometric status. Indeed, Coffey et al (2013) recently find that within India the children of lower ranking daughters-in-law in joint rural households are shorter, on average, than the children of their higher ranked counterparts in the same households. As in the case of the disease environment, there are differences in the nature of women's status between India and Africa, and the implications for the lives of their children need to be explored further before jumping to the conclusion that any differences must be genetic.

Panagariya makes a number of useful points about the open research questions surrounding whether a single anthropometric standard could be applicable for the whole world. If Dutch babies were to become enormous because of a peculiar diet, that might be no reason to become more concerned with the status of Indian babies. But that is not the issue today. Indian children are extraordinarily short compared with children in even some of the poorest countries around the world. And as noted by Gillespie (2013) – whose arguments we endorse – the international growth standards according to which India comes up so short are not *assumed* to apply everywhere, as Panagariya implies. Their applicability is based on international evidence, including older evidence on well-nourished children (see Habicht et al 1974 and, for India, Agarwal et al (1991), and Bhandari et al (2002)). Nowhere in his lengthy paper does Panagariya present a clear account or a persuasive critique of the "Multicentre Growth Reference Study" that forms the basis of the World Health Organisation's current growth standards.[2]

Further, as two of us have emphasised before, it could take many generations for previously malnourished populations to reach the heights of which they are capable, so it is not so surprising that populations or sub-populations that are well-nourished today are still shorter than populations or sub-populations where the food and disease environments were improved long ago (Deaton and Drèze 2009). This account does not say that Africans are further along in any catch-up process; many other factors could be at work. And the slow catch-up hypothesis cannot easily explain why Indian newborns are not much shorter than newborns elsewhere – although India does indeed have among the highest fraction of low-birth weight babies – nor why they become more stunted as they get older. The point is not that there are no unresolved puzzles, but that nothing is gained by "solving" those puzzles by leaping to a genetic explanation that ignores much evidence, as well as a long-held professional consensus.

Stunting among Indian children matters: shorter children are disadvantaged.

There is evidence from around the world that within population differences in height are strongly associated with within population differences in cognitive outcomes (Case and Paxson 2010), productivity (Vogl 2012) and health. Taller Indian children have better cognitive outcomes than shorter Indian children – along a much steeper height-cognition gradient than children in the US (Spears 2012) – which is exactly what we would expect from the literature on the harmfulness of early life malnutrition, whether it is caused by inadequate diets or a heavy burden of disease, or both. If we decide that Indian children are not stunted relative to African children, but just genetically short, we risk downgrading the importance of improving their status and denying them the much better lives that are within their reach.

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NOTES

1 One reason that exposure to fecal pathogens has become less deadly for babies and children over recent decades is the discovery and increasing availability of oral rehydration. However, chronic enteropathy is increasingly understood to be able to cause stunting without manifesting clinically as diarrhoea.

2 See particularly WHO Multicentre Growth Reference Study Group (2006). This study concludes (p 56): "The striking similarity in linear growth among children in the six sites justifies pooling the data and constructing a single international standard from birth to 5 y of age." See also Bhandari et al (2004) on the Indian component of this international study.

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