Can sanitation reduce stunting?

The missing piece: “If campaigns to change behaviour are not initiated to tackle the problem of open defecation, Indians will continue to defecate in the open even if they get toilets for free.” An eco-friendly public toilet in Bengaluru. G.R.N. Somashekar

Studying the impact of sanitation on stunting is tricky, and the much-awaited results of two ambitious new trials published this year show why.

The trials, which implemented water, sanitation and hygiene (WASH) interventions in Bangladeshi and Kenyan villages for two years, were an effort to prevent stunting (low height for age) seen in children under two years in developing countries. Specifically, the WASH interventions included replacing poor-quality toilets with improved ones, chlorinating drinking water, and promoting handwashing — all in an attempt to protect toddlers from the faecal pathogens that are believed to interfere with their growth. But when the trials ended, disappointingly, the researchers found these children were not taller than those who did not receive these interventions. The findings are a setback to the hypothesis that improving sanitation can thwart childhood stunting. But how big a setback they are is disputed.

One point of view is that even though Bangladesh and Kenya see childhood stunting, they are dramatically different from countries such as India on a critical count. India is the only country today in which over 50% of the rural population still defecates in the open. Bangladesh, while close to India in population density, brought down open defecation rates from 42% in 2003 to just 1% in 2016.

This critical difference was apparent in the two trials as well. Only around 3-9% of the participants in the trial in Bangladesh, and less than 5% in the trial in Kenya, defecated in the open at the start of the experiment. Most people already had toilets, albeit poor-quality ones, which the trial improved. It is likely that the children sampled were exposed to lower levels of faecal pathogens in the first place, which is why the trials didn’t impact stunting, says Dean Spears, an economist at the Research Institute of Compassionate Economics (RICE). He argues that the only thing the trials show is that upgrading from a basic toilet to an improved toilet, along with other WASH interventions, didn’t make children taller. “But it is not as informative for someone focussed on India’s policy challenges, because the policy challenge in India is open defection,” he says.

Others say the new trials raise doubts about the link between sanitation and stunting in India too. Wolf-Peter Schmidt, an epidemiologist at the London School of Hygiene and Tropical Medicine, points out that even in countries like Bangladesh, poor-quality toilets can cause heavy faecal contamination. Stephen Luby, an epidemiologist at the Stanford Woods Institute for the Environment and lead investigator in the Bangladesh study, says that the villages in his study saw high rates of both contamination and stunting. Yet the WASH improvements made no difference, which means that other factors could be driving stunting. “This heightens concerns that similar mechanisms underlie the association between open defecation and stunting in India,” he says.

Stunting is a complex problem. Children in richer South Asian countries are shorter on average than those in poorer Sub-Saharan African countries, and no intervention so far has closed this gap. Even though prenatal health, breastfeeding and diet, among dozens of factors, have been implicated in stunting, trials to encourage breastfeeding or supplement the mother’s and child’s diets have come up short. Simultaneously, researchers have homed in on an alternative hypothesis: that poor sanitation plays a greater role in stunting, because faecal bacteria and parasites deprive the child of nutrition.

Evidence for this hypothesis has piled up over the decades. Studies in Gambian children in the 1990s showed that intestinal inflammation, possibly caused by exposure to faecal germs, is correlated with stunting. Among animals, baby mice infected with *Escherichia coli*, a faecal bacterium, grew slower, and showed signs of such intestinal inflammation when dissected. In 2013, Mr. Spears analysed data from 65 countries and found that much of the height variation among those regions could be explained by differences in open defecation rates. The study also showed that open defecation had a stronger impact on height when population density was higher, as is the case of India and Bangladesh.

The problem is that most of the data which show that children in households with poor toilets are more likely to be stunted comes from descriptive studies. Descriptive studies have a downside: they can show association but not causation. “The concern with these studies is that they may be explained by some other difference between households with nice toilets and those without,” says Mr. Luby. This is why randomised control trials (RCTs), like the ones in Bangladesh and Kenya, matter.

But this is where researchers run into another stumbling block. It is extremely hard to conduct RCTs on sanitation. Since 2010, some six groups, including three in India, have experimented with sanitation approaches to tackle stunting. Nearly all failed because they were unable to convince enough people to use toilets in the first place. One RCT in Mali, in 2015, did increase toilet use by 30% and saw a small increase in child growth. But RCTs need to be replicated before their findings can be extrapolated to other countries, says Amy Pickering, one of the study’s authors who is from Tufts University. Another predicament is that for WASH interventions to be truly effective, more than one generation of families may need to adopt them. Most trials do not last longer than two years, given how expensive and logistically challenging they are.

India’s Swachh Bharat Abhiyan (SBA) is an example of how difficult it is to change people’s sanitation habits. Even though the SBA aims to eliminate open defecation by 2019, data from the 2015-16 National Family Health Survey show the campaign hasn’t changed much since it began. “Almost halfway through the SBA, open defecation remained quite common in rural India and its distribution across districts looked pretty similar to 2011,” Mr. Spears says. In *Where India Goes*, Mr. Spears and RICE demographer Diane Coffey argue that programmes like the SBA that focus on constructing toilets can’t do much in the face of deep-rooted cultural beliefs about open defecation because they presume that people do not build toilets for financial reasons. If behavioural change campaigns are not initiated to tackle the problem, Indians will continue to defecate in the open even if they get toilets for free.

Against this background, the Bangladesh study is significant because it did succeed in changing participant behaviour. It provides critical information for countries that have already eliminated open defecation. They may now want to weigh the merits of sanitation against other interventions like nutrition. What the trials mean for India is a tougher question. For an RCT to test the link between open defecation and stunting, it must figure out first how to get Indians to stop open defecation. Several researchers have tried this, but have come up dry.

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