

Maternal health in India much worse than previously thought, new study finds

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A small child in Mumbai, with a shaved head, eating bread with her hand.
Credit: Wen-Yan King/Wikipedia

More than 40 percent of women in India are underweight when they

begin pregnancy, according to a new study published by Princeton University's Woodrow Wilson School of Public and International Affairs. On average, these women gain only 15 pounds throughout pregnancy - just half of the recommended amount.

The findings - featured in the *Proceedings of the National Academy of Sciences* (PNAS) - are a concern as [body mass](#) and weight gain during pregnancy are important indicators of maternal health. Babies born to undernourished mothers are more likely to be underweight, a characteristic influencing height, cognition and productivity across a lifetime.

The study also drew surprising comparisons with sub-Saharan Africa, a region known for extremely poor health with high birth rates. In the end, Indian [women](#) fared worse; only 16.5 percent of women in sub-Saharan Africa are underweight before pregnancy.

The results highlight the need for government-backed support with regards to maternal health monitoring throughout pregnancy. While feasible, improving maternal nutrition in India may be an uphill climb because, as the research reports, the health of pregnant women is often compromised by their low social position in Indian households.

"These findings should be a wake-up call about maternal nutrition in India," said lead author Diane Coffey, a Ph.D. student at the Wilson School's Center for Population Research. "The health of children is one of the most important measures of the wellbeing of a society, and that starts during pregnancy. India must invest more in its most important resource: human capital formed at the very beginning of life."

In 2012, Coffey -who is a co-founder of the research institute for compassionate economics (r.i.c.e.), a non-profit in India - conducted a qualitative study about the health mothers and infants in three Indian

villages. She soon began noticing a pattern: mothers were not gaining weight at the expected rates. Coffey decided to investigate this behavior on a larger scale by looking at maternal health across India.

Coffey found that unlike the United States, where the Centers for Disease Control and Prevention monitors health in pregnancy, there is no national health monitoring system in India. As a result, prior studies of maternal health in India have severely missed the mark when calculating pre-pregnancy body weight.

The most recent maternal health data was collected in 2005 by the Demographic and Health Survey, which showed that 35.5 percent of women aged 15 to 49 are underweight. While this figure is commonly cited, it is actually inaccurate, Coffey reports, as women who become pregnant are different from those who do not with regards to body mass.

Using a variety of econometric strategies, Coffey estimated the pre-pregnancy body mass and weight gain during pregnancy in India and sub-Saharan Africa. Using reweighting techniques to correct body mass index scores (BMI), she finds that the average BMI of pre-pregnant women in India is 19.5 percent and the fraction of women who begin pregnancy underweight is 42.2 percent. This is almost 7 percentage points higher than the fraction of underweight women between ages 15 and 49.

"These findings point to the need for a national health monitoring system," said Coffey. "That way we wouldn't need to rely on outdated cross-sectional surveys to estimate these important indicators of maternal health."

The research also computes pre-pregnancy BMI and underweight women in sub-Saharan Africa. In sub-Saharan Africa, people are poorer and fertility rates are higher than in India. And yet, [maternal nutrition](#)

indicators in sub-Saharan Africa suggest better maternal health. Coffey's reweighting analysis found that only 16.5 percent of women there are underweight before pregnancy, and the average pre-pregnancy BMI is 2 points higher than women in India, at 21.5.

One commonality is that women gain only 15 pounds on average in both regions, just half of what is recommended by the U.S. Institute of Medicine. Still, while women in both regions gain similar amounts of weight, Indian women weigh much less when beginning pregnancy - putting them at a severe deficit from the start.

That maternal health in India is so poor seems puzzling considering its economic successes, but past social scientific and epidemiological literatures offer some clues. It is widely recognized that the status of women in India is much worse than in sub-Saharan Africa. In India, young, newly married women are at the bottom of household hierarchies and have even lower status than older women. Sex ratios in sub-Saharan Africa are a bit more balanced, and the sex gaps in education, work outside the home and child mortality are not as large.

"Throughout India, pregnant women and their babies suffer the consequences of living in a deeply patriarchal society," Coffey said. "Young, newly married women, who are the most likely to become pregnant, are often expected to keep quiet, work hard and eat little."

In addition to having low social status, these women live in exceptionally poor disease environments. Around 70 percent of rural Indian households defecate in the open, a practice that spreads intestinal diseases and parasites, making it difficult for people to use the energy and nutrients food. It is likely that infectious disease is responsible for a significant proportion of India's pre-pregnancy [underweight](#) problem, Coffey concludes.

Addressing India's abysmal maternal health outcomes with government policy will not be easy. Current maternal health programs, such as the distribution of free food and cash incentives for hospital deliveries, do not focus on weight during pregnancy and have little effect on neonatal mortality. Reducing the disease burden by reducing open defecation is extremely challenging because, due to villagers' ideas about purity, pollution and caste, most people reject affordable latrines.

"An important first step to improving pregnancy outcomes would be for the government to monitor maternal health by tracking a sample of women throughout their pregnancies. Sample surveys are quite feasible in India - they were in a sense invented in India - the only hard part is the government choosing to do it." Coffey said. "A national monitoring system would allow policy makers to see how [maternal health](#) changes over time and to see whether new programs make a difference."

More information: Prepregnancy body mass and weight gain during pregnancy in India and sub-Saharan Africa, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1416964112

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