

Research finds *Cryptosporidium* infects more than 75 percent of poor children in Bangladeshi slum

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Children infected even just once with a certain type of waterborne parasite are nearly three times as likely to suffer from moderate or severe stunted growth by the age of two than those who are not - regardless of whether their infection made them feel sick, new Johns Hopkins Bloomberg School of Public Health-led research suggests.

The researchers, publishing May 4 in the journal *PLOS Neglected Tropical Diseases*, found that three of every four [children](#) studied in a slum on the outskirts of the capital of Bangladesh experienced at least one *Cryptosporidium* infection in the first 24 months of life. One in four of the 302 infected children experienced the severe diarrhea that is associated with the parasite, while the other 72 percent were infected with *Cryptosporidium* but had no symptoms at all.

Despite a lack of symptoms, more than half of the children experienced stunted growth in the first two years of life, leading to irreversible damage and contributing to poor cognitive development, poor educational performance and reduced earning potential in adulthood, trapping individuals in a lifetime of poverty. Worldwide, an estimated 178 million children under 5 suffer from stunted growth, primarily in lower-income countries. The spread of *Cryptosporidium* can be blamed on a lack of access to clean drinking water and proper toilets. It is resistant to chlorine, which is often used to clean water.

"It has been thought that the diarrhea that results from *Cryptosporidium* infections was causing the dehydration and malnutrition that can lead to stunted growth," says the study's leader Poonum Korpe, MD, an assistant scientist in the Department of Epidemiology at the Bloomberg School. "This study suggests that while diarrhea is certainly a problem, infection with the parasite itself - even if there are no diarrheal symptoms - is causing the malnutrition. These children don't even get sick and their growth is stunted. We think it's possible that the parasite is damaging the gut at this early age, making absorption of vital nutrients more difficult."

For the study, Korpe worked with collaborators from the University of Virginia and the International Centre for Diarrhoeal Disease Research in Bangladesh. The researchers followed 392 children from a slum called Mirpur from birth until the age of two. Twice a week, families were visited by researchers who asked questions about the child's health, monitored growth and collected blood and stool samples, which were later tested for a variety of bacteria and [parasites](#).

According to the World Health Organization definition, children are considered stunted if their height-to-age ratio falls under what is considered the norm. The researchers found that by the age of two, nearly 30 percent of the children in Mirpur met the WHO definition for mild stunting, nearly 36 percent for moderate stunting and 21 percent for severe stunting.

While the researchers aren't certain exactly why children without diarrhea still experienced stunting, they suspect that the appearance of the larva-like parasite in the intestines may be causing permanent damage to the intestines' ability to absorb nutrients. Recent studies of programs that provide adequate food and supplementation to families in need in low-income countries have surprised researchers in that these interventions have not had the impact on malnutrition that they expected.

"Those interventions have not been as successful as we thought they would be," Korpe says. "Malnutrition is more than just an issue of food insecurity. This study suggests a possible reason why. It could be the first step in recognizing that gut infections may be the real problem. But we have a lot of work to do to figure this all out."

According to a 2008 analysis by a separate Johns Hopkins Bloomberg School of Public Health group, 21 percent of deaths in children younger than five are attributable to malnutrition worldwide.

The infection occurs all over the developing world, but there have been sporadic outbreaks in the United States, typically in the summer when a pool is contaminated with the *Cryptosporidium* parasite.

Korpe says that the focus needs to be on interrupting the spread of infection as well as developing vaccines and treatments.

"These children weren't born stunted," she says. "Something happened in the environment that's doing this to them."

More information: "Natural history of Cryptosporidiosis in a longitudinal study of slum-dwelling Bangladeshi children: association with severe malnutrition" *PLOS Neglected Tropical Diseases*, 2016.

Provided by Johns Hopkins University Bloomberg School of Public Health

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