The Global Enteric Multicenter Study
Karachi, Pakistan

Overview

The Global Enteric Multicenter Study (GEMS) is the largest, most comprehensive study of childhood diarrheal diseases to date. GEMS involved seven study sites, selected to represent the range of contexts where diarrheal diseases occur. The GEMS site in the coastal villages near Karachi, Pakistan, was chosen to evaluate diarrhea in peri-urban, low-income settings with a lack of clean water and inadequate sewage disposal facilities. The study was led by Principal Investigator Dr. Anita Zaidi at the Aga Khan University.

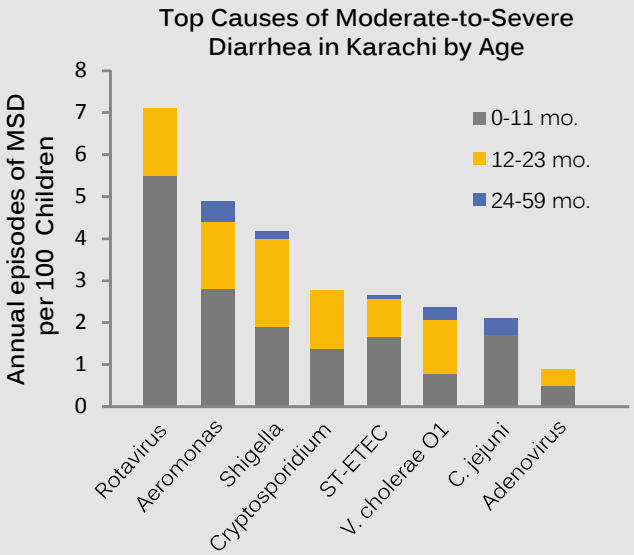
Study Findings

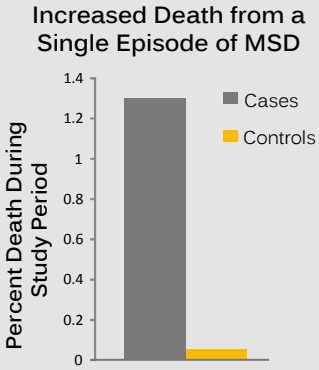
Cause and Incidence

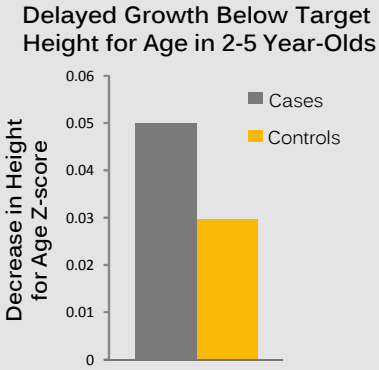
Similar to other GEMS sites:

- Four pathogens – rotavirus, *Cryptosporidium*, *Shigella,* and ST-Enterotoxigenic *E. coli* (ST-ETEC) – were leading causes of moderate-to-severe diarrhea (MSD) cases in Karachi
- The burden of MSD was highest in infants and decreased with age.

Unlike at other sites, *Aeromonas* was the second leading cause of MSD among infants. Previous research on *Aeromonas'* importance as a pathogen had been inconclusive. GEMS provides the most definitive evidence to date and confirms *Aeromonas'* regional importance: the pathogen was also a leading cause of MSD in Bangladesh, but not at any African sites.







Impact of Diarrhea on Children

GEMs found that a single episode of MSD had an impact on both growth and a child's risk of death. Children in Karachi presenting with a single episode of MSD had a 13.1-fold increased risk of death at a two-month follow-up visit compared to controls, a greater increase in risk than at any other site in Asia. Children ages 1-5 years old with MSD also had significantly stunted growth compared to controls at the same visit.

Implications for Improving Child Health in Pakistan

GEMS data reveal important information that can inform evidence-based diarrheal disease prevention and control strategies in Pakistan. Rapidly expanding access to clean water and existing interventions – including vaccines for rotavirus and other pathogens, and oral rehydration solutions and zinc supplements for treatment – is essential. Local data reinforce the importance of nutritional rehabilitation of all children with diarrheal diseases as well as interventions to prevent malnutrition in Pakistani children.

Additional Information

The Center for Vaccine Development at the University of Maryland School of Medicine coordinated GEMS, with funding from the Bill & Melinda Gates Foundation. For more information, please visit: http://www.aku.edu/gems or http://medschool.umaryland.edu/GEMS/