

Enteric Fever and Household Water Supply: Detection of *Salmonella enterica* serovar Typhi and Paratyphi in the Supply Water of Urban Dhaka, Bangladesh

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Background: Although *Salmonella enterica* serovars Typhi and Paratyphi are known to be transmitted through the fecal-oral pathway, the proportion of transmission that occurs through direct interpersonal or intra-household transmission versus transmission through an environmental reservoir is uncertain. Understanding transmission pathways can help focus prevention efforts. We attempted to replicate recent work in Kathmandu, Nepal which found high concentration of *S. Typhi* and *Paratyphi* in public drinking water sources.

Methods: Blood-culture positive *S. Typhi*/*Paratyphi* cases at Dhaka Shishu Hospital and Shishu Syastho Foundation Hospital, Dhaka, were enrolled. A field worker collected one liter of water from the source of household drinking water and kept at 4°C until processed. Each water sample was filtered (0.45µm), followed by DNA-extraction (Epicentre metagenomic water-DNA Kit) and qPCR for detection of *S. Typhi* (target gene *STY0201*) and *S. Paratyphi* (target gene *SSPA2308*). A standard curve was prepared using different concentrations of positive-control to calculate DNA copy numbers.

Results: We recruited 59 patients with culture-confirmed enteric fever (48 *S. Typhi*; 11 *S. Paratyphi*), visited their homes, and collected water for qPCR. Among these water samples, 36 (61%) were positive for *S. Typhi*, 14 (24%) for *S. Paratyphi* and 11 (19%) for both. Twenty-seven (46%) *Typhi* cases had a cycle-threshold (Ct) <35, in contrast to only 2 (3%) for *Paratyphi*. Median DNA copy number/liter of water was 934 (IQR: 361-1952) for *S. Typhi* and 266 (IQR: 183-963) for *S. Paratyphi*.

Conclusions: This preliminary finding on presence of *S. Typhi* and *Paratyphi* in water supply of urban Dhaka, where prevalence of enteric fever is high, strengthens the claim that supplied water disseminates these organisms. The replication of the results from Kathmandu suggests that this approach can be useful in identifying the high burden communities that could benefit from interventions to prevent enteric fever.