Risk factors for disease in an ongoing outbreak of multidrug resistant Typhoid fever in Blantyre, Malawi

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Background

There has been an ongoing outbreak of Typhoid fever due to multidrug resistant H58-*Salmonella* Typhi in Blantyre (Malawi) since 2011. This was identified through sentinel surveillance of bacteriaemia at Queen Elizabeth Central Hospital. We have investigated the distribution of and risk factors for Typhoid fever in urban Blantyre.

Methods

Between April 2015 and January 2017 a prospective cohort of patients with culture-confirmed Typhoid fever was recruited and an unmatched case-control study was nested within this. Demographic and clinical data, including complications and outcomes were recorded in the cohort study. Community controls were frequency weighed by residential area, and probability proportional to size sampling of controls accounted for population density. We questioned participants about exposures and recorded household and water source location with GPS devices.

Results

542/659 patients presenting to QECH with culture-confirmed Typhoid were recruited. 72% of patients were hospitalized. The most frequent complications were severe anaemia (9%), hepatitis/cholecystitis (5%), severe sepsis (4%), GI bleeding (4%), shock (3%) and intestinal perforation (2%). Complications were associated with male gender. The case fatality rate was 1.5%. Mapping showed clustering of cases in the urban townships, apparently sparing affluent income areas. The distribution of cases throughout the affected urban areas was uneven. The minimum incidence estimate for urban Blantyre in the observation period is 130/100,000 people/year.

We recruited 125 paediatric cases and 572 controls. Multivariate analysis identified distance to water source, recent use of more than one drinking water source, and household altitudeas risk factors. Cases and controls reported different health care utilization patterns.

Conclusions

There is an ongoing epidemic of multidrug resistant Typhoid fever in Blantyre, associated with a significant burden of morbidity and mortality. Typhoid fever is unequally distributed in Blantyre, suggesting clustering of cases. We identified vulnerability of water supply and exposure to febrile household members as risk factors in this outbreak.

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