

## **Risk Factors Associated with Typhoid Intestinal Perforations During a Large Outbreak of Typhoid Fever: Kampala Uganda; 2015**

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**Background:** Between January and June, 2015, a large typhoid outbreak occurred in Kampala, causing 10,230 suspected infections. We conducted a study to evaluate typhoid intestinal perforation (TIP) during the outbreak, and to assess risk factors for TIP.

**Methods:** We defined TIP case as a physician-diagnosed typhoid patient with nontraumatic terminal ileum perforation. We reviewed medical records from January 2013-December 2015 at five major hospitals in Kampala which performed surgeries. In a case-control study, we compared potential risk factors for TIP among cases and controls; controls were those with typhoid diagnosis by TUBEX, culture, or physician but with no TIP, matched to cases by age, sex and residence. We used conditional logistic regression to assess risk factors and control for confounding.

**Results:** Of the 88 TIP cases identified, 77% (68/88) occurred during the outbreak period. TIPs sharply increased in January and peaked in March, coinciding with the outbreak period. Compared with 29% (13/45) of cases and 63% (86/137) of controls who sought treatment within three days of onset, 42% (19/45) of TIP cases and 32% (44/137) of controls sought treatment after four to nine days ( $OR_{adj}=3.0$ , 95% CI=1.3-6.3); 29% (13/45) of cases and 5.1% (7/137) of controls sought treatment after  $\geq 10$  days ( $OR_{adj}=12$ , 95%CI=4.1-37). Additionally, 57% (26/46) of cases and 31% (43/137) of controls had self-medication ( $OR_{adj}=2.9$ , 95%CI=1.4-6.2); 36% (25/39) of cases and 18% (116/142) of controls had not heard about typhoid ( $OR_{adj}=2.5$ , 95%CI=1.1-5.5); and 59% (23/39) of cases and 25% (35/142) of controls had not heard about the typhoid outbreak in Kampala ( $OR_{adj}=4.9$ , 95%CI=2.0-12).

**Conclusion:** TIP was associated with delay in seeking treatment, self-medication, and being uninformed of the typhoid outbreak in Kampala. We recommended active community case finding for early and appropriate treatment, health education about typhoid fever and TIPs and raising awareness among physicians about risk of perforation during future typhoid outbreaks.