



Assessing the Association between Piped Water Access and Cholera Dynamics in Peri-Urban Lusaka: A Case-Control Study, 2002

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Abstract

Cholera remains a significant public health burden in African urban and peri-urban settings, where inadequate water and sanitation infrastructure are persistent challenges. Understanding the specific role of improved water access in outbreak dynamics is critical for effective prevention and control. This study aimed to quantify the association between household access to piped water and the risk of cholera infection during an outbreak in peri-urban areas of Lusaka. A hospital-based case-control study was conducted. Confirmed cholera cases were recruited from treatment centres. Community-based controls, matched by age and area of residence, were selected. Data on household water sources, sanitation, and socio-demographic factors were collected via structured questionnaires. Conditional logistic regression was used to calculate odds ratios and 95% confidence intervals, adjusting for potential confounders. Households without access to piped water had 3.2 times higher odds of cholera infection compared to those with access (adjusted OR 3.2, 95% CI 1.8–5.7). This association remained significant after adjusting for household sanitation type and crowding. The population attributable fraction suggested that 45% of cholera cases in the outbreak could be linked to the lack of piped water. Access to piped water was strongly and independently associated with a reduced risk of cholera in this peri-urban setting. The findings underscore that improving municipal water infrastructure is a fundamental intervention for cholera control in rapidly urbanising areas. Public health policy should prioritise the expansion of reliable, piped water networks to peri-urban communities as a core cholera prevention strategy. Complementary hygiene promotion and improved sanitation are also essential. Further research should investigate the quality and reliability of water supply in addition to access. cholera, water supply, case-control study, Lusaka, urban health, sanitation. This study provides specific quantitative evidence on the protective effect of piped water against cholera in a high-risk peri-urban African context, informing infrastructure-focused public health interventions.

Keywords: *Cholera, Piped Water, Case-Control Study, Peri-Urban, Sub-Saharan Africa, Waterborne Diseases, Zambia*

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