

Comparative analysis of access to WASH facilities and risk of microbial infection to children in poor urban communities in Accra, Ghana

Abstract

Water quality is often compromised during the transmission chain in poor urban communities due to exposure to faecal matter. Uncontained toilet facilities and indiscriminate faecal disposal results in contamination of water sources with consequent enteric infections especially among children. This study aimed to analyse the linkage between accessibility to WASH (water, sanitation and hygiene) facilities in two urban poor communities; and to spatially predict the risk of infection to children under five years. We mapped building blocks, households, toilet facilities, drains and water sources using orthophotos generated from UAV images and Real-Time Kinematic GPS surveys in two poor urban settlements- Madina Zongo and Gbegbeyise- in Accra.

We enumerated 1, 680 households in the two study sites taking key indicators such as number of children under 5 years and duration of water storage. Results from the study show that most sanitation facilities were shared by multiple households. Water points and toilet facilities had uniform geographical coverage in Madina Zongo compared to Gbegbeyise. In Madina Zongo, water and toilet facilities are mostly private, shared by users from the house where the facilities are located. In Gbegbeyise, most of the facilities are public use, open to several community members. The flash points in the drains mapped indicates several potential sources of contamination.

Further, larger proportion of households in the two communities rely on water sources from storage tanks due to the infrequent water flow (more than 61.8% in Madina above the median water storage days for both rainy and dry seasons and more than 56.1% in Gbegbeyise above the average days of water storage for both rainy and dry seasons). A significant number of houses in Madina Zongo, use unprotected well as alternative source of water to the pipe water. Baseline water quality monitoring revealed that water from treatment point were devoid of total coliform and faecal coliform indicating safe drinking water source. However, several water samples collected at point of use showed presence of faecal matter. Mapping the distribution of infection risk adjusted for WASH allowed the identification of communities where interventions to improve WASH will yield the greatest health benefits.