

Association of Fecal Contamination and WASH Conditions in a Zambian Peri Urban Community

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Poor sanitation, water and hygiene (WASH) often cause serious fecal contamination. Peri-urban communities in low-income settings have poor WASH conditions, leading to exposure risk of fecal microorganism with complicated transmission pathways. However, studies focusing on the association of faecal contamination and WASH conditions in peri-urban context are limited. Hence, this study aimed (1) to assess the faecal contamination levels in various media in the living environment, and (2) to associate the fecal contamination levels of environmental media by the WASH conditions in the peri-urban Lusaka, Zambia.

The present study was conducted in two peri-urban areas: Chawama and Kanyama compounds in Lusaka, Zambia. Firstly, on-site investigations were done to obtain WASH conditions including water-use activities and distance of the toilets and wastes from the houses. Secondly, *E. coli* tests were conducted on samples: stored tap water ($n = 24$), shallow well water (12), cup surfaces (37), plate surfaces (23), toilet floor (24), toilet entrance floor (24), house entrance floor (24), kitchen floor (25), flies inside a toilet (35), flies outside a toilet (42), flies at a polysack waste bag (46), flies at house entrance (42) and flies in a kitchen (35). Water samples were collected using sterilized sampling bags and surface samples were collected by using swab test kits. Fly samples were collected from sticky fly tapes hung at different locations around houses after left for an hour.

Results show several important findings: (1) certain media around toilets without roof had significantly more contamination and more flies than that of toilets with roof, (2) as water sources for cleaning kitchenware, shallow well water was significantly more contaminated than stored tap water, (3) cups and plates washed by shallow well water were more contaminated despite insignificant, and (4) media in kitchen had more contamination when they were located closer to waste bags and closer to toilets. The results implied that the fecal contamination levels of environmental media were associated with the sanitary conditions in the study sites. Countermeasures were suggested to improve the WASH conditions: to select tap water over shallow well water for washing kitchenware, to provide roofing on toilets, and to keep toilets and waste bags farther from the kitchens.

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