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Water, Sanitation, and Hygiene Access, Practices, and Health Outcomes

in Peri-Urban Households of Lusaka, Zambia

（ザンビア・ルサカ都市周縁地域における

世帯の水・サニテーション・衛生（WASH）アクセス、行動、および健康影響）

Access to Water, Sanitation, and Hygiene (WASH) is a fundamental human right essential to public health. However, access to WASH remains critically low in low-income settings such as peri-urban areas. Evidence on behaviour sustainability, WASH coverage, and context-specific determinants is limited for peri-urban areas. While national reports compile WASH data by rural and urban divisions, peri-urban areas have unique characteristics that distinguish them from their urban counterparts. Therefore, this research aimed to evaluate access to WASH facilities, the determinants of hygiene behaviours, and their association with diarrhoeal diseases in peri-urban communities of Zambia. With a greater emphasis on hand hygiene, this research set out to: (i) Investigate hand hygiene practices, facility availability, and associated factors; (ii) Explore the barriers to and facilitators of handwashing behaviour; (iii) Assess the prevalence of diarrhoea and its association with household WASH access and practices.

A mix of quantitative and qualitative research approaches was used. First, a repeated cross-sectional survey was conducted in the Kanyama peri-urban area located west of Lusaka's city centre. This survey included data collected in 2018, after a cholera outbreak, and in 2022, during the COVID-19 pandemic. Each survey included 318 participants. Second, a cross-sectional survey was conducted concurrently with focus group discussions in the peri-urban areas of Kafue Town, located 40 km West of Lusaka city centre. The cross-sectional survey included 374 participants from four peri-urban communities. Two focus group discussions were conducted in three of these areas, each with 8-9 participants, for a total of 50 participants. Quantitative data analysis used descriptive statistics to summarise the participants' and WASH characteristics, including diarrhoea prevalence. Pearson's Chi-square and Fisher's exact tests were used to examine associations between variables. Logistic regression was used to assess the strength of the associations and predict outcomes. A framework approach to thematic analysis was used to analyse the qualitative data.

Quantitative analysis revealed a decline in access to handwashing facilities and hygiene practices. Households without handwashing facilities increased by 20%, whereas households with handwashing facilities, including soap and water, decreased from 14% to 0%. The decline extended to soap-and-water use between 2018 and 2022 ($p \leq 0.05$). The chances of handwashing with soap and water were lower among

males, those over 40 years old, those who were married or living with a partner, and those who were employed. In peri-urban communities in Kafue, only 12% of households had a handwashing station with both water and soap. Furthermore, while 83% had improved sanitation, three-quarters shared toilets with multiple households. Most households (96%) had improved water sources, and slightly more than half (57%) were satisfied with the quality. The two-week diarrhoea prevalence was 15.5%. Households with unimproved sanitation (AOR = 2.34; 95% CI: 1.04–5.15; $p = 0.039$) and those with inconsistent handwashing after toilet use (AOR = 5.32; 95% CI: 2.55–11.26; $p < 0.0001$) had significantly higher odds of experiencing diarrhoea. The risk of diarrhoea also varied among peri-urban communities.

The qualitative enquiry into the determinants of handwashing identified infrastructural, sociocultural, and behavioural factors that served as both facilitators and barriers. Infrastructural facilitators included the presence of a handwashing station with soap and water and proximity to a toilet facility. The socioeconomic and social enablers were higher income and education levels, knowledge of handwashing, fear of disease, a desire to protect the family, feelings of disgust, early introduction of handwashing education, and positive social influence from neighbours. Conversely, the structural barriers included the lack of handwashing facilities, insufficient and unreliable water supply, water scarcity caused by floods and droughts, vandalism, and theft of stations. Socioeconomic and cultural factors included the high cost of handwashing stations, limited soap availability, low income and education levels, and cultural aversion to soap scents, particularly for handwashing before eating.

Overall, this research illustrates that hand hygiene behaviour, WASH access, and diarrhoeal disease in peri-urban Zambia are best understood as interdependent phenomena shaped by uneven and limited access to WASH resources, structural instability brought by external contexts, social norms, and cultural meaning constructs that shape choices and priorities. A fundamental insight is that households' capacity to maintain hygienic practices is deeply entangled with broader contextual conditions in which they live. Hand hygiene behaviours fluctuate in response to shifting public health contexts, highlighting a vulnerability to external pressures that reflect deeper systemic fragility and instability, and offering an opportunity for change that could be sustained with the proper measures in place. Furthermore, cultural norms and gendered roles shape hygiene practices, revealing that these behaviours are not merely technical or mechanical. The persistence of diarrhoeal disease despite the presence of improved WASH facilities in most households further underscores that infrastructure alone does not ensure protection; rather, its effectiveness depends on reliability, usability, and households' ability to integrate hygienic routines into environments marked by scarcity and unpredictability.