Abstract

Climate change in Sub-Saharan Africa is severely affecting water access, compromising the health and safety of millions. The Nile Basin, a crucial transboundary catchment shared by 11 African countries and supporting 232 million people, plays a significant role in regional water policy. Despite its importance, limited information exists regarding the microbial quality of drinking water in this region. This study investigates waterborne pathogen contamination in drinking water sources along the Uganda-Kenya border within the Nile Basin. Conducted in two stages, the study first surveyed the water sources used by respondents and whether they treated their drinking water. The second stage involved aseptic sampling of water from identified sources for Total Coliforms (TCC), *Escherichia coli (E. coli*), *Helicobacter pylori*, and *Salmonella* spp. using culture methods. The survey revealed that residents in the region predominantly rely on multiple water sources: 94.0% use springs, 57.3% groundwater, 53.0% taps, and 28.1% streams. Water treatment was common, with 74.6% of households employing various methods. Analysis showed a high prevalence of contamination, with 98.6% of water samples testing positive for TCC, 72.2% for *E. coli*, 22.2% for *Salmonella* spp., and 44.4% for *H. pylori*. *E. coli* contamination was highest in Mumias (94.4%), followed by Yala (77.8%), and Acholi Quarter (40.0%). *H. pylori* prevalence was lowest in Yala (14.3%) compared to Mumias (37.0%) and Acholi Quarter (30.0%). *Salmonella* spp. was equally high in Mumias and Yala (85.7%) but lower in the Acholi Quarter (40.0%). Theoretical log reduction analysis revealed that both TCC and *E. coli* levels exceeded the limits (> 10 cfu [colony forming units] TCC/100 ml; > 0 cfu *E. coli*/100 ml), even after domestic treatment. These findings underscore the need for enhanced water quality monitoring and improved water management policies across borders to address microbial contamination and protect public health.