

Impact of Water, Sanitation and Hygiene Interventions on Water Quality in Primary Schools of Pakistan

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Abstract : The United Nation's sustainable development goals include the target to ensure access to water and sanitation for all; however, very few studies have assessed school-based drinking water in Pakistan. The purpose of this study was to characterize water quality in primary schools of Pakistan and to characterize how recent WASH interventions were associated with school water quality. We conducted a representative cross-sectional study of primary schools in the Sindh province of Pakistan. We used structured observations and structured interviews to ascertain the school's WASH conditions. Our primary exposures of interest were the implementation of previous WASH interventions in the school and the water source type. Outcomes of interest included water quality (measured by various chemical and microbiological indicators) and water availability at the school's primary drinking water source. We used log-binomial regression to characterize how WASH exposures were associated with water quality outcomes. We collected data from 256 schools. Groundwater was the primary drinking water source at most schools (87%). Water testing showed that 14% of the school's water had arsenic above the WHO recommendations, and over 50% of the water samples exceeded recommendations for both lead and cadmium. A majority of the water sources (52%) had fecal coliform contamination. None of the schools had nitrate contamination (0%), and few had fluoride contamination (5%). Regression results indicated that having a recent WASH intervention at the school was not associated with either arsenic contamination (prevalence ratio=0.97; 95% CI: 0.46-2.1) or with fecal coliform contamination (PR=0.88; 95% CI: 0.67-1.17). Our assessment unveiled several water quality gaps that exist, including high heavy metal and fecal contamination. Our findings will help various stakeholders to take suitable action to improve water quality in Pakistani schools.

Keywords : WASH interventions, water quality, primary school children, heavy metals

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