Student Hand Contamination

Can school WASH improvements have unintended consequences?

Questions

Low-income school settings without handwashing or sanitation facilities are thought to increase the risk of disease transmission among students and potentially their younger siblings at home. Interventions to improve hygiene and sanitation conditions in schools within low-income countries have gained increased attention, and some studies have observed improved attendance and health as a result of hygiene interventions. However, the direct impact of improved hygiene and sanitation on schoolchildren's exposure to fecal pathogens has not been established.

The SWASH+ partnership conducted a cluster-randomized controlled trial of two different school-based WASH interventions to answer: **"Can school WASH interventions reduce fecal contamination on students' hands?"**

Research

This study was nested within a large cluster-randomized controlled trial of 135 public primary schools in Nyanza Province, Kenya. Of the schools across three districts of the province, 34 were randomly selected and assigned into one of the three interventions arms:

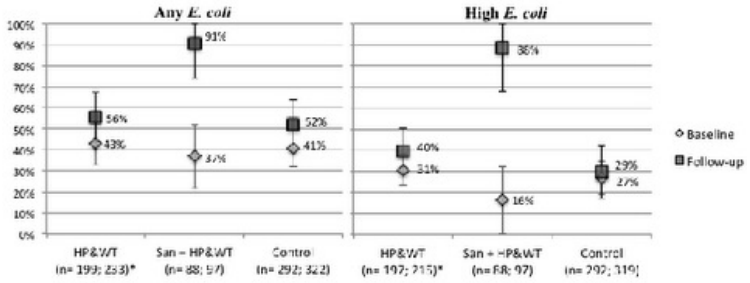
1. Hygiene promotion and water treatment (HP&WT): 12 schools received drinking and handwashing water containers, teacher training on how to conduct HP for students, and a year's supply of WaterGuard for drinking water purification
2. Sanitation facilities + HP&WT: 5 schools received ventilated improved pit latrines in addition to the HP&WT intervention
3. Control: 17 schools serving as a comparison group received all interventions at the conclusion of the study

Data collection happened before and after the intervention. Trained enumerators arrived at schools unannounced and systematically sampled students in grades 4-8. Each student was interviewed, and a handrinse sample was taken to capture fecal contaminants for subsequent analysis in a laboratory. A total of 574 baseline and 652 follow-up samples were collected.

Findings

Hand Contamination. The simple HP&WT intervention had no significant impact on the risk of children having any *E. coli* present on their hands; however, girls in these schools had more than two times the risk of having high levels of hand contamination (≥100 *E. coli* colonies per hand) compared to those attending control schools. The intervention that incorporated new latrines (Sanitation + HP&WT) significantly increased the risk of any *E. coli* being present on girls' hands by 2.6 times, and girls' risk of high hand contamination levels was more than 9 times greater than those attending control schools. The increased risk among boys in Sanitation + HP&WT schools was not statistically significant.

Figure 1. Change in Presence of Any and High E.coli **n for baseline; follow-up*



WASH Conditions and Behaviors. Although the intervention did not provide soap for handwashing, 33% of HP&WT and 60% of Sanitation + HP&WT schools provided it on the day of follow-up data collection, compared to 0% in control schools. There were no significant changes in reported or demonstrated handwashing practices for either gender in either intervention arm. Various indicators of comfort with and use of school latrines suggested that girls in particular may have been more likely to use school latrines at Sanitation + HP&WT schools, with a significant 17 percentage point increase in those saying they always used school latrines for defecation when needed.

Discussion and Conclusion

Although the reason for these results cannot be certain, it is possible that the increase of hand contamination in Sanitation + HP&WT schools may be due to **increased usage of school latrines for defecation without concurrent improvement in hand hygiene after using them.** This suggests that efforts to increase the quantity of school latrines may pose a risk to children in absence of actual hygiene behavior change, daily provision of soap and water prior to children's arrival at school, and provision of anal cleansing materials to prevent hand contamination while using latrines. Approaches that overcome these barriers are needed as a first step to improve school hygiene.

This brief is based on the article, "Impact of school-based hygiene promotion and sanitation interventions on pupil hand contamination in western Kenya: a cluster randomized trial" by Greene LE, Freeman MC, Akoko D, Saboori S, Moe C, Rheingans R. ***To be published in 2012 by the American Journal of Tropical Medicine and Hygiene.***

SWASH+ is a five-year applied research project to identify, develop, and test innovative approaches to school-based water, sanitation and hygiene in Nyanza Province, Kenya. The partners that form the SWASH+ consortium are CARE, Emory University, the Great Lakes University of Kisumu, the Government of Kenya, and formerly the Kenya Water for Health Organization (KWAHO), and Water.org. SWASH+ is funded by the Bill & Melinda Gates Foundation and the Global Water Challenge. For more information, visit www.swashplus.org.