



Sustaining and Scaling School Water,
Sanitation, and Hygiene Plus
Community Impact



Soil- Transmitted Helminths

Does improving school WASH impact students' likelihood of helminth reinfection?

Background

It is estimated that over 2 billion individuals worldwide are infected with soil-transmitted helminths (STH) and school-age children exhibit the greatest morbidity associated with STH infection. STH infection is directly related to fecal exposure, either through ingestion or skin exposure. School-based deworming is cheap and effective; however, without systemic change to environmental exposure to infection, dewormed populations become quickly reinfected.

The SWASH+ partnership conducted a cluster-randomized trial to assess **the impact of school-based sanitation and hygiene improvements on reinfection with different STH species among school children in western Kenya.**

Research

Following baseline data collection, 40 out of the 185 eligible schools were randomly assigned into two study arms:

1) Intervention (20 schools): sanitation (latrines) + water treatment (WT) and hygiene promotion (HP). These schools received a 3-day teacher training on HP, behavior change and WT methods, and regular follow-up visits throughout the year.

2) Control (20 schools): sanitation improvements and hygiene education following the final round of data collection in May 2009.

Following each data collection round, *all* children in study schools (intervention and control) received mass treatment for STH infections using a single oral dose of albendazole. Albendazole is highly efficacious in curing infection with hookworm and *A. lumbricoides*, but is less effective against *T. trichiura*. Stool and capillary blood samples were collected during three cross-sectional rounds (baseline and two follow-ups). Researchers also recorded students' self-reported geophagy (soil-eating behavior) and observed if students were wearing shoes.

Findings

Overall, 37.7% of children were infected with at least one STH species. Improvements in school water, sanitation and hygiene (WASH) resulted in reduced helminth reinfection depending on student's behaviours, sex and specific helminth:

- *A. Lumbricoides*: Students with improved school sanitation and hygiene were less likely to be infected with *A. lumbricoides* compared to those children in control schools.

The intervention *significantly* reduced odds of reinfection by 52% among girls, but not among boys.

- *T. trichiura*: The intervention did not significantly change the prevalence or egg count of *T. trichiura* among students. However, soil eating significantly modified the intensity of infection. Students who reported soil eating were significantly impacted by the intervention.
- Hookworm: There was no overall effect of the intervention on hookworm prevalence, but egg count differed significantly by sex. The intervention was protective for boys, but increased the odds of infection for girls. Students without shoes were significantly impacted by the intervention (under 40% of boys wore shoes at baseline).
- *Schistomana mansoni*: There was no significant impact of the intervention on the prevalence or intensity of *Schistomana mansoni*. However, prevalence and egg count significantly differed by sex; boys were impacted by the intervention more than girls.



Improved water and sanitation at schools significantly reduces girls' reinfection of some soil-transmitted helminths.

Conclusions

Deworming alone cannot eliminate STH infection if schools and communities lack adequate WASH facilities. The gains from deworming will only be sustained through improved WASH access. The greater impact of WASH improvements on *A. lumbricoides* among girls suggests that improving access to WASH reduces the exposure to feces for girls. These findings provide initial support for the benefit of improved WASH in schools when implemented alongside school-based deworming, but show that the effect is not consistent among boys and girls or among sub-groups with different exposure-related patterns of behavior.



This brief is based on the article, "The impact of school-based hygiene, water quality, and sanitation intervention on soil-transmitted helminth reinfection: A cluster-randomized trial" (2012) by Freeman, M.C., Clasen, T., Brooker, S., Akoko, D., and Rheingans, R. Submitted PLoS NTD

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 Organisation (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.