School WASH and Diarrheal Disease

Can improving school-based WASH conditions reduce diarrheal disease among students?

Background

Nearly 1.3 million children under age five die each year from diarrheal diseases due to unsafe drinking water[i]. Although there are numerous studies of diarrhea-related mortality for children under age five, little is known about the burden and implications of diarrheal disease for school-aged children. The SWASH+ Project conducted a cluster-randomized trial to assess the **impact of a school-based water supply, water quality, sanitation, and hygiene promotion intervention on diarrheal disease among primary school pupils.**

Research

In January 2007, eligible schools within four districts of Nyanza Province in Western Kenya were selected and randomly assigned into intervention initiatives based on water source availability:

- "Water available" schools had a dry-season water source within one kilometer. 135 schools in the 'water available' study group were randomly placed in one of three intervention arms:
  1) hygiene promotion and water treatment (HP&WT) intervention, which included teacher training on hygiene behavior change, containers for safe drinking and hand washing water storage, and water treatment supplies;
  2) HP&WT with the addition of improved school latrines (HP&WT+ Sanitation); or
  3) control schools, which received the full intervention at the conclusion of the study.
- "Water scarce" schools had no improved water source within two kilometers or any source during the dry season within one kilometer of the school grounds. 50 schools were randomly allocated into one of two arms:
  1) intervention schools that received improvements to their water supply, such as rainwater-harvesting tanks and boreholes, in addition to the HP&WT+ Sanitation intervention described above, or 2) control schools.

Data from over 4,000 pupils was collected in 2008. Diarrheal prevalence was measured using self-report of diarrheal duration for one week prior to data collection.

Findings

Reduction in Diarrheal Prevalence

In the 'water scarce' study group researchers found a **66% overall reduction in diarrheal prevalence and a similar reduction in days of illness** among pupils in intervention schools compared to pupils in control schools. This reduction in diarrheal prevalence was similar for both boys and girls. The study found no evidence that interventions without water supply improvements reduced diarrhea prevalence or days of diarrhea.

A student retrieves water from a school borehole. Improved water sources reduced diarrheal disease and days of illness among students.

Conclusions

Findings suggest that improvements to school water supply and quality, along with sanitation provision and hygiene promotion, can reduce diarrheal illness among students. School WASH is especially needed in water-scarce areas to mitigate the diarrheal disease burden on students. Children's health can greatly benefit from simple water supply improvements such as drilled boreholes and rainwater-harvesting tanks.

This study did not provide conclusive evidence that combined WASH interventions (adding sanitation to a water treatment and hygiene promotion) are more effective than single interventions. However, it did suggest that WASH interventions were protective against diarrhea only when there was a minimum level of improved water supply. Results from this study also reveal that the effectiveness of an intervention on reducing diarrheal disease is based on background rates of disease and baseline WASH conditions.

[i] Pruss-Ustun A, Bonjour S, Corvalan C (2008). The impact of the environment on health by country: a meta-synthesis. *Environ Health* 7**:** 7.

This brief is based on the article, *The impact of a school-based water supply and treatment, hygiene, and sanitation program on pupil diarrhea: A cluster-randomized trial.* Freeman MC, Clasen T, Dreibelbis R, Saboori S, Greene L, Rheingans R.

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, the former 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.