

Research Summary: Results from a School WASH Service Delivery Trial May-November, 2011

A SWASH+ project report

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June 11th, 2012

Funding provided by the Global Water Challenge and the Bill and Melinda Gates Foundation

Executive Summary

Background: The positive effects of improvements in water, sanitation and hygiene (WASH) have been well documented. For primary school students, WASH improvements in schools can play a particularly important role in promoting health and well-being. In resource-restricted countries in particular, WASH services are seldom delivered in schools and sustainable solutions are needed.

Methods. We conducted a study in Nyanza Province, Western Kenya with seventy primary schools to explore the effectiveness of various interventions to improve the delivery of WASH services in schools. Schools were randomly divided into four groups: three intervention groups of 15 schools each and a control group of 25 schools. All intervention schools received 37KES (\approx 0.44USD) per pupil for purchase of water, sanitation and hygiene supplies. Two of the intervention groups additionally received either funds for repair costs and a cleaner or guidance and materials for monitoring facilities.

Results. Schools across all intervention groups achieved improved conditions of their WASH facilities compared to control schools: cleaner latrines, chlorinated drinking water and soap provided for handwashing. Direct comparisons were not made between intervention groups due to small sample sizes.

Discussion. While interventions provided promising results, additional research is needed to understand how improved conditions can be more consistent. Schools that had the required inputs (soap, chlorine, cleaning supplies) still did not provide services to students on a daily basis.

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List of Acronyms

| | |
|---------------|---|
| FPE | Free primary education |
| RR | Roles and Responsibility intervention group |
| SMC | School management committee |
| SWASH+ | Sustaining and Scaling School Water, Sanitation and Hygiene Plus Community Impact |
| WASH | Water, Sanitation and Hygiene |
| WB | WASH Budget Only intervention group |
| WBP | WASH Budget Plus intervention group |

Background

UNICEF estimates that more than 50% of primary schools in developing countries do not have sufficient water, sanitation and hygiene (WASH) services (UNICEF, 2010). We define WASH services in schools as WASH supplies (e.g. soap, water treatment, brooms), or activities (e.g. latrine cleaning, WASH facility repair) that support latrine quality and cleanliness, safe water, hygienic practices and the associated monetary and human resources needed to ensure continuous access for students. In resource-poor settings, schools with existing WASH facilities, often have latrines that are dirty or unsafe, unreliable or distant water sources and little handwashing promotion (WHO, 2009; Bolt et al., 2006). Results from an assessment of school sanitation and hygiene interventions in six developing countries across Sub-Saharan Africa, Southeast Asia and Latin America found that the majority of schools did not have handwashing soap or soap was inaccessible to students. In nearly all schools included in the assessment, there was no system for operations and maintenance of school WASH facilities (Bolt et al., 2006). A study by Saboori et al. (2011) on the sustainability of school water and hygiene interventions in western Kenya reached similar conclusions related to schools' capacity to sustain handwashing and a point-of-use water treatment system. None of the 55 schools in the study were able to maintain *both* a supply of treated drinking water and handwashing water with soap two and a half years after initial program implementation. Over 60% of the schools surveyed reported cost as a barrier for repurchasing soap and 27% of schools reported cost as a barrier to repurchasing chlorine treatment. These studies demonstrated that there are a number of barriers to sustaining school WASH globally and there is a need to better understand how we can improve the delivery of WASH services in schools.

Provision of WASH services is an integral component of the overall quality of primary schools (WHO, 2009; IRC, 2007; Snel, 2004). Findings from assessments of WASH programs in Kenyan schools (Saboori et al., 2011; Njuguna et al., 2009) demonstrate that services are either not being delivered, or are not being delivered consistently enough to provide a benefit to students.

There are likely three main factors contributing to inefficient WASH service delivery in Kenyan primary schools:

- 1) insufficient funds
- 2) overextended staff
- 3) low incentives to prioritize wash services

WASH services at schools are often not prioritized by teachers and school committees due to competing school priorities and the lack of monitoring and accountability for these services. Teachers, particularly in rural schools, are often overextended, taking on multiple roles in the school, with few incentives to spend extra energy towards WASH promotion. The School Management Committees (SMCs) – which is a group of parents, representatives of local institutions and the head teacher – are charged with operationalizing and managing school budgets. All government primary schools receive money twice a year from the Government of Kenya with allocations per pupil in delegated budget categories. There is no specific budget category for covering WASH costs and supplies, so even schools that want to prioritize WASH are often unable to do so effectively due to limited funds.

Small-scale efficacy trials of institutional interventions is a potential method for identifying and testing intervention strategies. In this manner, learning is maximized prior to large-scale cluster-randomized trials, commonly employed in operations research. We employed a mixed-methods triangulation design in which in-depth qualitative data from focus group discussions and interviews with key stakeholders were utilized to validate, expand or compare to quantitative data from facility observations and structured surveys.

Study Goals

In this report, we outline findings from a small, randomized trial testing the sustainability and efficacy of various school-based interventions for improving delivery of WASH services. Using both qualitative and quantitative information, we attempt to not only identify intervention strategies with the potential for improving service delivery in schools, but also document the research process used to inform both our analysis and our findings. Results from this trial will serve as the basis for a larger set of proposals and interventions for improving school WASH service delivery in Kenya at the national-level.

The purpose of this study was to determine what factors can have the greatest impact on improving the delivery of WASH services in rural primary schools in Kenya.

Methods

Intervention Development

In order to assess the three above-identified challenges associated with service delivery, we developed three intervention packages to implement in primary schools: increased resources (financial), increased resources (personnel) and increased monitoring and oversight of existing services. Small-scale intervention models addressing each of these factors were pilot tested at nine schools February-April, 2011, and refined based on feedback from key stakeholders, including school officials, teachers, implementing partners, and students. The final intervention models assessed in our small-scale randomized trial were as follows:

1. **WASH Budget Only (WB) schools:** This intervention consisted of financial disbursement to 15 schools of 37KES (\approx 0.44 USD) per pupil. This 37KES figure was calculated by SWASH+ staff based on reported need and costs of basic cleaning supplies and water treatment for three terms. Schools also received guidance documents on how to plan for items such as water treatment and handwashing soap according to their school population, but no specific purchase requirements were placed on the schools.
2. **Roles & Responsibilities (RR) schools:** These 15 schools received the WB package described above plus a set of monitoring tools. Pupil monitoring sheets were adapted from a previous SWASH+ trial and were revised with pupil input during piloting. Teachers were trained on use of the sheets, and provided with a binder of 25 blank sheets (one for each school week) plus guidelines for executing a pupil monitoring program. Additionally, RR schools received information, and guidance on how to engage parent volunteers who would monitor and represent health issues to the School Management Committee (SMC) – a position we called the SMC health rep (some schools already had a parent in this position). Tools for use by the SMC health rep (intended for once-weekly use) were given to the schools to assist in monitoring.

3. WASH Budget Plus (WBP): The WASH Budget Plus intervention package included the WB package described above plus an additional allocation of 5,000KES (\approx 60 USD) for minor repairs of existing school infrastructure in 15 schools. A list of suggestions for minor repairs was given to schools, including fixing latrine door hinges and locks and replacing water taps. Schools were free, however, to prioritize repairs as appropriate for their schools. In addition, schools also had the option to employ a WASH attendant – a parent who could assist with duties such as latrine cleaning and water collection. Schools were encouraged to advertise the position to parents as voluntary, with a small stipend provided to show appreciation. An additional 10,000KES (\approx 120 USD) was allocated to WBP schools that decided to employ a WASH attendant over the course of two 12-week school terms.

School Selection and Implementation

The 70 schools recruited for participation in this trial were selected from three districts¹ where SWASH+ implemented infrastructure and hygiene promotion programs: 28 schools in Rachuonyo, 22 schools in Nyando and 20 schools in Suba. All schools had previously received interventions from SWASH+, but had not been visited for routine data collection for at least two years. Selected schools were randomly assigned to one of the three intervention groups described above (n=15 in each group) or a control group (n=25).

At all 45 intervention schools, an appointment was made with the head teacher requesting the attendance of two to three parent SMC members, two to three non-SMC member parents, the health patron teacher and a non-health patron teacher.² A SWASH+ moderator met with school stakeholders for a discussion of the intervention the school was to receive. The moderator distributed copies of a budget guideline designed to help schools calculate how to spend the 37KES per pupil, according to the school's facilities and population. The guideline did not list items that should be bought. Instead, the moderator told the group the money would be deposited in their school account and they could spend it on WASH supplies as they see fit. For the WBP and RR intervention schools, after distributing the budget guideline, the moderator introduced the additional interventions SWASH+ was suggesting: minor repairs and hiring a WASH attendant (WBP schools) or pupil monitoring and SMC Health Rep (RR schools). After a thorough explanation, an implementation guide was distributed to all stakeholders for each intervention.

Data Collection

Facilities survey

Facility-level data was collected on observed school latrine quality, water availability, soap availability, water sources, current stock of WASH supplies, and reported school demographics. The baseline visit prior to implementation was unannounced. Six additional unannounced visits were conducted approximately

¹Rachuonyo, Nyando and Suba were the names of the districts during initial SWASH+ implementation. Rachuonyo district was divided into North and South Rachuonyo; Nyando has been divided into Kisumu East and Nyando districts and Suba has been sub-divided into Mbita and Suba districts.

² Health Patrons are teachers that were trained on safe water, hygiene, latrine use and disease transmission by SWASH+ during initial implementation, 2006-2008.

every two weeks during the remainder of term two and during term three. After baseline, facility surveys included additional questions about cleaning, water treatment and soap supplies purchased, and questions specific to the WBP and RR interventions. For the fifteen WB schools, the final survey visit included an additional set of structured, open-ended questions conducted by project enumerators.

Interventions were introduced in all schools in May 2011 at the start of the second of three terms in the academic year. Data collection continued over the course of the second and third terms of the school year, for a total of 21 weeks. Although interventions were introduced in the 45 intervention schools within two weeks, it took two to three weeks for schools to withdraw money from their accounts, make purchases and find parent participants (where applicable). It is for this reason we only considered data collected during weeks 4-7 as the post-intervention period.

Follow-up interviews

After the final facility data collection visit was completed, project enumerators conducted 56 in-depth interviews with stakeholders at the 30 WBP and RR schools. The interviews covered topics such as actors involved in the budgeting process, how decisions regarding purchasing supplies or hiring outside services were made, and general opinions on the challenges, benefits, and observed outcomes during the two-term intervention.

Data Processing

The facility survey data were imported into SAS 9.3 (Cary, NC) and outcome measures for each intervention group were compared to the control group. We did not make statistical comparisons between intervention groups due to small sample sizes. Outcome measures included indicators of latrine quality and cleanliness, and presence of handwashing water, soap and chlorinated drinking water. Facility-level outcomes were aggregated across the fourth through seventh data collection rounds, or post-intervention period, and summary measures calculated for each school. Variables representing conditions of all latrines observed to be in use were aggregated to an average score per school, per data collection round. These school-specific averages were then averaged across the post-intervention period. Combining multiple rounds of data collection into a single measure reduced the chance that facility conditions on one day would significantly alter school-specific outcomes.

Detailed notes were handwritten during structured interviews with WB schools and responses typed into Microsoft Word. In-depth interviews from the 30 RR and WBP schools were digitally recorded and transcribed. SWASH+ staff transcribed and translated interviews from DuLuo to English, when applicable. Preliminary coding and highlighting of key themes was carried out in all transcriptions.

Preliminary Results

Conclusions comparing any two interventions should be interpreted with caution, as small sample sizes limited our capacity to make comparisons between intervention groups using the observational data from the facility surveys. We were, however able to draw some conclusions comparing intervention groups using qualitative data.

Facility Survey Data

School demographics and WASH coverage. The average number of students per school in classes one through eight was 337 (range 107 - 690). The average population of nursery school students – students that share facilities, but for whom the schools receive no government funding – was 70 (range 11 – 162). The main water sources for drinking water and handwashing water were, respectively: rainwater harvesting (61%, 54%), boreholes (20%, 27%) and lakes (6% for both). Schools had an average of 36 pupils per latrine observed to be *in use* at the time of the first round of data collection (range 15.3 – 86.3).³

Water containers. All intervention and control schools had between 3 and 4 water containers outside for handwashing or drinking water use. On average, 53-67% of containers in intervention schools had detectable chlorine residuals compared to 24% of containers at control schools. Chlorine residual levels in each of the three interventions arms were statistically significant ($p < 0.05$) when compared to control schools. Across the four rounds of the post-intervention period, 36-43% of containers at intervention schools had soap next to them while at control schools this figure was 6%. This difference was statistically significant ($p < 0.05$). For the mean number of water containers used per school and the proportion of containers with functioning taps, we noted non-significant improvements when comparing intervention groups to controls.

Table 1. Water container data aggregated across the post-intervention period for intervention and control schools

| Indicator | Control (n = 25) | | | WB (n=15) | | | RR (n=15) | | | WBP (n= 15) | | |
|--------------------------------------|------------------|---------|---|----------------|---------|---------|----------------|---------|---------|----------------|---------|---------|
| | Mean (std dev) | Range | P | Mean (std dev) | Range | P | Mean (std dev) | Range | P | Mean (std dev) | Range | P |
| Total number of containers available | 3.6 (1.3) | 2-7 | | 4.4 (1.5) | 2-8 | 0.161 | 4.4 (1.4) | 3-7 | 0.128 | 4.5 (1.8) | 2-9 | 0.131 |
| proportion available with water | 91% (13%) | 67-100% | | 97% (8%) | 72-100% | 0.165 | 93% (7%) | 80-100% | 0.51 | 90% (16%) | 50-100% | 0.757 |
| proportion with functional tap | 98% (4%) | 83-100% | | 100% | – | 0.17 | 99% (1%) | 94-100% | 0.484 | 100% | – | 0.17 |
| proportion with residual chlorine | 24% (28%) | 0-93% | | 67% (28%) | 0-100% | <0.001* | 59% (19%) | 33-100% | <0.001* | 53% (31%) | 0-100% | 0.007* |
| proportion with soap | 5% (13%) | 0-50% | | 43% (32%) | 0-83% | <0.001* | 36% (30%) | 0-88% | 0.002* | 39% (26%) | 0-83% | <0.001* |

* P value significant at <0.05 for interventions compared to control

Latrine conditions. Latrines in the WASH Budget and Roles & Responsibilities intervention schools were less likely than control schools to have any feces on the latrine floor, and less likely to have a strong smell. Latrines in all intervention schools were less likely than controls to have any smell. WASH Budget and WASH Budget Plus schools were significantly less likely than control schools to have latrines that were “somewhat or very dirty” or “very dirty,” respectively. Roles and Responsibilities schools were significantly

³In Kenya, UNICEF has observed many schools with up to 100 pupils per latrine. The Kenyan government guideline is 25:1 for girls and 30:1 for boys. (WASH in Schools: <http://www.washinschoolsmapping.com/projects/Kenya.html>).

more likely than controls to have working doors. The proportion of latrines with doors, and with doors that lock on both the inside and outside was similar for all study groups.

Table 2. Comparison of latrine conditions aggregated across the post-intervention period

| Latrine in use | Control (n=25) | WB (n=15) | | RR (n=15) | | WBP (n=15) | |
|-----------------------------------|------------------|------------------|--------|------------------|--------|------------------|--------|
| | Mean % (std dev) | Mean % (std dev) | P | Mean % (std dev) | P | Mean % (std dev) | P |
| with doors | 80 (23) | 80 (18) | 0.963 | 78 (17) | 0.797 | 80 (15) | 1 |
| with working doors | 82 (18) | 90 (11) | 0.133 | 94 (8) | 0.021* | 88 (15) | 0.331 |
| with working doors & inside locks | 27 (21) | 39 (23) | 0.111 | 29 (22) | 0.75 | 42 (31) | 0.115 |
| a lot of feces inside | 9 (12) | 5 (6) | 0.191 | 5 (4) | 0.115 | 8 (7) | 0.587 |
| any feces inside | 42 (21) | 27 (17) | 0.028* | 25 (17) | 0.014* | 31 (20) | 0.116 |
| strong smell | 26 (22) | 11 (13) | 0.019* | 10 (11) | 0.011* | 15 (17) | 0.085 |
| any smell | 74 (18) | 52 (28) | 0.015* | 58 (26) | 0.044* | 59 (22) | 0.039* |
| very dirty | 24 (18) | 13 (16) | 0.053* | 16 (14) | 0.12 | 12 (10) | 0.016* |
| somewhat or very dirty | 72 (20) | 51 (28) | 0.014* | 58 (25) | 0.075 | 61 (21) | 0.092 |

*P value significant at <0.05 for interventions compared to control

WASH supplies. Intervention schools had more WASH supplies available during follow-up data collection visits than control schools. Detergent and disinfectant, soap for handwashing and chlorine for water treatment, were among the most commonly observed supplies seen in intervention schools. Table 3 below provides a specific breakdown of the proportion of post-intervention visits where supplies were noted at each school. Toilet paper (defined as at least 5 rolls) was more likely to be found at WB and RR schools than control schools and sanitary pads (defined as at least ten pads) were significantly more likely to be found at RR schools than control schools.

Table 3. WASH supplies data aggregated across the post-intervention period for intervention and control schools

| Indicator | Control (n=25) | WB (n=15) | | RR (n=15) | | WBP (n=15) | |
|-------------------------------|------------------|------------------|---------|------------------|---------|------------------|---------|
| | Mean % (std dev) | Mean % (std dev) | P | Mean % (std dev) | P | Mean % (std dev) | P |
| Detergent | 0 | 43 (42) | 0.001* | 42 (31) | <0.001* | 57 (43) | <0.001* |
| Chlorine treatment | 12 (19) | 82 (11) | <0.001* | 78 (16) | <0.001* | 93 (15) | <0.001* |
| HW-specific soap ¹ | 2 (6) | 52 (35) | <0.001* | 40 (38) | 0.002* | 52 (44) | <0.001* |
| Any soap ² | 2 (6) | 60 (34) | <0.001* | 57 (29) | <0.001* | 80 (29) | <0.001* |
| Disinfectant | 0 | 55 (34) | <0.001* | 60 (30) | <0.001* | 78 (30) | <0.001* |
| Toilet paper | 0 | 20 (36) | 0.047* | 23 (37) | 0.029* | 12 (31) | 0.17 |
| Sanitary pads | 1 (4) | 5 (10) | 0.178 | 20 (33) | 0.043* | 8 (22) | 0.233 |

*P value significant at <0.05 for interventions compared to control

¹HW-specific soap: schools specifically mentioned that this soap was for handwashing.

² Any soap: field enumerators observed soap amongst the supplies

Interview Data

Enrollment

We completed a total of 56 interviews with teachers, SMC members and health patrons. At least one interview was completed at each of the thirty WBP and RR schools. At the fifteen WB only schools we were able to hold structured interviews with a teacher (mostly head teachers) at each school.

WASH Budget – All Intervention Groups

Budgeting of intervention funds. At most all of the intervention schools, the head teacher, deputy head teacher, health patron and a few SMC members were involved in developing the budget of how to spend the 37KES per pupil. Many schools did not involve parents not affiliated with the current SMC. Teachers said if they were to repeat the process, they would involve more parents in the budgeting process to increase transparency. Involving parents outside of the existing SMC was seen as a way to establish that the school received rather limited financial packages as part of the intervention. By sharing this information with the broader group of parents, school officials hoped that parents would be more likely to contribute funds or in-kind services once funds or supplies from SWASH+ were exhausted.

WASH supplies purchased. Schools either purchased supplies in bulk or on an as-needed basis. Bulk purchases were thought to reduce transport costs, reduce chances of re-appropriating money to other things, reduce prices, and were easier to monitor. Schools that purchased items on a more frequent basis recognized the transportation savings they could have had by buying in bulk, but had a variety of reasons for purchasing “in bits”: concerns about students or teachers stealing supplies due to perceptions that the schools has “plenty to spare,” monitoring a smaller quantity of items each term was seen as easier than across a full year, and essential items such as chlorine treatment and soap were seen as more likely to last when purchases were made at the beginning of each term.

Water treatment. Every intervention school purchased either WaterGuard or Aquaguard for water treatment. Many of the head teachers noted that they preferred to buy these chemicals on a weekly or monthly basis since they have short-term expiration dates compared to other cleaning products.

Sanitary pads. A number of schools elected to use some of their WASH budget to purchase sanitary pads for *emergency use* since money was not enough to provide a regular supply for all girls. The subject of sanitary pads helping girls stay in school came up in numerous interviews, initiated by the respondents themselves. Even a number of elderly SMC chairmen (who do not attend government meetings where sanitary pads have been discussed) brought up the importance of providing pads to support keeping girls in school. A number of interview respondents reported that they opted not to buy sanitary pads with the money because they had heard the government would soon be supplying them to all primary schools.

Roles & Responsibilities Intervention Group

Pupil monitoring. All fifteen schools receiving the RR intervention reported that their pupils utilized the monitoring sheets. Because completed sheets were rarely returned to the supplied monitoring binders, SWASH+ staff could not confirm the level of school participation. Schools reported that the students involved in monitoring ranged from every student in classes 4-8, to health club members only or to a select group of health club prefects. Head teachers reported that the pupils enjoy monitoring and the teachers do not have to coerce them into doing the activity. Nearly all head teachers said that when pupils find a messy latrine, broken door or missing soap, they now report this to either the teacher on duty or the health patron.

Teachers at many of the RR schools reported that students are less likely to steal soap and they care more about conserving supplies since monitoring began. A number of head teachers reported the positive impact of student monitoring, saying that problems are noticed, and addressed sooner by the school, since the SMC is made aware of problems through the formal reporting system. All schools report that they intend to continue monitoring beyond the intervention period. A few of these schools noted that while they hope to continue with pupil monitoring, they are worried pupils might get bored and that teachers have limited time to oversee the monitoring.

SMC health representative. All fifteen RR intervention schools reported having elected an SMC health representative. In some schools this position was given to an existing SMC member, and other times it was a parent added to the SMC. The duties of the SMC health representative during a weekly visit generally consisted of checking on facilities, reviewing pupil monitoring sheets, talking to the head teacher and giving updates to the committee on the current conditions of the WASH facilities at the school. While all RR schools had SMC health representatives, some head teachers reported that the representative was often too busy to come to the school. For teachers that did not have a “diligent” representative, they still reported that they intended to continue with the program and saw the benefit that such a parental-role could have. Schools with active representatives reported some of the benefits of a SMC health rep: parents will become more aware of the challenges teachers face at school, the SMC health rep will teach parents more about the importance of clean water and latrines, parents will trust this person when the school is asking for additional funding to support the WASH program, and the SMC health rep “keeps teachers on their toes.” Likewise, head teachers generally reported that the teachers all had a positive view of the SMC health rep and appreciated their participation in monitoring and interest in improving school conditions.

WASH Budget Plus Intervention Group

Minor Repairs. Schools received 5,000KES to spend towards minor repairs. At many schools the health patron and head teacher decided what to repair without input from parents. Some schools chose to invite a repairman to the school to look at the facilities, give estimates for items in need of repair, and then discuss the priorities at a meeting with the SMC or parents.

Schools selected a range of ways to spend their minor repairs budget. From interview data, the most common use of funds was the replacement of water taps on water containers and storage tanks, and hinges or locks on latrine doors. Two schools used funds to empty some of their pit latrines, while others chose to spend all the money on fixing the floor or wall

...Some of the doors were...not lockable from inside. And therefore, especially the girls were not safe to use those, the latrines with faulty doors. But after the repairs were made, they were very free. And therefore there's nothing that is disturbing them.

- Head Teacher

of one latrine. Comments from teachers were that the minor repairs were constructive and resulted in important improvements. At the schools where

repairs were made to latrine doors, respondents reported that everyone, especially the girls, now felt more comfortable when using the latrines.

Very few of the 70 study schools had latrine pits that were reported to be almost full – but all teachers expressed concern about what the school would do when they filled up due to the high cost of latrine-emptying or their lack of experience on the subject. Estimated emptying costs ranged from 1,500 – 3000 KES (≈17-36 USD) per pit to 10,000 KES (≈120USD) per latrine bank.

Initial views of WASH attendant position. Twelve of the fifteen WBP schools decided to implement a WASH attendant. The three schools that chose not to implement an attendant reported concern about what they would do after two terms when the money ran out. All fifteen WBP schools reported initial concern about finding someone to clean latrines for minimal pay due to the cultural taboo of latrine cleaning. During follow-up interviews in October and November 2011 respondents were asked about the specific “benefits” and “concerns” discussed among stakeholders at their school. All schools, whether they hired an attendant or not, were able to report opinions on both sides of the issue. The results are shown in Table 4 below.

The decision to hire an attendant was dependent on a vote by SMC members and parents in attendance at the meeting. Reasons for not employing an attendant varied at each of the three schools that did not hire an attendant during the follow-up period. At one school, the SMC chairman reported that the SMC and parents voted to implement a WASH attendant, but after the meeting the head teacher decided it was in the school’s best interest not to do so due to sustainability concerns. Another school expressed interest in hiring an attendant, but as of October 2011 had not found a parent interested in the position. At the third school, officials decided they would rather spend the money to supplement minor repairs and purchase a higher quantity of cleaning supplies.

Table 4. Reported benefits and concerns of implementing a parent volunteer to wash latrines, collect water, or perform other related WASH duties, Nyanza Province, Oct-Nov 2011.

| Benefits | Concerns |
|---|---|
| children can get to class sooner and spend more time in class | children will be spoiled |
| children do not have to come in contact with cleaning chemicals | children will not respect the cleanliness of latrines |
| children do not have to come in contact with feces | children are already accustomed to collecting water and cleaning latrines |
| it is dangerous for children to have to walk a far distance to get water each day | no parents have time to come to the school |
| the money will benefit someone in the community | difficulty sustaining the program after the money runs out |

WASH attendant compensation and duties. The stipend paid to attendants (KES per week) ranged greatly: 3 schools paid 200KES, (\approx 2.40USD), 1 school paid 300KES, (\approx 3.60USD), 7 schools paid 400KES (\approx 4.80USD) and 1 school paid 1000KES (\approx 12.00USD). Nearly every school expressed that they hired a parent who was “most needy” to do the job, often a widow from the local community. The duties of the attendant consisted mainly of cleaning latrines, while some additionally collected or treated water. Due to the small stipend, many schools tended to compromise with the attendant on the work schedule, for example having him or her come two to three times per week to deeply clean the latrines, while students were expected to sweep them out with water on the other days.

Actually the latrines are now clean. The pupils that used to go outside the fence are now visiting the latrines. So there we have seen some improvement. Also it gives time for the pupils to stay in classrooms in the morning hours instead of spending a bit of their time in washing the latrines.

- Head Teacher

Head teachers, SMC chairpersons and health patrons at the twelve implementing schools raved about the positive effect of the attendant. They all reported the improved condition of the latrines, even at schools where the attendant did not come every day.

Many head teachers reported that students were actually *more* respectful of keeping latrines clean than they were prior to the intervention. Two common reasons given was that students wanted to impress the attendant, often a schoolmate’s parent, or did not want to soil latrines the attendant had worked so hard to clean on their behalf. Multiple teachers expressed their appreciation for the attendant because the work of the attendant required minimal supervision.

Additionally, many schools report that the WASH supplies were used more conservatively by the attendant compared to pupils while simultaneously doing a better job in cleaning. Respondents at all twelve WASH attendant schools reported that visitors had noticed there was a lack of smell in the latrines, and students were no longer using the area outside the latrines to relieve themselves.

Personally I would recommend that the WASH attendant continue...I have seen that if the WASH attendant is there, the management of the toilets becomes easier...regular checkups by the duty teacher...sometimes becomes a problem. But if the WASH attendant is there, he will continue to take care, and make the toilets to be clean also.

- Head Teacher

All twelve schools that hired an attendant expressed the desire to continue the program. Every head teacher talked of the intention to hold a parent’s meeting so they could discuss a way forward to support the WASH attendant – potentially through increasing extracurricular school fees by 5-10KES per child.

Limitations

Although visits were unannounced and schedules adjusted so that follow-up data collection was not scheduled for the same day and/or time every two weeks, school officials and pupils were generally aware of routine data collection schedules. At one school, the head teacher reported that students wanted to

keep their latrines clean since they knew they would soon be receiving a visitor from SWASH+. While schools may have maintained facilities more diligently than normal due to routine follow-up, this effect likely occurred across all study groups and was not isolated just to schools receiving interventions. Any potential response bias reflected in our data also demonstrates the positive effect that monitoring can have on WASH outcomes. A study on sustainability of sanitation and hygiene approaches in Zimbabwe by Whaley and Webster (2011) also found that monitoring visits from outsiders can have a positive impact on behavior.

In the RR schools, results related to the SMC health representative were limited by the short length of the trial, and too few scheduled SMC meetings. The job of the SMC health representative was to visit the school weekly and report observations to the SMC meetings for appropriate action. Although the duty of reporting was recognized as a huge benefit to the school, this did not occur frequently due to the limited number of SMC meetings that took place during the trial period. Additionally, since RR schools had two different monitoring interventions (pupils and SMC health rep), it was difficult to decipher which had the greatest effect.

One challenge at many WBP schools was that the WASH attendants did not work daily, and pupils were still involved in latrine cleaning or water collection. Many head teachers saw this sharing of duties as a benefit since pupils were still learning to care for their facilities. However, for the purposes of the study, the intervention was meant to absolve the pupils of latrine cleaning duties and allow them more time in class. Because WBP schools made repairs on latrine infrastructure, and also had a WASH attendant, it is hard to know which aspect of the intervention had the greatest effect on latrine cleanliness.

Additionally, because all 45 intervention schools chose to spend their 37KES per pupil budget slightly differently, we cannot guarantee that it was the appropriate amount to cover basic WASH supplies for one full year.

Discussion

Overall school conditions improved

Compared to control schools, intervention schools had clearly improved WASH conditions due to the increased budget for WASH supplies. The latrines were cleaner, drinking water was more likely to be chlorinated, and intervention schools were more likely to have soap near handwashing containers. While these are positive results, there is room for improvement with respect to consistent soap provision and water chlorination. According to observations made during the post-intervention period, all intervention schools had purchased the appropriate supplies and had them in stock. It is unclear why schools did not chlorinate their water or place soap outside next to handwashing containers when they had these items available at the school. Findings from previous SWASH+ studies suggest that if the health patron is absent, or not on duty, the other teachers in the school will not necessarily ensure water is collected and chlorinated, latrines are cleaned and soap is provided, since they do not see it as their role.

The RR schools were most likely to have latrine doors that worked and sanitary pads in stock – both outcomes that were not significant for the other two intervention groups. These findings suggest that either pupil monitoring and engagement, or increased involvement of a parent in school WASH, leads to improved school conditions. All intervention schools received the same 37KES per pupil allocation, and the RR schools were most likely to have purchased sanitary pads.

In WBP schools, having a WASH attendant for latrine cleaning did not necessarily lead to cleaner latrines. Two school-based WASH studies involving janitors found similar results, observing that schools with and without a janitor had comparable latrine conditions (Mathew et al., 2009; Njuguna et al., 2009). While the data in this study did not demonstrate that janitors clean better than pupils – this finding can be interpreted in two ways. First, latrines can only get so clean, and untangling clean and very clean is unrealistic. Second, the benefits observed and reported by schools with a WASH attendant went well beyond latrine cleanliness. Having a WASH attendant reduced student time outside the classroom, teachers' time spent monitoring and school costs due to more efficient use of cleaning supplies.

Role of school management committee and parents

Throughout all intervention schools there was a consistent theme emphasizing parental involvement in school matters – especially school WASH. SMC chairpersons and head teachers both discussed the importance of parents attending the WASH budgeting meetings for reasons of accountability and transparency. The RR schools had the strongest role for a parent to play, with someone selected to visit the school each week and present the WASH challenges and needs to the SMC. In turn, RR schools reported that SMCs took all suggested repairs and maintenance costs into consideration, with the majority taking action, either through approving use of school funds, or through seeking assistance from parents. Schools were optimistic about the SMC health representative position and hoped to find a sustainable way to continue parental involvement in WASH at the school. For WBP schools, nearly all parents and SMCs were in agreement of the benefits a WASH attendant could provide in their school. The main challenge during implementation was finding a parent volunteer to clean latrines for low pay, along with the reported cultural taboo against latrine cleaning.

Recommendations

1. ***Allocation of a School WASH Budget.*** Our findings confirm that schools with an additional budget for WASH have the capacity to greatly improve their conditions. Schools could also benefit from specific purchase guidelines and supply lists, especially if accompanied by a network of items supplied to government schools at reduced or wholesale prices. Additional research is needed to confirm the minimum amounts schools require in other regions of Kenya.
2. ***Improved or Alternative Monitoring System.*** Results from our study demonstrate the positive impact consistent monitoring can have on school WASH outcomes. Whether monitoring is done by a local government official or by a combination of pupils and parents, there is likely to be improved delivery of WASH services in schools. Additional studies are needed to understand the most effective means for consistent monitoring in schools.

3. ***Alternative Cleaning Management.*** Our data suggests that a WASH attendant to clean latrines and collect water on behalf of students is an acceptable and constructive way to reduce the burden on teachers and students and allow them extra time in class. More research is needed to define how a WASH attendant can be employed and sustained in rural and other school settings in Kenya.
4. ***Plan for Latrine Emptying.*** Although not a specific question at the outset, we learned that nearly all schools in the study are concerned about what will happen when the latrines are full. For remote rural schools, manual removal of waste is often the only option for latrine emptying. Due to the taboo and nature of the work, manual waste removal is generally prohibitively expensive for schools. Additionally, there is concern that inexperienced people in rural areas may not know how to empty and dispose of the fecal matter safely and without causing damage to the slabs or foundation of the latrines. SWASH+ schools in Nyanza Province, as well as other WASH program schools across Kenya, are in need of an effective and affordable solution for emptying their latrines.

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