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TEACHER PERSPECTIVES ON IMPLEMENTING AND SUSTAINING A HANDWASHING PROMOTION INTERVENTION IN WESTERN KENYAN PRIMARY SCHOOLS*

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ABSTRACT

School-based handwashing programs are challenging to establish and sustain, especially in low-resource settings. This qualitative study described teacher perspectives associated with implementing and sustaining a handwashing program in primary schools participating in the Nyando Integrated Child Health and Education (NICHE) project. Structured key informant interviews were conducted with teachers. Prevalent concepts and themes were grouped into themes and topic areas using an iterative, open coding approach. Forty-one teacher respondents reported favorable expectations and benefits of handwashing programs. The importance of available resources (e.g., reliable water) was cited as a primary concern. Other challenges included time and personal or institutional financial commitment necessary to ensure program sustainability. Handwashing programs in low-income, rural schools, where infrastructure is lacking and "student ambassadors" extend the intervention to the surrounding community, hold great promise to improve community health. Teachers must have adequate support and resources to implement and sustain the programs.

INTRODUCTION

Diarrhea causes approximately 800,000 deaths in children less than 5 years old annually, mostly in developing countries [1]. Handwashing with soap is a low-cost intervention that has been shown to reduce the risk of diarrhea [2]. While traditional handwashing interventions are cost-effective, simple, and can be effective at reducing the occurrence of childhood diarrhea, further research is necessary to determine improved methods to encourage individuals to adopt and maintain proper hand hygiene behaviors such as washing hands after using the latrine [3, 4].

Behavior change initiatives promoting handwashing in primary schools have met with some success [5-7]; however, school-based handwashing programs are challenging to establish and sustain, especially in low-resource settings [8]. Furthermore, there is little published literature about the feasibility or success of primary school-based handwashing programs, and feedback from teachers is often not sought in a systematic manner. In their evaluation of a handwashing promotion program in Chinese primary schools, Bowen and colleagues acknowledge that school-based interventions, though an appropriate and advantageous intervention avenue, require considerable commitment, time, and resources from school officials, teachers, and students [5]. Costs to establish and sustain programs can be a prohibitive factor in resource-poor settings [7]. An evaluation of school-based handwashing programs in rural Kenya showed that program sustainability is contingent upon individual, institutional, and governmental support [8]. Teachers, however, are often accountable for carrying out programs, engaging students, and maintaining equipment [8].

Before schools can be expected to undertake and sustain handwashing programs, more information about essential resources and how to overcome barriers to implementation needs to be available, to enable local teachers and school staff to design, implement, and sustain programs. This qualitative study sought to gain teacher perspectives on barriers and facilitators associated with implementing and sustaining a handwashing program in primary schools participating in the Nyando Integrated Child Health and Education (NICHE) project, a community-based program of multiple, bundled child health interventions in Nyanza Province, western Kenya, with an evaluation component that involved data collection from 2007 to 2010 [9].

METHODS

NICHE Project

The NICHE project, conducted by a Kenyan non-governmental organization called the Safe Water and AIDS Project (SWAP), the Kenya Medical Research Institute (KEMRI), the Centers for Disease Control and Prevention (CDC), and Ministries of Health and Education in rural western Kenya, focused on integrated approaches to household-based interventions to promote community health. One component of the NICHE project involves community use of the Safe Water System (SWS), a three-pronged intervention consisting of point-of-use water treatment, safe water storage, and behavior change techniques for safe drinking water, handwashing, and sanitation. Through NICHE, the SWS intervention was implemented in 51 primary schools in two stages in Nyando District, western Kenya [9]. Two teachers from each school were trained in the handwashing program that included use of the SWS in schools and were encouraged to set up SWS and handwashing clubs in their schools. All schools were provided with containers for safe water storage, soap for handwashing, water treatment supplies, and low-cost, locally available materials to set up handwashing water stations. These materials were provided and replaced for 1 year, after which schools were expected to continue the project independently if desired. Education manuals on handwashing were also provided. Schools were monitored throughout the year by locally trained NICHE staff members.

Setting

This study took place in Nyando division (population 80,000), an impoverished area located in Nyanza province in rural western Kenya. Compared to the rest of the country, Nyanza province has the highest under-five and infant mortality rates (95 and 149 deaths/1,000 live births, respectively). Childhood disease burden is also high in this area, including diarrheal disease (2-week period prevalence was 16.2% for children < 5 years) [10].

Respondents

A purposive convenience sample of teachers was selected from 16 NICHE schools that received the SWS intervention 14 months previously. Up to three teachers were asked to participate from each school: a Head Teacher or Deputy Head Teacher, a teacher who was trained by the NICHE project, and a teacher who was not trained by the NICHE project. Teachers' positions were confirmed by the Head Teacher or Deputy Head Teacher. Training for the NICHE intervention was based on self-report and confirmation by NICHE staff. Male and female teachers were interviewed (sex categorized according to self-report). Informed consent was obtained from respondents before interviews were conducted.

Interviews

Structured interviews were carried out between July and August 2008. Interview scripts were designed based on the goals of the handwashing component of SWS and reviewed for clarity and completeness by NICHE staff. The interviewer asked each respondent a standard series of open-ended questions. Individual interviews were conducted in locations as confidential as possible: in empty classrooms, private offices, or on school grounds. Respondents were asked to share their perceptions and experiences with the services provided by the school's handwashing program.

Interviews were conducted in English, digitally recorded, and transcribed verbatim without alteration or deletion of statements. Respondent names or identification were not recorded. Each interview lasted for 15 to 30 minutes. Ethics approval for the study was obtained from institutional review boards at the CDC (protocol 5039), the University of Washington, and the Kenya Medical Research Institute (protocol 1176).

Analysis

The structured nature of the interview questions allowed for the identification of several *a priori* variables of interest, upon which an initial codebook was developed. To refine the codebook, two authors (JMG, EDF) coded a random sample of 10 transcripts together. Emerging themes beyond the pre-specified variables were identified and recorded using an open-coding approach. Coding from each evaluator was compared and discrepancies were discussed. New codes were iteratively developed and defined and added to the codebook when deemed appropriate by both coders. The authors independently coded the remaining transcripts and discrepancies were discussed as necessary.

Codes and assigned text were entered into Microsoft Excel. Variables directly based upon the interview questions were classified as categorical or binary variables [11]. Text derived from the open-coding approach was grouped into major themes and topic areas in order to facilitate reporting.

RESULTS

Across the 16 NICHE schools selected for this study, 41 teachers were approached and all agreed to participate in interviews. At most schools ($N = 10$) three teachers were interviewed, two teachers were interviewed at five schools, and one teacher was interviewed at one school. Most respondents were female (63%) and the majority identified as Teachers (44%) or Head/Senior Teachers (37%) (Table 1). Among those interviewed, approximately half (51%) reported attending formal training provided by NICHE for the SWS intervention.

Open coding of interviews resulted in the generation of five categories, with several subcategories (Table 2). Categories included expectations (pre-intervention), benefits (post-intervention), resources, sustainability, and translation of the intervention into the community.

Expectations

In interviews, teachers were asked to reflect on their expectations about the SWS intervention before implementation. Twenty-six (63%) respondents provided comments that referred to how they expected the SWS intervention would benefit health after implementation. For example, one teacher commented, "We expected that at least the children at their basic health to improve. You know, in this area there is frequent outbreak of cholera. So that kind of cleanliness, maybe that cholera will at least go down" (Teacher). Teachers were also asked about personal impressions about the intervention after it had been in their school for over 1 year. Many teachers commented that the intervention benefited pupils'

Table 1. Characteristics of Interview Respondents

Characteristic	Count (*N*)	Percent (%)
Gender		
Female	26	64
Male	15	37
Position		
Head/senior teacher	15	37
Deputy head teacher	1	2
Teacher	18	44
Assistant teacher	2	5
Unknown	5	12
Trained for NICHE intervention		
Yes	21	51
No	20	49

Table 2. Results from Open Coding of Interviews with Teachers

Category	Percent of interviews[a]	Test example
Expectations (pre-intervention)		
Neutral	46.3%	I knew there was going to be something good for the school.
Not associated with health	51.2%	At first when it was introduced, we thought it was something that was going to interfere with the normal learning of the kids.
Associated with health	63.4%	We thought it would help us alleviate this problem of waterborne diseases and others.
Benefits (post-intervention)		
Neutral	29.3%	It is trying to create a positive affect to pupils to school and community. Students are changing attitudes.
Not associated with health	34.1%	We have seen these children developing a habit of actually washing their hands from the toilet without being asked to do that. That one has helped instill the sense of hygiene and sanitation. Not only the children, but even the teachers.
Associated with health	87.8%	Because the sickness, that stomach ache all the time, it is diminishing. You might find that it is not as it used to be. When you used to come to class one, six are absent. Why? Stomach ache. Some are diarrhea, and so on. So with the improvisation (sic) of that, it is good.

Resources		
Neutral	68.3%	At present we have [a permanent source of water], we had one previously but it was not working, but now we are trying to revive it if it can now work. But having that one in place, it is not going to be easy because . . . we can carry out the treatment.
Positive (Facilitates the intervention)	51.2%	We lucky. We have a permanent river close by, and we also have a borehole within the school. So those challenges we have never come across them.
Negative (Barrier to the intervention)	65.9%	Relatively, it has not been all that easy because we have a water problem. So initially there was a water problem . . . so now you can see that we are a bit relieved that we get water inside the school compound. But initially it was difficult. We have a . . . [1:54] . . . now it has taken 5 years before it was repaired. It was only last week that it was repaired so now I think we are going to get a bit of relief.
Sustainability	97.6%	So, in order to sustain it, it's just the parents to be here to help where needed. They have not been negative. They have been positive because they have seen the good side of it.
Translation of intervention into community or across participants	87.8%	We can use the pupils, we can train the pupils. Then after training them, they can now sensitize their parents at home. Another way we can use parents day meetings to sensitize. We had even talked to that, we even discussed that those teachers who are trained. That they can use that opportunity when parents come to school to train them on safe water.

[a]Percentages indicate the percent of interviews containing text that was grouped into the listed category. Categories are not mutually exclusive.

health at their school. Comments regarding direct observations of the health benefits of SWS referred to a decline in the rate of diseases such as dysentery, reduction in medical expenses for pupils' stomach aches, fewer health complaints among pupils, and pupils performing better in sports against other schools.

Resources

Open coding provided insights regarding the teachers' opinions on the resources necessary for the SWS intervention (i.e., barriers and facilitators). Program necessities, such as buckets, WaterGuard (a liquid chlorine solution), and soap were often cited as necessary elements for a successful intervention. Presence of a reliable water source was mentioned as a crucial facilitator to the project:

> Because we have water on the school compound, we expected [the intervention] to be easy, not difficult. Because sometimes it becomes tedious when you send children to go and look for water maybe far away from the school. But now that we have our own borehole, we are not experiencing that [difficulty]. (Head Teacher)

In contrast, teachers at schools without a water supply spoke of the need for a borehole or permanent water source:

> Water availability—it is not there. We have a river, but it is quite away, some distance away. So getting it is not so much easy. Because we are also afraid if you sent the children there, they may get in the river and maybe get drowned. So getting water is a problem. (Teacher)

The time necessary to maintain intervention was often mentioned as a critical (and potentially unnoticed) resource. This includes the time necessary to set up and monitor handwashing stations, as well as the time to purchase supplies. One head teacher stated, "it was becoming cumbersome to purchase these things again and again."

Several teachers recognized the financial challenge of maintaining project supplies and materials, calling it a "sacrifice" to keep the project going. A teacher stated, ". . . there may be some problems because you know you have to part with some money to buy this WaterGuard. And the soap. And the buckets." They brainstormed possible sources for funds to ensure the project would continue after NICHE support ended:

> Funds for this—we shall get maybe some funds from the ministry. Maybe talk to parents, maybe we can chip in—a few coins, if they have. (Head Teacher)

Sustainability

Most teachers (98%) provided opinions and suggestions on how to achieve sustainability for SWS. One teacher recommended using income generating projects to support the intervention:

> If only we can get a project that can sustain the school. Yeah. We have these [for] poultry, we have [for] forestry. We have so many things that the school can continue that can be like an IGA (income generating activity) for the school. That can help sustain the school. We should not always be relying on the [project funds], all the time we want the taps.

Connections to the Community

Interviews showed that the SWS project was not confined to the school property—handwashing and hygiene were being discussed in the surrounding community—and the impetus for this translation is the children. One teacher called her pupils "great ambassadors," telling us that "what they learn at school they carry home." A head teacher said, "What [the children] are doing here, they are practicing it even at home." Parents and community members also benefit from the intervention in schools. The impact on family members is summarized by one head teacher:

> The parents? Very very happy. Because, first of all, this project came to school first. Then the information was disseminated to the parents and now the parents are also practicing what they saw in school. And they are seeing the effects. They are seeing that whatever we give them, or the information that the pupils took back home, is now helping them and they are also becoming very healthy in terms of drinking safe water and also handling things in a more hygienic manner.

Not all teachers who were interviewed shared this view, however. There was concern among some that children were not exposed to the same hygiene practices at home and that the skills they learned at school would diminish at home.

DISCUSSION AND CONCLUSIONS

Teachers interviewed in this study provided two important insights about sustaining a primary school handwashing program in rural Kenya. First, programs similar to the NICHE project may benefit from developing and maintaining positive, yet realistic, expectations among project staff. Teachers interviewed for this study described expectations for positive health outcomes from the hygiene intervention, which may have served as a motivating factor. Second, problems in maintaining supplies in the program led teachers to suggest that developing strategies for purchasing supplies and materials, either through government or parental contributions or school-based income generation, would not only help ensure the project would continue after initial support ended, but would also foster ownership and accountability for the project's future directions.

According to the teachers, there were several important challenges to program success. The challenges included: distant water supplies; limited resources that required teachers to make personal financial "*sacrifices*" if they wanted to

maintain the program; frequent teacher turnover with the attendant loss of programmatic knowledge and commitment; supply stockouts; and limited time and minimal curricular materials to carry out the handwashing program. Several of these challenges could be mitigated by increased involvement and management of the handwashing program by the school administration [8]. In fact, the Kenyan government's recent decision to incorporate water, sanitation, and hygiene into the national curriculum [12] should permit the training of all teachers, which will alleviate the problem of loss of institutional memory through teacher turnover, and assure that teachers have adequate time for handwashing and hygiene lessons. If these curricular changes are accompanied by additional funding for construction of water supply nearer to schools and purchase of hygiene supplies, then most of the barriers to sustainable school hygiene programs would be lowered.

This study had several important limitations. First, the analysis and conclusions were based on key informant interviews of teachers at NICHE project schools and may not be generalizable beyond the project. However, interviews with teachers in other rural Kenyan schools identified similar challenges and enablers to sustaining handwashing programs [8]. Second, because most interview questions were open-ended, we did not have a denominator to evaluate the frequency of teachers' claims or statements. However, comments from teachers reinforced and illuminated quantitative data collected in the same population [9]. Third, we were not able to systematically collect data on the thoroughness of hygiene program implementation in schools, and it is likely that some schools carried out the project more successfully than others. Information reported by teachers is thus subjective and reflects their individual experiences with the NICHE project. Also, teacher's optimistic expectations for the NICHE project prior to implementation might have contributed to their perception of the program's success and value. Because interviews were only conducted at one point in time, it is not possible to evaluate this relationship. Finally, despite the relatively large number of interviews for a qualitative study, only 16 NICHE schools were involved in this study, limiting the representativeness of the data.

Handwashing programs can serve as low-cost, effective interventions to reduce the risk of diarrheal disease and acute respiratory infections [2]. Additional benefits of school-based handwashing programs include reductions in absenteeism [5, 7, 13], as described by teachers in this study (Table 2, health benefits expectations). Focusing handwashing programs in low-income, rural schools, where infrastructure is lacking and "student ambassadors" can extend the intervention to the surrounding community, holds promise to improve health, not only of pupils, but of their parents and families as well [7, 14]. Challenges described by teachers in this study may be addressed through institutional support and improved access to resources. As shown in this study, qualitative data complements quantitative information and offers useful recommendations for initiating and sustaining school hygiene programs. In interviews for this study, teachers discussed challenges, facilitating factors, and suggestions for

sustainability that might not have been obtained through routine, close-ended questionnaires. If modest funding accompanied the implementation of handwashing curricula, the resource issue cited by many teachers could be alleviated. The enthusiasm and support exhibited by teachers could be buttressed by commitment from government partners to improve hygiene and sanitation conditions, ensure adequate resources, and safeguard the sustainability of handwashing programs.

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