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The Development of a Water, Sanitation, and Hygiene Training Manual for Community Health Workers in Low Resource Arid Regions: A Special Studies Project

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The Development of a Water, Sanitation, and Hygiene Training Manual for Community Health Workers in Low Resource Arid Regions: A Special Studies Project

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2022

Abstract

The Development of a Water, Sanitation, and Hygiene Training Manual for Community Health Workers in Low Resource Arid Regions: A Special Studies Project

By: Nisha Patel

Background: The Kenyan-based non-profit Riruta United Women Empowerment Programme is launching a WASH program for rural Kenyan communities. They have requested the development of a WASH training manual for community health workers (CHWs) that live in arid regions and lack access to safe water. There is a need for community members to be trained as community health workers on the topic of WASH in arid areas in countries such as Kenya to reduce the occurrence of water-based diseases.

Methods: A literature review was conducted using the databases Google Scholar, Web of Science, and PubMed. The studies in the literature review are a mix of cross-sectional studies, systemic reviews, and journal articles. Only articles in English were included. Some keywords that were used for research were WASH, community health workers, invest, arid regions, health programs, inadequate WASH, knowledge, attitudes, and practices, community health, investment, and health outcomes. The keywords were used in many combinations.

Results: A WASH training manual was created to train community members by community health workers. The training manual addresses how water can be treated at household levels so that it can be made safer for consumption. A resource guide was also developed for the trainers so that it provides them with more education on the methods and issues that they will be training community members on.

Conclusion: The training manual provides the trainees an opportunity to engage with the material through activities, discussions, and demonstrations. The training manual is a start to developing a comprehensive WASH training program. Investment in CHWs to advance and create a full WASH program is needed. Investment in CHWs has been found to be a resourceful and effective way to provide health education in communities where that is a gap in resources. Investing in small-scale and local programs can be an effective method of increasing WASH knowledge and influencing WASH practices.

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Acknowledgements

I want to thank the Anne Baraza, the CEO and founder of Riruta United Women Empowerment Programme, for entrusting me and providing me with the opportunity to develop to a WASH training manual that for their communities. I would also like to thank Dr. Kenneth Castro for agreeing to be my thesis chair and offering his guidance, time, and feedback on this project. I want to also thank Dr. Joanne McGriff for agreeing to be my thesis committee member and serving as the WASH Subject Matter Expert while I worked to develop the training manual and the resource guide.

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Introduction

The lack of clean water and proper sanitation and hygiene education can lead to various diseases such as cholera, diarrhea, and dysentery (World Health Organization Regional Office for Africa, n.d.). The United Nation's 2015 Sustainable Development Goal 6 is aimed at "Clean Water and Sanitation". Specifically, Goal 6B is to "Support and strengthen the participation of local communities in improving water and sanitation management" (United Nations, n.d.). Investing in Community Health Workers is an important component to help reach this goal.

More specifically, it is important to provide the communities who reside in arid regions with water, sanitation, and hygiene (WASH) trainings to prevent and reduce diseases that may arise in absence of the sufficient water system infrastructures (Mynepalli K. C. Sridhar, Oladapo T. Okareh, & Mohammed Mustapha, 2020). In this context, more than 80 percent of the landmass Kenya is classified arid and semi- arid lands (ASAL) and affects 16 million people, which is about 30 percent of the population. (International Union for Conservation of Nature, n.d.). When people are living in arid regions their water-resources are scarce and their knowledge, attitudes, and practices in WASH must be strengthened and optimized to provide this precious resource and simultaneously reduce adverse health outcomes associated with limited access to clean water. In these special settings it is crucial to provide education and ensure the proper selection and support of those delivering this ongoing education and training. Community Health Workers have been identified as effective and efficient in underserved areas (Seutloali, Napoles, & Bam, 2018).

This thesis will explore the need for investment in properly training community members living in arid regions of the Kajiado West region, which is south of Nairobi, in Kenya. There are numerous benefits to training community members to be community health workers. They are

able to address the social and behavioral determinants of the population and have been proven to cost effective for various health interventions (Assoication of State and Territorial Health Officals & National Association of Community Health Workers, n.d.).

Literature Review

Overview

The articles in this literature review were found through Google Scholar, Web of Science, and PubMed. Only articles in English were included in the literature review. Key words used for research were WASH, community health workers, CHW, invest, ASAL, arid regions, water, sanitation, and hygiene, health programs, inadequate WASH, knowledge, attitudes, and practices, KAPs, community health, water related diseases, lack of water, investment, rural, and health outcomes. The key words were used in many different combinations to find articles that informed the different topics discussed in the literature review.

The studies in the literature review are a mix of cross-sectional studies, systemic reviews, and journal articles. The literature review begins with a focus on the health impacts and consequences of having an inadequate access to clean water particularly for people live in arid and semi-arid lands. It continues to highlight that adequate access to safe water is not enough to reduce the impacts of waterborne diseases and how knowledge, attitudes, and practices for water, sanitation, and hygiene are a key factor in reducing the impacts even when there is adequate water supply available. The next section explores evidence of the effectiveness of community health workers in filling the gap of knowledge, attitudes, and practices of communities in low- and middle-income countries. The evidence of the effectiveness of community health workers is highlighted by inclusion of the non-governmental organization, *Last Mile Health's* financial and impact reports. Along with evidence of effectiveness of community health workers on health

outcomes, studies have also shown a lack of proper investing in community health programs. Lastly, the literature review addresses the gap in the literature regarding the impact of community health workers on WASH programs specifically.

Impact of Lack of Adequate Water

Access to clean and safe water is a basic and essential need for all people (M. K. C. Sridhar, O. T. Okareh, & M. Mustapha, 2020). Without access to safe water preventable diseases become prevalent (Ssemugabo et al., 2019). The high rate of child mortality for children under five in low and middle-income countries has been due to water, sanitation, and hygiene challenges (M. K. C. Sridhar et al., 2020).

There are multiple categories of disease that can occur from inadequate water supply such as waterborne disease, water-based diseases, water-related diseases, and water-washed diseases (Hunter, MacDonald, & Carter, 2010). Waterborne diseases are spread through fecal contamination; water-based diseases are disease where the causative organism spends part of its lifecycle in water; and water-related diseases refers to vector-borne diseases in which the vector requires water. (Hunter et al., 2010). Water-washed diseases are diseases that result from a lack of water available for washing for personal hygiene (Moe & Rheingans, 2006). Common diseases that result from these water issues are diarrhea, cholera, trachoma, shigellosis, typhoid, and malaria and they cause hundreds of thousands of deaths every year (Mourad, Habumugisha, & Sule, 2019). Inadequate WASH health education and practices also lead to malnutrition, acute respiratory infections, and soil-transmitted helminth (Prüss-Ustün et al., 2019).

Sources of Unclean Water

Lack of safe water can be attributed to a variety of causes such as poor infrastructure, poor water quality, water scarcity in arid regions or due to the increasing population's demand for freshwater (Moe & Rheingans, 2006). In arid regions people often must use unsafe or unreliable water sources such as surface water, unprotected dug wells, or water vendors (M. K. C. Sridhar et al., 2020). In Kenya, about 16 million people, which is about 30 percent of the population, lives in arid or semi-arid lands (ASAL), where adequate access to water and sanitation are an issue. In Kenya, the portion of the population that lives in arid regions must resort to obtaining water from unimproved sources. Samples taken of water from households during the dry season in Kenya were analyzed for *Escherichia coli* and total bacterial coliform counts (Osiemo, Ogendi, & M'Erimba, 2019). The sources of the water were boreholes, rivers, and wells. The study showed that, regardless of what water source, most of the water was contaminated with fecal matter and unfit for human consumption (Osiemo et al., 2019).

Providing communities in the ASAL with adequate access to safe water is crucial in reducing poor health outcomes and incidence of water-related disease, but that is not enough (M. K. C. Sridhar et al., 2020). While 485,000 deaths were attributed to inadequate water, 165,000 additional deaths were attributed to inadequate hygiene behaviors in low and middle-income countries (Prüss-Ustün et al., 2019). Waterborne and water-washed diseases can also be reduced by improving sanitation and hygiene practices that reduce the rate of community members who drink fecal contaminated water and by providing them with the knowledge, attitudes, and practices that allow for them to practice sufficient personal hygiene (Hunter et al., 2010).

Importance of Knowledge, Attitudes, and Practices

Having access to safe water and sanitation is not enough to reduce the rate of water-related diseases and poor health outcomes. Where there is a lack of water from reliable and safe, community members using household water treatments (HWTs) become key to keep the prevalence of waterborne and water-washed diseases low. Common HWTs are sedimentation, boiling, filtration, chlorination, and solar disinfection (Bitew, Gete, Biks, & Adafrie, 2017). However, community members that use HWTs can be hindered by their knowledge, attitudes, and practices (KAP).

KAP of community members is one of the most important factors contributing to the transmission of infectious diseases where there is a lack of adequate water and sanitary conditions (Berhe et al., 2020). In 2015, a community-based cross-sectional study of 845 mothers from Dabat District, northwest Ethiopia was conducted on their knowledges, attitudes, and practices on WASH practices through questionnaires. The questionnaire consisted of 83 questions. Nearly 80 percent of the participants were from rural areas. From this study it was found that 49% of the women had good knowledge of HWTs, 54.8% had favorable attitudes about HWTs, and 49% retrieved water from improved sources such as protected springs and protected hand-dug wells (Bitew et al., 2017). In another cross-sectional field survey study in Nigeria, which administered and collected 854 surveys from community members that varied in gender, age, marital status, and education levels it was found that there is knowledge deficiency in the areas of water treatment, use of unsafe water sources, and open defecation being major routes of exposure to waterborne diseases (M. K. C. Sridhar et al., 2020). Across six schools in Rwanda three in urban area and three in rural, more than 50% of the students did not know causes of common diseases such as diarrhea, cholera, shigellosis, typhoid, or trachoma. Without

knowing the causes, they were not aware that their practices and attitudes could contribute to the prevalence of WASH-related diseases (Mourad et al., 2019). KAP of a community regarding WASH reinforce behaviors that increase or maintain high levels of infectious diseases or decrease behaviors that would lead to better health outcomes. When there is a lack of WASH knowledge, certain practices become common in communities such as a lack of purification of household water and poor water storage, which leads to contamination of drinking water (M. K. C. Sridhar et al., 2020).

In addition to limitations and deficiencies in WASH-related KAPs, misinformation regarding WASH practices has also been observed (Bitew et al., 2017). In Kenya, even when there is adequate knowledge regarding safe water collection, storage, and treatment these are not regularly practiced, often due to the perception that their water is safe for consumption even when obtained from surface water (Bitew et al., 2017). In one survey, 41% of the residents in Kenya considered untreated water from rivers to be safe for consumption. Cultural concepts and societal norms take precedent in WASH practices rather than the evidence-based methods for safe water treatment. Among the greatest challenges in reducing water-related diseases remains addressing limited knowledge, misinformation, negative attitudes, and lack of experience in the best practices for water treatment (Bitew et al., 2017).

WASH Program Successes

WASH education interventions have been implemented in different settings such as schools and churches. Many different studies and evaluations have established that WASH education has been proven to be an effective tool in reducing poor sanitation-relation diseases (Gizaw & Addisu, 2020). In a study that was conducted to evaluate the effectiveness of WASH

education on households in rural Dembiya, Ethiopia, the study found that educational activities were associated with significant percentage increase. The study found that WASH education resulted in a a baseline to end line increase from 11.6% to 62.3% for properly storing household water, 34.7% to 69.5% for properly covered drinking water, 44.9% to 66.2% for households that kept their living compounds free from human excreta, and from 1.3% to 34.4% for general children's personal hygiene (Gizaw & Addisu, 2020). The study was a before-and-after intervention (no controls) and it conducted 225 baseline and 302 end line surveys using structured questionnaires and an observational checklist for households with children under 5. (Gizaw & Addisu). The WASH intervention included building hand washing facilities and incorporating interactive activities such as role-play, demonstration, group discussion, song, games, question and answer, and lecturing to engage community members (Gizaw & Addisu). WASH education and promotion using these methods in countries such as in India, Kenya, Myanmar, and Burkina Faso have also found positive impacts on WASH behavior (Gizaw & Addisu).

Impact of Community Health Workers

There is evidence to show that community health workers (CHWs) can be effective in filling the gaps in KAP regarding WASH. CHWs have been able to learn, teach, and promote safe WASH practices in low- and middle-income country settings where there are limited doctors and nurses. CHWs are able to provide health care services that are centered around the underserved population they are in contact with and encouraging other community members to be involved and participate in health promotion interventions at relatively low cost.

Improvements have been seen in areas such as health promotion and disease prevention (Palafox et al., 2021). In a systematic review, it was found that across multiple studies, CHWs have been effective in improving health outcomes through influencing social norms, increasing social cohesion, and increasing social capacity. CHWs have were also found to have positive impacts of community engagement on health behaviors, health consequences, and self-efficacy for both communicable and non-communicable diseases (Questa et al., 2020).

Collaborating with communities also improves critical health behaviors, improves knowledge, and practices which lead to a reduction in poor health outcomes in areas with low resources (Farnsworth et al., 2014). The non-governmental organization, *Last Mile Health*, is one organization that has proven many times that making CHWs central to programs is very effective in bettering health outcomes. *Last Mile Health* was first founded in Liberia to bring healthcare services to the most remote parts of the country. The organization has made CHWs central to their model and has seen much success in bettering health outcomes since 2013. (Brian Trelstad & V. Kasturi Rangan, 2020). They have made numerous strides in improving health outcomes using CHWs. By 2013, they brought access to healthcare workers to 100% of the villagers of the Konobo District (Last Mile Health, 2014). There have been great improvements in rates of childhood diarrhea, malaria, and acute respiratory infections in the district. During the 2014 Ebola outbreak the local health systems of Liberia were facing difficulties as they did not have trained faculty members on safety protocol during the outbreak. However, *Last Mile Health* continued to show the effectiveness of CHWs by providing them with "no touch" training for Ebola screening which allowed them to screen more than 10,000 people for Ebola, and training them to provide more than 11,000 community members with education about Ebola, and still delivering essential health care services during the crisis (Last Mile Health, 2015). They have

continued to rely on their CHWs during the COVID-19 outbreak of 2020 (Last Mile Health, 2020). Even when there has been doubt in the effectiveness of CHWs, *Last Mile Health* continued to stick to their founding principle and has been a global health leader working closely with the Ministry of Health in Liberia and being chosen to lead the way through the Ebola crisis in Liberia (Brian Trelstad & V. Kasturi Rangan, 2020).

Need for Investment in Community Health Workers

CHWs have proven to be effective in improving health outcomes and they are cost-effective (Viswanathan et al., 2010). Though the success of CHWs involvement in programs can vary, greater investment in trainings, providing monetary, and non-monetary incentives are important in the success of their involvement in programs (Rahman et al., 2021). Investing in community health programs and CHWs yields a 10:1 return on that investment (Last Mile Health, 2015; Masis, Gichaga, Zerayacob, Lu, & Perry, 2021). Expanding community health programs will also be essential in reaching global goals as we continue to see a strain on human health resources in primary health care in coming years (Masis et al., 2021). Despite the consistent evidence of CHWs being an effective means in reaching the most remote communities and leading long-term and short-term cost saving in the health system, there is propensity by in-country decision makers and donors to underfund community health programs. In contrast to the limited number of, and more specialized training required by, doctors, nurses, and clinic associates, it is quicker to train and deploy CHWs. Also the cost over 25 years of employment for CHWs is about 22% that of a nurse, 15% that of a clinical associate, and 7% that of a doctor based on the average health workers costs from nine East and Southern African countries (Masis et al., 2021). Programs that are funded are mostly for vertical disease- specific programs in sub-

Saharan Africa even when horizontal programs can offer cost-saving opportunities. Horizontal programs build community trust and increase in demand for health services, whereas vertical programs work mostly in collaboration with, government health systems (Masis et al., 2021).

Community Health Workers in WASH Programs

There is much research on the effectiveness of CHWS workers in HIV, malaria, and in maternal and child health programs. However, the effect of CHWs on WASH programs remains sparsely studied (Questa et al., 2020). In a cross-sectional study conducted in Kenya, 300 mothers were sampled with baseline interviews and postintervention interviews to evaluate the effectiveness of sanitary and hygiene promotion and how it affected their children's health. At the end of this study, it was found that the portion of those who wash their hands regularly had increased from just 48.8% to 91.3% in Kakuma Division, from 85.5% to 89.9% in Lodwar Central Region, and from 77.5% to 93.8% in Lokichogio. There was also a significant decrease in the prevalence of diarrhea for children ages less than five years old (Kariuki et al., 2012). This intervention does hold basis that WASH education can improve health outcomes and through the delivery of community health workers which have been found helpful in other programs there can be the added benefit of cost effectiveness and longevity. Other studies, such as published by Mourad, Habumugisha, Sule (2019) and Sridharr, Okareh, and Mustapha (2020), have concluded that further health promotion and education for WASH will result in better health outcomes for the communities as well. One of the few studies that showed the benefit of community health worker training programs' improvements on WASH knowledge involved 22 CHWs supervisors, who trained and monitored the work of rural junior help agents (Yu et al., 2019). At the end of the program, which was a weeklong classroom training and a weeklong community based

experimental learning, it was found that training did enhance the CHWs supervisors' WASH knowledge and capacity to educate the junior health agents to disseminate knowledge to local residents in a cost-effective manner (Yu et al., 2019) Though there are few studies and resources that have looked at the impact of CHWs on WASH health outcomes in WASH program, their effectiveness in other health-related programs should encourage further incorporation and evaluation.

Methods

Introduction

This thesis is a special studies project. A water, sanitation, and hygiene training manual was developed for the community health workers of the arid regions of the Kajiado West area in Kenya, which is south of Nairobi. The training manual has developed for the Kenyan based non-profit organization, Riruta United Women Empowerment Programme's WASH program. The training manual has been developed to provide the substantive basis and as a part of the educational activities targeting community health workers. The specific needs of the community were incorporated in the manual through feedback from the CEO of the organization, Anne Baraza.

Ethical Consideration

In this special studies project, there is no human subject research, or interventions that would result in risks to human subjects. As such, this special project was deemed by MPH Thesis Committee Chair to meet the established guidelines for exemption from Emory IRB approval. The development of the training manual uses web research and the input of the CEO of the

organization, who resided in the Kajiado region. The input does not include collection or storage of personal health information. The feedback provided is regarding the health and water, sanitation, and hygiene needs of the community in this arid region as it pertains to their specific culture and infrastructure.

Literature Review Topics

The literature review discusses the background and issues of arid and semi-arid land, the influence of knowledge, practices, and attitudes on WASH practices, importance and success of previous WASH education programs, importance of community health workers, and the need to invest in them. These topics are discussed to address to discuss the different aspects of the need for proper WASH procedures to be taught to the community members of arid areas in developing countries to reduce the occurrence of water-washed diseases. The literature review was completed with online research, which used journal article sources.

Results

Training Manual Structure

The training manual has been structured into four units. Throughout the training, discussions and activities will be incorporated to engage the CHWs and receive feedback from them regarding their needs and expectations. There are seven activities incorporated throughout the day long training. There are printable worksheets included that will be provided to the trainees to work on through different units and will be theirs to keep.

Unit One is the introduction to the training manual. It sets the need for the WASH training in the community. It introduces information about the unreliable and unsafe water sources that people of the arid region resort to at times. The unit includes a discussion to engage the participants and to allow for the CHWs to provide input to the training.

Unit Two is about the needs of CHWs. It highlights the needs of the CHWs, their role in WASH education, and expectations. It also opens the training to a group discussion to allow for them to share their experiences as, or with, CHWs.

Unit Three is about the water-related health outcomes in arid regions. It reviews the common water-related diseases that arise from water scarcity in arid regions, their source, and prevention methods. The F-Diagram will be discussed in this unit to give a picture of common routes feces can be ingested by humans and how it can be prevented.

Unit Four includes the WASH practices that the CHWs will be trained on that can be done at the household level. This will include best practices for cleaning and storing water and sanitization and hygiene with limited access to water. It also includes the building and demonstration of a Tippy Tap and handwashing in this unit.

Discussion

Strengths

The following are three key strengths of the training manual, not meant to represent a comprehensive list.

A strength of this the WASH training manual is that there are discussions, activities, handouts, and demonstrations implemented throughout the day. This allows for the CHWs to be involved and engaged with the content material. They also receive handouts for them to take with them so that they will have access to the information the day of the training. A second strength of the training is that is covers important aspects of the WASH in ARID regions without being too long or complex. The training is set for one day and it provides the most immediate solutions for sanitation and hygiene challenges in an ARID region that do not require too many

resources, time, or training. It makes the training material accessible to the community members. A third strength of the training is that it is best conducted with a small group. Though this has been discussed as a limitation, it is also a strength as the smaller groups contribute to the greater time with the trainer, more time for everyone to provide input and their experiences, and more time and opportunity for everyone to engage with the material.

Limitations

The WASH training manual has three limitations.

One limitation of this training is that it is only one day long. The training is to be completed in one day which may not be enough time to reinforce the material to the community health workers (CHWs). It also can lead to a lack of adequate time with the trainers and can leave a gap between clarifications CHWs may need after they have had time with the material. A second limitation is that the training has not set a schedule or process for evaluations after the training is completed. Without a plan set for evaluations and follow-up surveys it cannot be known if the material is being implemented by the CHWs, if there were gaps in the material presented, and no feedback to improve the training. A third limitation is that the trainings will work best if conducted for small groups. The recommended size for a training will be 10 CHWs. Having to use a small group for training can be limitation as they will not be able to reach as many CHWs as fast and it will require more resources and time to put on multiple trainings.

Recommendations

For the use of this training manual, it is recommended that it is conducted for a group of 10 community health workers. The smaller groups will allow for more engagement for each CHWs.

It is also recommended that the inclusion criteria for recruiting trainers include that they are literate in both English and Swahili. When working in rural communities it is important to ensure that material and resources are available in the languages that community members understand.

The training will be offered in both English and Swahili, it is recommended that training sessions are held in English and Swahili, but on different days to avoid extending the time of the training for too long and repetitive. The primary language of the trainees should be assessed before deciding which language will be used at the training.

It would also be recommended that the RUWEPO conduct follow-up surveys 3 weeks after a CHW has attended a training. This survey can be both knowledge based, ask if they have been implementing the material that was presented, and if they have been working to spread the material as CHWs for the programs.

It is recommended that the CHWs that will be present for the training should be given care bags with hygiene products such as hand soap, dish soap, dish scrubs, body wash, laundry detergent, and others that are found to be a need in the community.

This training has not yet been audience tested. It is recommended that there is a pilot testing in both English and Swahili to work through any facilitation adjustment needed.

Public Health Implications

WASH education and promotion programs have been implemented all over the world with many positive results (Gizaw & Addisu, 2020). Also, community health workers have proven to be an important part of many health incentives (Viswanathan et al., 2010). Providing WASH education for adults can be beneficial as it can fill gaps of WASH knowledge they may

have from missed or unavailable education, it can reinforce any pervious WASH education, and because as the adults of the household they can also be teachers for their children at home and can pass along healthy and positive WASH knowledge and attitudes. Implementing short WASH trainings for communities that face a high rate of adverse water-related health outcomes can help reduce those undesirable health outcomes and move towards the United Nation's 2015 Sustainable Development Goal 6 for "Clean Water and Sanitation" Goal 6B to "Support and strengthen the participation of local communities in improving water and sanitation management" (United Nations, n.d.).

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