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FIELD REPORT | WATER AND SANITATION

Individual and Community Level Factors Related to Sanitation, Water Quality, Treatment and Management in Rural Communities in Accra, Ghana: A Field Study Report

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ABSTRACT

Access to safe drinking water and adequate sanitation are basic necessities of life, yet not everyone in the world is able to access these services, particularly people living in rural areas. Rural areas in Ghana, defined as communities with populations less than 5,000 people, and some rural areas in the United States (US), defined as non-metropolitan communities, experience water and sanitation-related issues to varying degrees. The purpose of the field study was to examine individual and community level issues related to sanitation, and water sources, water quality, treatment and management, water needs and water-related illness in Accra, Ghana, and to determine areas of similarities and differences with the US. Thus, study results are not generalizable to the entire population of Ghana. Given the short duration of the entire field study (three weeks) and the fact that most information on water and sanitation in the US is publicly-available, secondary data from various sources were used for the US comparison. Results from the study showed that 61.4% of study participants in the selected communities in Accra and 80.0% of Americans living in rural areas had access to safe water. Lack of access to toilet facilities was minimal in rural communities in both Ghana and the US.

Keywords: • Water • Sanitation • Water Quality • Ghana • Preventable Illnesses • Inequalities

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I. Introduction

I.1. Statement of the Problem

Water and sanitation are basic necessities of life and crucial to the health and well-being of the human population, yet not everyone in the world has access to them. Globally, over 785 million people lack access to essential water services, and over 884 million people lack access to safe drinking water.¹ It is estimated that about 40% of the world's population

lacks access to adequate sanitation facilities and thus, practice open defecation.¹

Despite significant investments made by the government of Ghana and its development partners in water and sanitation infrastructure over the past 30 years, 10% of Ghanaians, especially those living in rural areas, still lack access to safe drinking water and 14% lack access to adequate sanitation facilities.² Some reasons for this include broken-down facilities,

water pollution, and rapid urbanization. The primary sources of water in rural communities in Ghana are private piped water systems, standpipes, boreholes with a handpump, hand-dug wells, and open water sources such as streams, rivers, lakes, and ponds. Some of these water sources are prone to environmental contamination.

Lack of access to safe water and adequate sanitation are risk factors for poor health outcomes. According to the World Bank, about 19,000 Ghanaians living in rural areas, including children under the age of 5, die from water and sanitation-related diseases such as typhoid and diarrhea each year.³ Recognizing these issues, Member States of the United Nations, including Ghana and the US, adopted Millennium Development Goal 7 in 2000, and Sustainable Development Goal 6 in 2015, which seek to reduce the lack of global access to safe drinking water and adequate sanitation.

1.2. Objectives

The purpose of the field study was to examine individual and community level factors related to sanitation, water quality, water treatment and management, water needs and water-related illness in select rural communities in Accra, Ghana. Specifically, a field-based review of water and sanitation-related issues in rural Ghana were analyzed and compared with publicly available data in the US to determine areas of similarities and differences.

2. Methods

2.1. Description of Activities

As part of the three-week Georgia State University School of Public Health's Ghana Study Abroad Program, we participated in a virtual field study in the summer of 2021. The field study focused on three contemporary public health issues (water and sanitation, HIV, and women's health) and required students to participate in lectures, site visits, field trips and to write a field study report. For the field report aspect of the study, our team chose to focus on water and sanitation. Due to COVID-19 travel restrictions, we were unable to travel physically to Ghana. As a result, we had our in-country partner at the Suntreso Government Hospital located in

Kumasi, use an electronic questionnaire we created in Qualtrics to collect data on our behalf over a period of four weeks prior to the commencement of the three-week study abroad program. We pilot tested the questionnaire with our in-country partner for appropriateness, clarity, and ease of administration since the partner was to administer it. His feedback was used to revise and finalize the questionnaire.

2.2. Setting

The study focused on women and men living in selected rural communities in Accra. Individuals were qualified to participate in the study if they lived in any of the 20 rural communities selected for the study in Accra (Table 1).

2.3. Data Collection

We used a cross-sectional mixed-method study design. Using the face-to-face questionnaire administration format, data were collected electronically using Qualtrics from 101 residents

Table 1: Selected Rural Communities and Districts in Accra, Ghana

Community	District
1. Ayikofi Otaten	Ga West
2. Samsam	Ga West
3. Kojo Ashong	Ga West
4. Ayikai Doblo	Ga West
5. Akwegyiri no. 2	Ga West
6. Koteiman	Ga West
7. Kramoman	Ga West
8. Torkuse	Ga South
9. Kofi Kwei	Ga South
10. Agbledo Asuaba	Ga South
11. Zingakope	Ga South
12. Bosuafise-Zoglo	Ga South
13. Obinfo Agumezekope	Ga South
14. Medie	Ga South
15. Nsuobri no. 2	Ga South
16. Osuwem - Gbese	Shai-Osudoku
17. Osuwem - Estate	Shai-Osudoku
18. Asutsuare	Shai-Osudoku
19. Sege	Ada West
20. Kweiman (Ayimensah, Danfa, Otinibi)	Lakwantanang-Madina

in 20 rural communities in 5 districts in Accra (Table 1) using Ga (the predominant language spoken in Accra), Twi, or English, depending on the language spoken by the community member. Data were collected over four weeks. Prior to data collection, our in-country partner obtained consent from study participants and informed them of the confidentiality of information provided. The questionnaire comprised 20 questions covering seven domains: 1) demographic information, 2) sanitation facilities, 3) sources of water, 4) water quality, 5) water treatment and management, 6) water needs, and 7) illness due to water. An average of five questionnaires were administered per community so as to collect data on diverse water sources.

2.4. Data Cleaning and Analysis

Quantitative and qualitative data collected were exported from Qualtrics to the Statistical Package for the Social Sciences (SPSS) version 26 for data analysis (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp). Prior to data analysis, all questionnaires were checked for completion, double entries, and inconsistencies. Quantitative data with missing values were excluded from calculations. Descriptive analysis was used to summarize the data. Qualitative data were analyzed manually using the thematic approach.

2.5. Ethical Approval

We worked with one of our community partners in Ghana to obtain institutional review board (IRB) approval from the Kwame Nkrumah University of Science and Technology prior to data collection.

3. Findings

3.1. Demographic Information and Sanitation Facilities

We found that 61.4% of study participants in the selected rural communities in Accra had access to safe water.⁴ However, a few lacked access to adequate sanitation facilities. Of the 101 participants surveyed, 45.4% had completed senior secondary school, 71.3% were married, and about 3.0% were widowed. Fifty-four percent of the study participants indicated that they use a ventilated improved pit latrine with

a fly trap to meet their sanitation needs, and 84.0% said that they use private toilets.

3.2. Sources of Water

Overall, 27.0% of study participants in rural communities in Accra used water from a standpipe to wash their hands after using the toilet, 26.0% used a borehole with a handpump, 15.0% used a private piped water system, 14.0% used a hand-dug well without a pump, 13.0% used an open water source, and 5% used water from various sources including streams, rivers, or ponds (Table 2). Regarding water

Table 2: Study Participant-Reported Sources of Water for Handwashing, Bathing, Drinking, and Cooking

Water source	Sample Size (N)	Percentage (%)
Hand washing		
Hand-dug well	14	14.0
Standpipe	27	27.0
Borehole with a Pump	26	26.0
Private Water system	15	15.0
Open Water Source (stream, lake, river, pond)	13	13.0
Other (canal or tanker) Missing	5	5.0
Other (canal or tanker)	0	0
Bathing		
Hand-dug well	14	13.9
Standpipe	27	26.7
Borehole with a Pump	27	26.7
Private Water System	15	14.9
Open Water Source (stream, lake, river, pond)	13	12.9
Other (canal or tanker)	5	4.9
Drinking		
Hand-dug well	2	1.9
Standpipe	9	8.9
Borehole with a Pump	21	20.8
Private Water System	4	4.0
Open Water Source (stream, lake, river, pond)	4	4.0
Other (tanker)	1	1.0
Bottled/Packaged Water	60	59.4
Cooking		
Hand-dug well	12	11.9
Standpipe	29	28.7
Borehole with a Pump	26	25.7
Private Water System	15	14.9
Open Water Source (stream, lake, river, pond)	13	12.9
Other (tanker)	4	3.9
Bottled/Packaged Water	2	2.0

for bathing, an equal number of study participants (26.7%) used water from a standpipe, or a borehole with a handpump, while 14.9% used water from a private piped water system. When it came to drinking water, 59.4% of study participants used bottled or packaged water, 20.8% used water from a borehole with a hand pump, and 9% used water from a standpipe. We found that 28.7% of study participants cooked with water from a standpipe, 25.7% with water from a borehole with a hand pump, and 14.9% with water from a private piped water system. (Table 2).

3.3. Water Quality, Treatment, and Management

The majority (61.4%) of study participants in rural communities in Accra stated that they had good quality water. However, 38.9% reported that their water was not of good quality because it was salty (cited 11 times), difficult to wash with (cited 4 times), had algae in it (cited 3 times), was of poor quality after storage (cited 3 times), was dirty (cited 5 times), contained chemicals (cited 1 time), was used by animals (cited 3 times), and was bathed in by people (cited 2 times).

The majority of the study participants (67.3%) reported that regardless of water source, they did not do anything to the water they collected prior to drinking. However, 90.6% of those who indicated that they did something to the water they collected, reported that they boiled it prior to drinking. Most study participants (67.3%) reported paying for their water facility.

3.4. Water Needs and Water-Related Illnesses

Most of the study participants in rural communities in Accra (80.2%) said they had access to sufficient drinking water. Over half (54.5%) of study participants said that they had sufficient water for cooking and bathing and 10 reported that they had suffered from water-related illnesses such as skin rashes (cited 8 times), diarrhea (cited 1 time), and stomachache (cited 1 time) as a result of the water they drank.

4. Discussion and Implications for Policy and Practice

This field study examined individual and community level factors related to sanitation, water quality,

water treatment and management, water needs and water-related illness in 20 rural communities in Accra, Ghana. Given that majority of the students who participated in the study were native-born and residents of the US, our findings present a number of implications for public health policy and practice in the US and the host country which we discuss below.

4.1. Sanitation Facilities

We found that the percentage of study participants in the selected rural communities in Accra that engaged in open defecation due to the lack of access to sanitation facilities was lower (2.9%) than the percentage for the whole of Accra (5.6%).⁵ This may be due to the fact that we focused on only a few communities in Accra. Although comparatively lower, existing data show that less than 1.0% of residents in rural areas in the US engage in open defecation due to lack of access to sanitation facilities.⁶

4.2. Sources of Water and Water Quality

Study participants in the selected rural communities in Accra reported that they use bottled or packaged water to meet their drinking water needs. This we were told was primarily due to the presence of salt in some of the underground water sources.⁷ This finding is consistent with a study conducted by Archer et al. which showed that people in Ghana use bottled water when they believe that their drinking water is unsafe.⁸ Similarly, we found that about 33.0% of people living in rural communities in the US also drink bottled water because they consider bottled water safer and purer than water from piped systems, and also because they distrust their local government's ability to maintain water systems because of what happened in Flint, Michigan some years ago.⁹

Some residents of rural communities in the US also experience challenges associated with access to safe water. In 2017, about 4.0% of Americans living in rural areas were drinking water from unsafe sources, and less than one percent lacked access to adequate sanitation facilities.⁶ Pollution from agricultural waste, shrinking populations, and the aging of rural water system infrastructure have been identified as sources of water pollution in the US.¹⁰ Similar to 61.4% of study participants in Ghana, about 77.0% of

people living in rural communities in the US report that their water quality is excellent. However, some African American and Hispanic consumers report lower levels of satisfaction with the quality of water they have access to.⁴

4.3. Water Treatment and Management

According to study participants in Accra, international development agencies involved in the rural water supply and sanitation sector in Ghana usually test and treat water from the systems they provide. If test results show that the water is safe, nothing is done to the water. Unlike Accra, in the US, fluoride is always added to water from piped water supply systems from the onset, prior to distribution to consumers. In both Accra and the US, residents pay for their water supply.

4.4. Water Needs and Water-Related Illnesses

Access to safe water for bathing and cooking was an issue for some study participants in Accra because it meant they had to pay more money for water. This is however not an issue in rural communities in the US except among the homeless population.¹¹ A few study participants in Accra said that their water sources did not make them sick. This was a bit of a surprise as some of the water sources used are not protected from animals and potential environmental contaminants.

4.5. Strengths and Limitations

There were a few limitations with the field study. Our in-country partner had to manage community expectations as some people thought her collecting data meant she was going to do something about their unimproved water sources. Our in-country partner addressed the expectation by explaining to community members that the effort was purely for academic purposes. Poor internet connectivity made it difficult for our in-country partner to collect data electronically in Qualtrics on some occasions. To address this challenge, she collected data manually and later entered it into Qualtrics when there was better connectivity. Since we focused on only select rural communities in Accra and used a convenient sample drawn from 20 rural areas, results from this field study cannot be generalized to the entire population of Ghana.

4.6. Recommendation for Further Field Study for Students or Professionals

For future field studies, it is recommended that community gatekeepers speak to community members prior to data collection, so there are no false hopes or expectations about the data being collected. It would also be good for students to collect data from other regions in Ghana to allow for a more detailed comparative and generalizable analysis.

Compliance with Ethical Standards

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Key Messages

- ▶ Water and sanitation are basic necessities of life, yet not everyone in the world has access to them.
- ▶ Despite significant investments made by the government, many Ghanaians, especially those in rural areas, still lack access to safe water and adequate sanitation.
- ▶ Access to safe water is also a public health issue in some rural areas in the US.

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