

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

NUTR/GLST 498b: Global Research Experiences  
in Nutrition & Health

Nutrition and Health Sciences, Department of

---

2022

## Don't Forget to Wash! Water, Sanitation, and Hygiene Among Zambian Students

Katie Schmitz

*University of Nebraska-Lincoln*

Follow this and additional works at: <https://digitalcommons.unl.edu/nutritionglobalresearch>



Part of the [International and Community Nutrition Commons](#), [Other Food Science Commons](#), and the [Public Health Commons](#)

---

Schmitz, Katie, "Don't Forget to Wash! Water, Sanitation, and Hygiene Among Zambian Students" (2022).  
*NUTR/GLST 498b: Global Research Experiences in Nutrition & Health*. 11.  
<https://digitalcommons.unl.edu/nutritionglobalresearch/11>

This Presentation is brought to you for free and open access by the Nutrition and Health Sciences, Department of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in NUTR/GLST 498b: Global Research Experiences in Nutrition & Health by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.



By: Katie Schmitz

RESULTS

DISCUSSION

## Overview & Limitations

- As in much of sub-Saharan Africa, WASH practices and water security are inadequate to strengthen the overall health and wellbeing of Zambians as illustrated by student interviews in Southern and Eastern Zambia.
- Hygiene resources such as soap remain luxuries in households as well as schools.
- Most reported that they are often without water and must travel long distances to access a source.
- It is unclear if Zambian water sources are safe given that diarrheal disease rates are high and open defecation and urination are still practiced.
- Zambian students continue to worry about water-borne diseases such as cholera and typhoid revealing that WASH infrastructure and practices need to be strengthened.
- **Limitations:** research was conducted in only 2 of Zambia's 10 provinces and a random sample was not attainable due to several factors:
  - School participation was voluntary, not every student was present on research days, only 6<sup>th</sup> and 7<sup>th</sup> grade students participated, and interviews were only conducted in May and June.

## Soap

- Most schools, health clinics, hospitals, and homes did not supply soap or toilet paper in toilet facilities.
- The lack of hygiene resources and the commonality that students "steal" soap when it is available suggest that limited accessibility due to money (affordability) or supply (availability) is a common challenge across Southern and Eastern Zambia.
- Students gave contradictory responses regarding soap at school. Most schools visited were missing soap in handwashing areas despite reports to the contrary. At Umodzi for example, during interviews students said they have access to soap, but when asked directly, they admitted it was not available.
- Contradictory responses may indicate a wish to provide the "correct" answer.
- Misleading reports could also be due to communication issues because English is rarely a first language, or, because the school only periodically supplies soap, and the research was conducted outside of that time frame.

## Sanitation & Illness

- Pit latrines are the most common human waste disposal systems in low-income countries, and their use is increasing to meet the sanitation-related target of the MDGs. However, discharges from pit latrines to groundwater may negatively affect human health.<sup>7</sup>
- Given that most students reported diarrheal disease in the last year, it can be speculated that the overwhelming presence of pit latrines, combined with the absence of soap, may be critical factors in disease transmission.
- Although diarrheal disease was more prevalent among girls than boys, girls were taller on average. Therefore, a correlation between growth and diarrheal disease is unclear.
- While every school had pit latrines for students, and few did not have a toilet at home, open defecation and urination rates were substantial between rural and urban areas.
- Significant open defecation rates reveal that parts of Zambia are not unlike other regions of sub-Saharan Africa where toilet facilities are not always utilized. Therefore, the need for improved hygiene education is evident.

## Water & Handwashing

- The most common water source among Zambians is a tap, which according to WHO, is considered an "improved drinking-water source" and therefore protected from outside contamination.<sup>8</sup> Yet diarrheal disease was frequent suggesting that water-borne pathogens such as cholera and typhoid<sup>1</sup>, may be present in their tap water.
- Water availability in Southern and Eastern Zambia remains a critical issue given that both rural and urban students indicated water sources were often unreliable and intermittent.
- Some students mentioned cholera prevention as the most important reason to wash hands, while several listed typhoid. This indicates that water-borne diseases are still prevalent in Zambian communities and continue to be taught in school (Fig. 15).
- Although most schools had a dedicated handwashing station, many appeared to be new and displayed messages about Covid-19. Therefore, it is likely that most handwashing stations were built in response to the global pandemic.

## REFERENCES

<sup>1</sup>Tseole, NP, Mindu, T, Kalinda, C, Chimbari, MJ (2022) Barriers and Facilitators to Water, Sanitation and Hygiene (WaSH) Practices in Southern Africa: A Scoping Review. *PLOS ONE*, 17(8): e0271726.

<sup>2</sup>Mackinnon, E, Ayah, R, Taylor, R, Owor, M, Sempebwa, J, Olago, D, Kubalako, R, Tal Dia, A, Gaye, C, Campos, CL, Fottrell, E (2019) 21st Century Research in Urban WASH and Health in Sub-Saharan Africa: Methods and Outcomes in Transition. *International Journal of Environmental Health Research*, 29:4, 457-478.

<sup>3</sup>Momberg, D, Ngandu, B, Voth-Gaeddert, L, Cardoso Ribeiro, K, May, J, Norris, S, Said-Mohamed, R (2021) Water, Sanitation and Hygiene (WASH) in sub-Saharan Africa and Associations with Undernutrition, and Governance in Children Under Five Years of Age: A Systematic Review. *Journal of Developmental Origins of Health and Disease*, 12(1), 6-33.

<sup>4</sup>Morgan, C, Bowling, M, Bartram, J, Kayser, GL (2017) Water, Sanitation, and Hygiene in Schools: Status and Implications of Low Coverage in Ethiopia, Kenya, Mozambique, Rwanda, Uganda, and Zambia. *International Journal of Hygiene and Environmental Health*, 220(6), 950-959.

<sup>5</sup>Nyambe, S, Hayashi, K, Zulu, J, Yamauchi, T (2018) Water, Sanitation, Hygiene, Health and Civic Participation of Children and Youth in Peri Urban Communities: An Overview of Lusaka, Zambia, Field Research Report 2016. *Sanitation Value Chain*, 2(1), 39-54.

<sup>6</sup>Reid, B, Ogle, J, Roy, K, Pongolani, C, Chileshe, M, Stoltzfus, R (2018) Characterizing Potential Risks of Fecal-Oral Microbial Transmission for Infants and Young Children in Rural Zambia. *The American Journal of Tropical Medicine and Hygiene*, 98(3), 816-823.

<sup>7</sup>Graham, JP, Polizzotto, ML (2013) Pit Latrines and Their Impacts on Groundwater Quality: A Systematic Review. *Environmental Health Perspectives*, 121:5.

<sup>8</sup>Chahal, A, Bala, M, Vardell, E (2020) Global Health Observatory Data Repository. *Medical Reference Services Quarterly*, 39 (1), 67-74.

## ACKNOWLEDGMENTS

- This program would not have been possible without the support and generosity of:
- Benjamin A. Gilman International Scholarship, UNL Early Abroad Scholarship, UNL Peace Corps Prep Program-Lieding Global Impact Scholarship
  - UNL, 9 primary and secondary public schools in the Eastern and Southern provinces of Zambia, teachers, and students
  - Dr. Mary S. Willis, Alazar Kirubel, Mr. Moono, Shadrack and Vera Luyanga, Chipata Central Medical Students, Livingstone Central Doctors, and my research team



Figure 18: Chipata Research Team

## ABSTRACT

**Introduction:** Water, sanitation, and hygiene practices in sub-Saharan Africa, including Zambia, have not met the Millennium Development Goals (MDGs) and remain inadequate to improve the overall health and wellbeing of most populations.

**Methods:** Survey research, interviews, WASH observations, and anthropometric assessment were conducted between May-June 2022 on 6-7<sup>th</sup> grade students within 6 Zambian schools.

**Results:** While hygiene knowledge was prominent, and handwashing stations and pit latrines were available, schools rarely supplied soap or toilet paper. Diarrheal and respiratory diseases were common and water shortages remain problematic with some students traveling long distances to reach a water source.

**Discussion:** As in much of sub-Saharan Africa, WASH practices and conditions remain inadequate to optimize the health and wellbeing of Zambians. WASH knowledge is present among most, but high rates of disease and water insecurity reveal that WASH resources and infrastructure are insufficient. Soap, improved latrines, and reliable water remain luxuries in Zambia, however, they are the tools needed to strengthen the overall wellbeing of Zambians.

## INTRODUCTION

WASH is an acronym for water, sanitation, and hygiene. Globally, 2 billion people do not have access to safe water and over 263 million walk long distances to collect water from unimproved sources.<sup>1</sup> WASH-related diseases are among the leading cause of mortality for under five children worldwide, with 58% of deaths caused by diarrheal disease and inadequate WASH conditions.<sup>2</sup>

In Africa, about 28% of the population still practice open defecation with approximately 70% of rural water schemes being non-functional at any given time.<sup>1</sup> Sub-Saharan Africa did not meet MDGs for access to improved water supply in 2015; 311 million still lack a safe water source and as many as 70% live with inadequate sanitation.<sup>3</sup> Improved WASH practices have the potential to reduce prevalence of water-borne diseases, e.g., schistosomiasis, cholera, diarrhea, polio, and typhoid.<sup>1</sup>

In Southern and Eastern Africa, WASH practices in schools impact health, educational outcomes, and gender disparities.<sup>4</sup> Fewer than 23% of rural schools in the region met the WHO's recommended student-to-latrines ratio for boys and girls, and less than 20% have the recommended menstrual hygiene services.<sup>4</sup> Within Zambia, only 67% have access to improved drinking water, and 40% to improved sanitation.<sup>5</sup> In parts of Lusaka, disease outbreaks due to poor WASH practices occur annually, while in rural Zambia outbreaks are more common and human waste has been reported in the majority of compounds.<sup>6</sup> Consequently, this study was designed to assess WASH practices and conditions among primary school students in urban and rural regions of Southern and Eastern Zambia.

## METHODS



Figure 3: Student Interviews

Figure 4: Home Visit

Figure 5: WASH Observations

- Subjects:** 6<sup>th</sup>-7<sup>th</sup> grade students, ranging from ages 8 to 18 years
- Environment:** Eastern Province, 1 hour radius of Chipata (Fig. 1, 2)
- 2 Primary Schools and 2 Secondary Schools
- Southern Province, 1 hour radius of Livingstone (Fig. 1, 2)
- 1 Trust School, 1 Primary School, 2 Primary and Secondary Schools, 1 Secondary School
- Experimental Design:**
- Research conducted under IRB #20150515251 EP
  - Data collected as part of the *Food Security, Health and Nutrition* project, May-June 2022
  - Interviews with 782 Zambian students on illnesses, water source and distance, home toilet, soap availability at school, handwashing, and WASH knowledge (Fig. 3)
  - Observations of WASH practices and conditions in schools, households, farms, health clinics, and churches (Fig. 5, 8, 9, 10, 14)
  - Visited households, high schools, health clinics, and farms (Fig. 4, 7)
  - Interviewed high school teachers (Fig. 7)
  - Collected anthropometric data of 782 Zambian students (Fig. 6)
  - School, parental and student permission to participate obtained
  - Student could opt out at any time
- Statistical Analysis**
- Data hand-written in notebooks, entered into Excel, and uploaded to Statistica
  - Descriptive and correlational analyses conducted

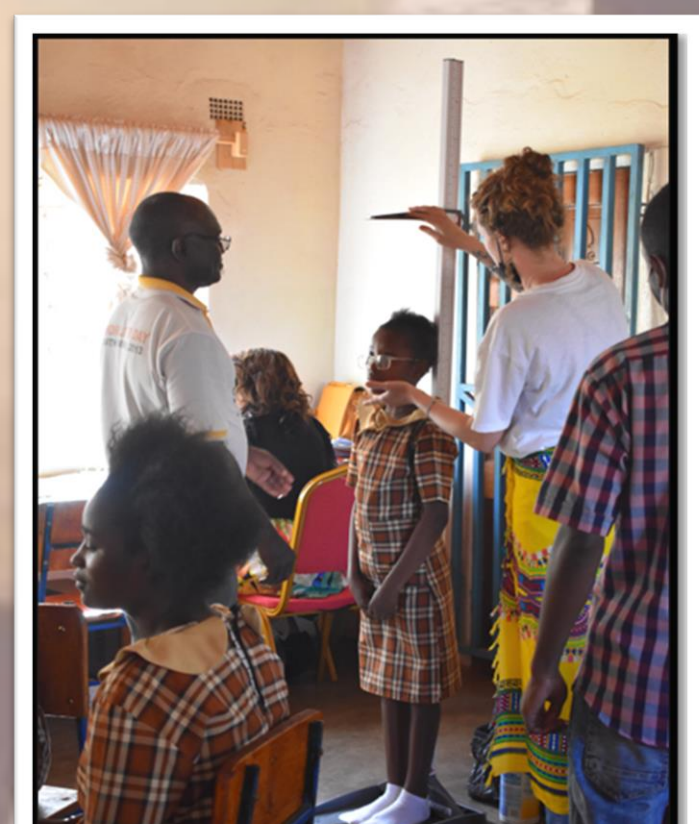


Figure 6: Anthropometric Measurements



Figure 7: High School Visit

Within 9 schools of Eastern and Southern Zambia, some form of WASH practices were observed and operational. Each school had toilet facilities with separate rooms for males, females, and teachers. However, student latrines (Fig. 8) rarely had toilet paper, soap, functional doors, or locks. Most students (71%) reported a toilet with a locking door at home. All toilet facilities for students were pit latrines (Fig. 8) whereas teacher facilities were typically seated toilets with toilet paper.

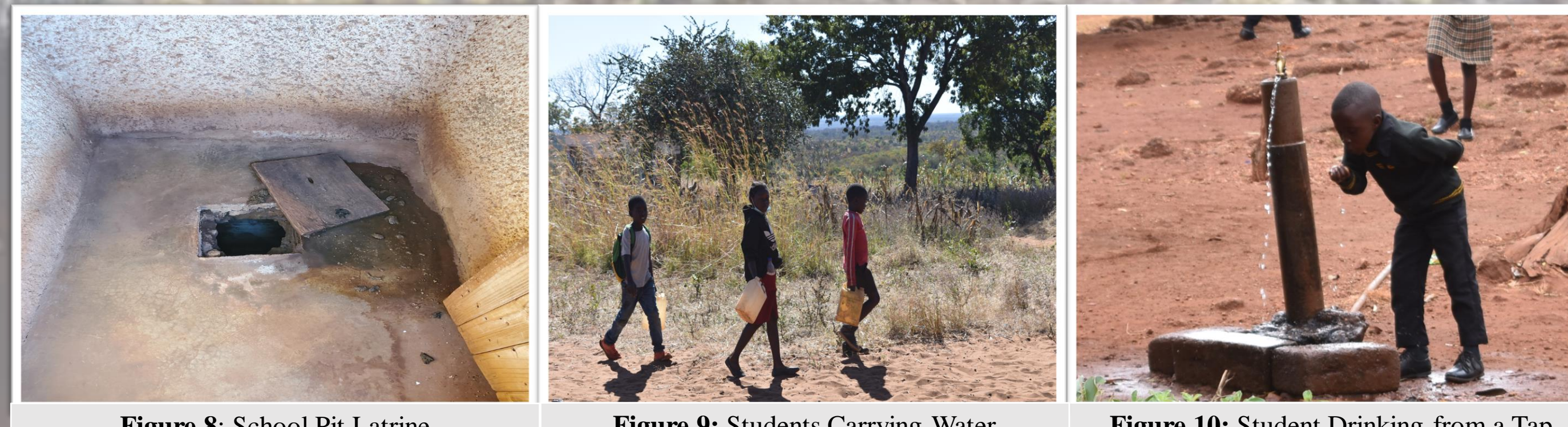


Figure 8: School Pit Latrine

Figure 9: Students Carrying Water

Figure 10: Student Drinking from a Tap

Although 96% of students indicated the presence of a handwashing station at school (Fig. 14), 22% described it as far from the toilet, while 78% indicated it was nearby. Nearly all students (98%) responded that they understand the importance of handwashing, having learned about hygiene and sanitation at school or home. Popular responses about the importance of handwashing included killing germs, preventing diseases, and avoiding sickness. Some children mentioned cholera and typhoid as the reason for washing hands.

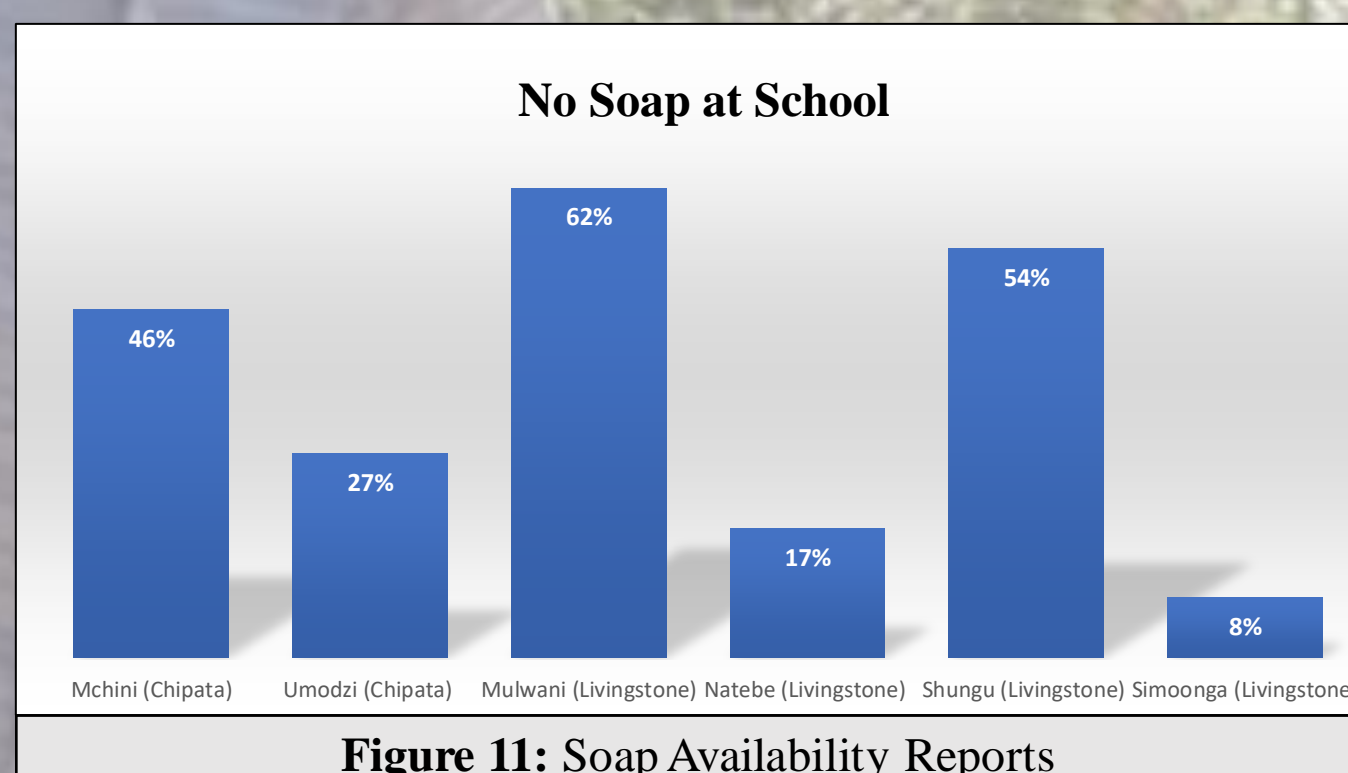


Figure 11: Soap Availability Reports

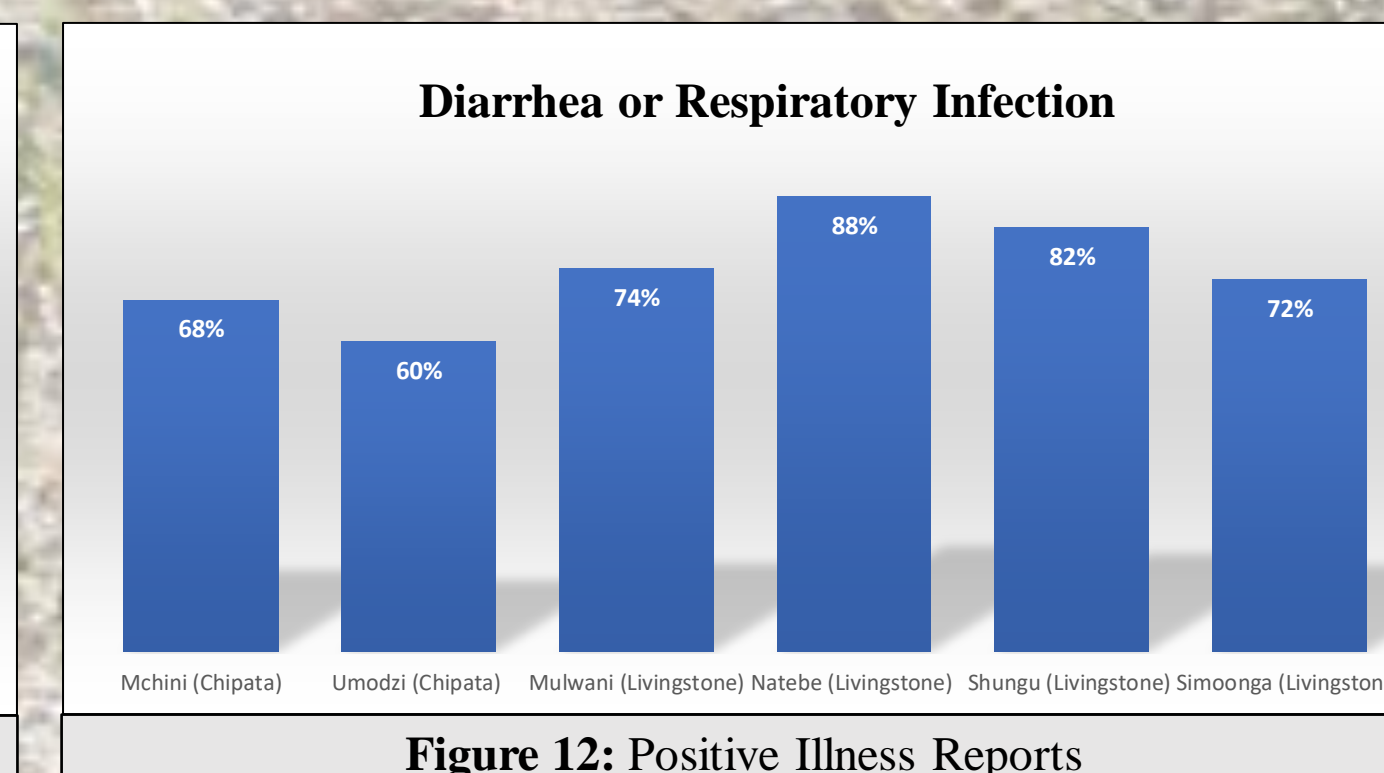


Figure 12: Positive Illness Reports

Almost half of all students (42%) did not have soap available at school. Urban schools ranked worse than rural with 46% of students claiming they do not have soap compared to only 11% in rural schools. One teacher in Livingstone stated that faculty do not supply soap because students "steal it" and the government does not provide enough funds for them to buy soap. Of the schools where interviews were conducted, the two that ranked among the highest in diarrheal and respiratory infections in the past year, Mulwani (74%), and Shungu (82%) (Fig. 12), are also the schools where limited access to soap was more frequently reported. At least 62% of Mulwani students, and 54% of Shungu students remarked that soap is not available (Fig. 11). Overall, 58% of students described having diarrheal in the past year.

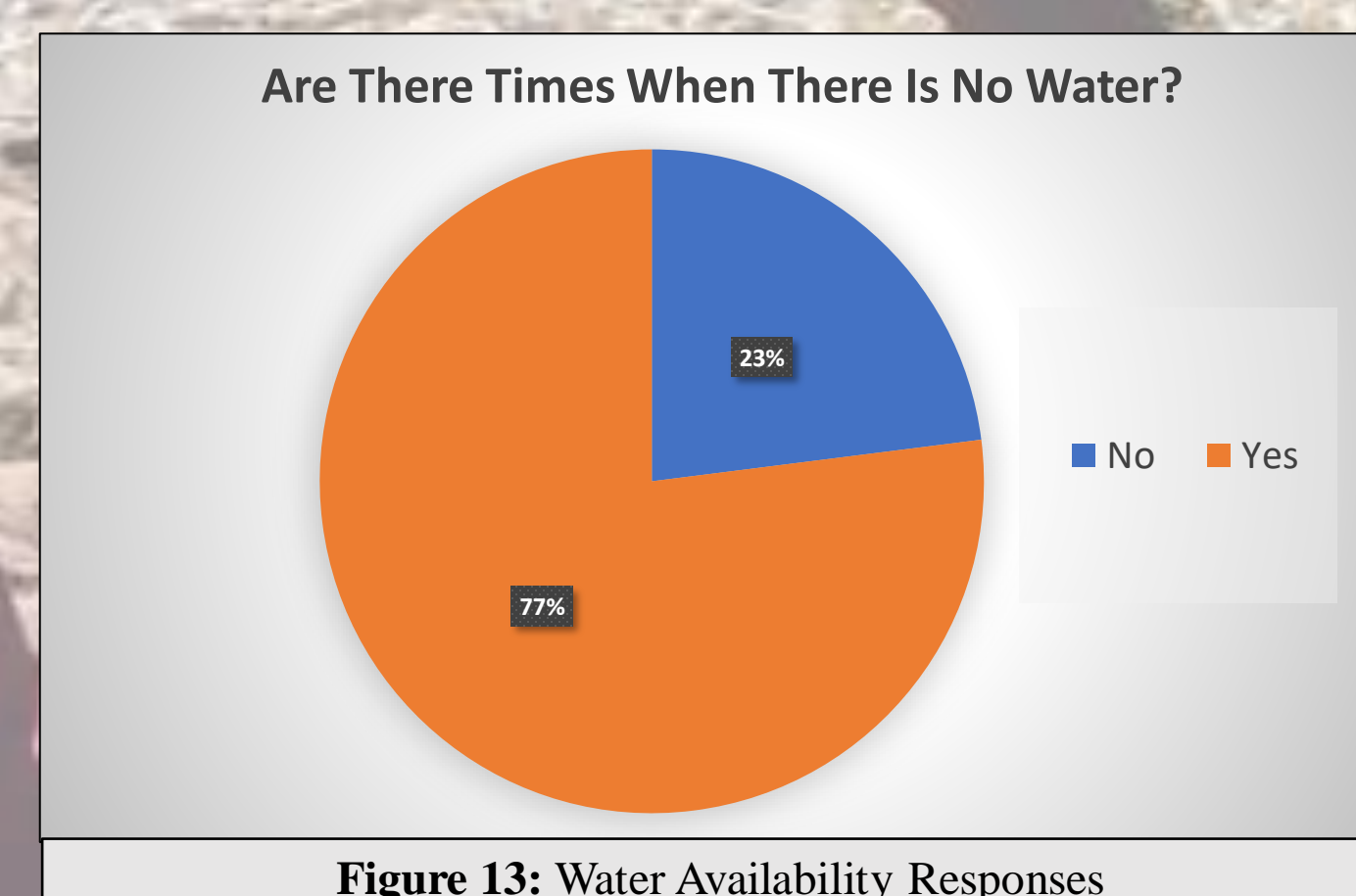


Figure 13: Water Availability Responses



Figure 14: School Handwashing Station Without Soap

Significantly, 46% of students reported having practiced open defecation or urination outside of a toilet. Responses were similar between rural (54%) and urban (45%) schools. Most students (86%) in rural areas reported having a pit latrine at home (Fig. 8) and almost half (46%) of students in urban areas reported the same.

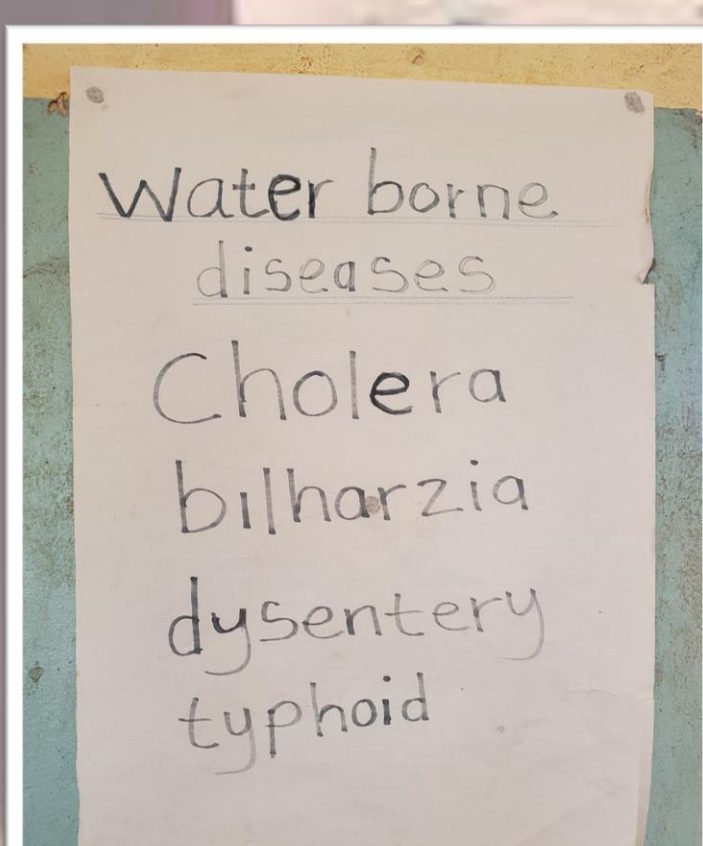


Figure 15: School's Water-Borne Disease List

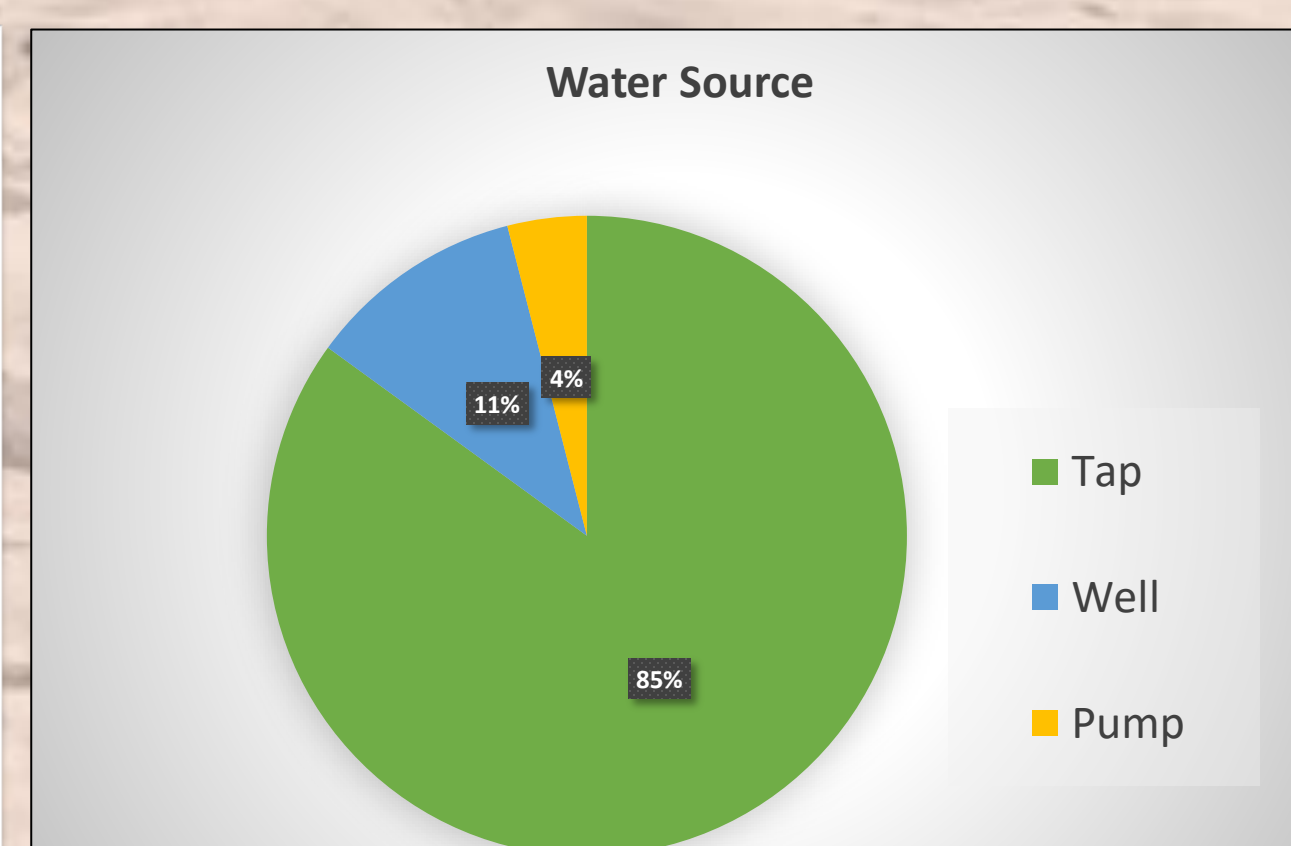


Figure 16: Water Source Responses



Figure 17: Water Kiosk

At least 77% of students stated that water is not always available (Fig. 13) with common reports of water insecurity prevalent in both urban (77%) and rural (71%) areas. Children as young as 8 years old were among the 14% of the rural population who described the distance to a water source as "far". The amount of time reported to reach a water source varied from less than a minute to over an hour on foot (Fig. 9). A significant portion of students (85%) reported that their water source is a tap (Fig. 10, 17), while 11% access water from a well (Fig. 16). Others responded that they get their water from the river (<1%), a pump (4%), or the store (<1%) (Fig. 16).