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EDUCATION

THE RELATIONSHIP BETWEEN RELIABILITY OF IMPROVED WATER SERVICE AND PUPIL'S HAND WASHING PRACTICES IN LURAMBI SUB COUNTY, KAKAMEGA COUNTY, KENYA

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ABSTRACT

Statement of the Problem: Inconsistent and inadequate water services in Kenyan public schools hinder effective handwashing practices, exposing students to preventable diseases such as diarrhea and respiratory infections. Insufficient hand hygiene resources are prevalent, with only 40% of schools equipped with essential soap and water facilities. This lack of resources poses a barrier to maintaining essential hygiene standards, impacting students' health and attendance.

Purpose of the Study: This study aims to analyze the relationship between the reliability of improved water services and students' handwashing practices in Lurambi Sub-County, Kakamega County. Insights from this research will inform targeted interventions to promote reliable water infrastructure and improve hand hygiene practices in schools.

Research Methodology: A cross-sectional survey design was used, with data collected from 389 pupils and 12 head teachers through questionnaires and key informant interviews. Quantitative data were analyzed using SPSS, while qualitative insights were derived through content analysis.

Findings of the Study: The study found that reliable water services, such as boreholes and shallow wells, increased handwashing participation among students; however, improved water service alone did not guarantee high compliance. Although students had a high level of knowledge about handwashing, factors such as inadequate handwashing stations, overcrowding, and maintenance issues limited effective handwashing practices.

Conclusion: Reliable water access positively impacts handwashing but must be paired with well-maintained and accessible facilities.

Recommendations: Schools should prioritize funding and infrastructure improvements for reliable water services and adequate handwashing stations to promote better hygiene practices.

Keywords: *Reliability, Improved Water Service, Pupil. Hand Washing Practices, Lurambi Sub County*

INTRODUCTION

Reliable water services play a crucial role in promoting effective handwashing practices among schoolchildren. According to UNICEF (2021), improved water services are foundational for hygiene practices, as handwashing facilities without consistent water access hinder students' ability to maintain hygiene standards. This issue is prevalent in many developing regions, where infrastructure challenges lead to inconsistent water availability, directly affecting the regularity of handwashing among students (Kumwenda, 2019). Research in schools in low-resource settings indicates that reliable, consistent water sources increase the likelihood of regular handwashing, particularly at critical times such as before meals and after restroom use (Migele et al., 2007; Saboori et al., 2011).

Studies confirm that schools with reliable water access report higher rates of hand hygiene, especially when water stations are conveniently placed near high-traffic areas, such as toilets and dining spaces (Dreibelbis et al., 2013). For example, Besha et al. (2016) found that Ethiopian primary schools with consistent water availability had significantly improved handwashing compliance, whereas those relying on intermittent water access reported lower rates, resulting in a higher vulnerability to hygiene-related diseases. Furthermore, Berhanu (2021) emphasizes that improved access to reliable water supports both hygiene and educational outcomes, as students in schools with dependable water sources spend less time fetching water and experience fewer health-related absences.

In Kenya, efforts to address these challenges include initiatives under the Kenya Environmental Sanitation and Hygiene Policy (KESHP), which aims to improve sanitation through reliable water services and educational programs (Ministry of Health, 2015). Nevertheless, Greene et al. (2012) noted that infrastructure disparities, particularly in rural schools, persist and limit the effectiveness of these interventions. In Kakamega County, where water scarcity is a persistent issue, inconsistent water services have been linked to low handwashing rates, compounded by insufficient infrastructure and overcrowded facilities (County Water Supply and Urban Sewerage Strategic Plan, 2015–2019). This underscores the urgent need for sustainable improvements in water reliability in schools to bolster handwashing practices and safeguard student health in Kenya and similar settings.

STATEMENT OF THE PROBLEM

Inconsistent and inadequate water service in Kenyan public schools created a significant barrier to handwashing practices, increasing students' vulnerability to contagious diseases, including diarrhea and respiratory infections. The World Health Organization (WHO, 2020) identified insufficient hand hygiene as a key factor in the spread of infectious diseases, especially in low- and middle-income regions where water and sanitation infrastructure was often unreliable or lacking. In Kenya, a 2019 study by the Kenya National Bureau of Statistics (KNBS) and UNICEF revealed that only 40% of schools had facilities with both soap and water for handwashing, resulting in irregular and inadequate hand hygiene among pupils.

The scarcity of reliable water services, compounded by a lack of facilities and resources, often forced students to forgo regular handwashing, increasing their risk of illness and absenteeism. This, in turn, disrupted academic performance and school attendance, hindering efforts toward achieving the Sustainable Development Goals (SDGs) related to health, education, and sanitation (UNICEF, 2020). In Kakamega County's Lurambi Sub-County, students were exposed to preventable illnesses, including diarrhea, cholera, dysentery, and typhoid, due to limited and unreliable water infrastructure that hindered consistent handwashing (Barasa et al., 2015). This study aimed to address this gap by examining the influence of water service reliability on pupils' handwashing practices in Lurambi Sub-County. The findings were expected to inform targeted interventions to improve water infrastructure in schools, promoting consistent hand hygiene and reducing preventable health risks in the school environment, ultimately supporting Sustainable Development Goal 6 on access to water, sanitation, and hygiene.

OBJECTIVE OF THE STUDY

To analyze the relationship between reliability of improved water service and pupil's hand washing practices

RESEARCH QUESTIONS

What is the relationship between the reliability of improved water services and pupils' handwashing practices in public primary schools?

LITERATURE REVIEW

The section discusses the theoretical review, which employs the Socio-Ecological Model (SEM) to explore how reliable water services influence handwashing practices among students. The study's empirical review examines existing research on the relationship between water service reliability and hygiene behaviors in schools, particularly focusing on the impact of water accessibility and infrastructure quality on student handwashing habits. Lastly, the conceptual framework, presented in a figure, illustrates how the reliability of water services affects the frequency and consistency of handwashing among students, highlighting the key variables in this relationship.

THEORETICAL FRAMEWORK

This study utilizes the Socio-Ecological Model (SEM) to understand the relationship between the reliability of improved water services and handwashing practices among public primary school students in Lurambi sub-County, Kakamega County. Developed by Urie Bronfenbrenner in the 1970s, the SEM framework provides a comprehensive approach for analyzing the multiple layers of influence on individual behaviors and health outcomes, recognizing that these influences extend beyond the individual to include interpersonal, organizational, community, and societal factors (Bronfenbrenner, 1994).

The Socio-Ecological Model (SEM) is particularly suited to studying handwashing practices as it accounts for how individual actions are shaped by both immediate and structural influences, such as the reliability of school water services. According to Lanfer et al. (2021), SEM frameworks effectively illustrate how interconnected subsystems—ranging from personal and peer influences to larger infrastructural and policy-level determinants—impact health behaviors like hand hygiene in schools. For instance, the accessibility and reliability of water sources within schools, supported by community infrastructure, strongly influence whether students can engage in regular handwashing.

At the organizational level, schools with consistent water services are more likely to foster a culture of hand hygiene, as pupils have access to water facilities when they need them most (Dreibelbis et al., 2013). This highlights the importance of structural supports in schools, such as reliable water systems, which align with community and societal norms promoting health and sanitation. On the societal level, policy-driven efforts to ensure sustainable water

infrastructure in schools, as promoted by public health organizations, reinforce the need for systemic support to enable effective hygiene practices among pupils (Costanza, 2014).

Using SEM as a framework allows this study to capture the broader socio-environmental context that shapes individual handwashing behavior among students, thereby providing a layered understanding of how reliable water service impacts health practices. This model supports the identification of targeted interventions that not only focus on behavior change among pupils but also on enhancing water infrastructure and community support to promote sustainable hygiene practices in school environments.

EMPIRICAL LITERATURE REVIEW

Hand washing is a critical component of personal hygiene, particularly in preventing the spread of communicable diseases. The presence of reliable, improved water services in schools plays a significant role in enabling and encouraging proper hand washing practices among pupils. This review examines empirical studies investigating the association between the reliability of improved water services and primary school pupils' hand washing behaviors, focusing on the impact of water accessibility, infrastructure, and consistent supply on hygiene practices.

Improved water services are essential for effective hand hygiene practices. These services are typically defined as those providing clean, accessible water through infrastructure like piped supplies, public taps, or protected wells. Research has shown that access to such water services significantly influences the frequency and quality of hand washing among schoolchildren. A study by Dreibelbis et al. (2013) in Kenyan primary schools demonstrated that pupils in schools with reliable water sources were twice as likely to engage in regular hand washing compared to pupils in schools with unreliable or no water supply. This suggests that the availability of water, particularly during critical moments such as after using the toilet or before meals, plays a key role in forming and maintaining hand washing habits. In another study conducted by Mwakitalima et al. (2018) in Tanzanian schools, researchers found a strong correlation between the reliability of water service and pupils' hand hygiene behavior. Schools with constant water availability reported better hand washing compliance among students, and the presence of soap further improved the effectiveness of these practices. This study highlights the importance of not only providing access to water but ensuring its consistent availability throughout the school day.

Accessibility to improved water services both in terms of distance and consistency strongly correlates with hand washing practices in schools. A study by Jasper et al. (2012) assessed the hand washing behavior of pupils in 60 rural schools in India and found that schools with easily accessible water stations (located close to classrooms and toilets) had significantly higher hand washing rates. Pupils were more likely to wash their hands when they did not have to walk long distances to access water, and when hand washing facilities were placed near sanitation areas. Similarly, in a study by O'Reilly et al. (2008) in Zimbabwean primary schools, it was found that water availability close to handwashing stations dramatically improved the frequency of handwashing after toilet use. The researchers reported a 67% increase in handwashing compliance in schools where pupils had easy and immediate access to water after using the bathroom, compared to schools where water access was distant or inconsistent.

While improved water services are critical, studies emphasize that water reliability alone is insufficient to foster proper handwashing practices. The availability of soap at handwashing stations is equally important in ensuring effective hand hygiene. A study by Saboori et al. (2011) in rural Kenyan schools found that while improved water access increased the likelihood of handwashing, the presence of soap was a significant factor in determining the quality and frequency of handwashing practices among pupils. In schools with both reliable water services and consistent soap supplies, 80% of students reported washing their hands with soap after using the toilet, compared to only 30% in schools with water but no soap. This suggests that the effectiveness of improved water services in promoting handwashing is greatly enhanced when soap is available, reinforcing the need for a comprehensive approach that addresses both water supply and hygiene materials.

Despite the importance of water access, many schools in low- and middle-income countries face challenges in maintaining a reliable water supply, which directly impacts pupils' ability to practice handwashing. Research by Watson et al. (2020) on school water, sanitation, and hygiene (WASH) services in Malawi found that schools with intermittent water supply struggled to maintain consistent handwashing practices. Pupils in these schools reported not washing their hands regularly due to a lack of water during certain parts of the day, particularly after lunchtime and during high-use periods when water shortages were common. This finding was echoed in a study conducted by Caruso et al. (2014) in Zambia, which showed that unreliable water services led to frustration and poor hygiene practices among students. Schools with frequent water outages or delays in replenishing water storage tanks experienced a marked

decrease in handwashing rates. Pupils in these schools reported resorting to wiping their hands-on clothes or skipping handwashing altogether when water was unavailable, highlighting the critical role of water reliability in promoting good hygiene.

Several studies have emphasized the importance of long-term infrastructure improvements in supporting sustainable handwashing practices. A longitudinal study by Freeman et al. (2012) conducted in 43 primary schools in Bangladesh assessed the impact of installing improved water services and handwashing stations on pupils' hygiene behaviors over a two-year period. The study found that schools with consistent water availability and functional handwashing infrastructure reported significantly higher levels of handwashing among pupils compared to control schools without such interventions. Moreover, the study found that when infrastructure improvements were maintained over time, the effects on handwashing behavior were sustained even after two years, indicating the long-term benefits of reliable water services.

Beyond infrastructure, policy and educational interventions aimed at promoting handwashing have been shown to be more effective when accompanied by reliable water services. A study by Greenland et al. (2016) examined the impact of a handwashing education program in Ugandan schools and found that while the program improved pupils' knowledge of hand hygiene, actual handwashing practices did not improve significantly in schools with unreliable water access. In contrast, schools that had reliable water services saw both improved knowledge and higher rates of handwashing compliance, underscoring the need for reliable infrastructure to support educational initiatives.

CONCEPTUAL FRAMEWORK

The conceptual framework for the second objective illustrates how the reliability of water services in schools impacts pupils' handwashing practices. This independent variable—water service reliability—affects the dependent variable, which is the frequency and consistency of handwashing among students.

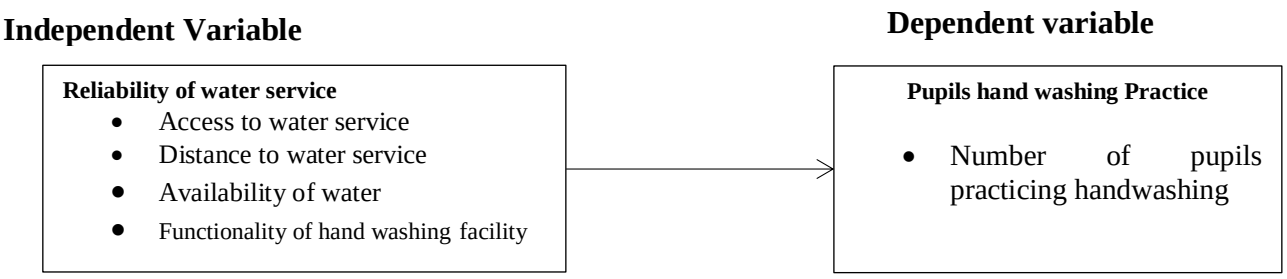

Figure 1: Conceptual Framework

METHODOLOGY

The study employed a cross-sectional survey design, focusing on students and head teachers within Lurambi Sub-County, Kakamega County, targeting a population of 37,514 pupils and 12 head teachers. Using the Taro Yamane formula, the sample size was determined to be 389 respondents, selected through cluster sampling for the sub-county's wards and purposive sampling to gather quantitative data from pupils. Data collection was conducted through questionnaires for students. Pilot testing was conducted to ensure reliability, and validity was assessed with input from WaSH experts. Quantitative data were analyzed using descriptive statistics in SPSS. Ethical measures included maintaining participant confidentiality, voluntary participation, informed consent, and securing a research license from relevant authorities.

FINDINGS AND DISCUSSION

This section provides an analysis of the relationship between the reliability of improved water services and handwashing practices within the sampled schools, supported by tabulated data, cross-tabulations, and insights from key informant interviews.

Table 1: Types of Water Services for Primary Schools Sampled (n = 10)

Ward	Name of School	Student Population	Water Service	Number of Handwashing Stations	Category of Water Sources - Improved/Unimproved
Mahiakalo	Nyayo Tea Zone	635	Shallow well	4 functional (3 dysfunctional)	Improved
	Mwiyala	349	Municipal piped water, RWHS	7	Improved
Shirere	Rosterman	380	Shallow well, RWHS	7	Improved
Butsotso Central	St. Agnes Ikonyero	1260	Borehole	6	Improved
Butsotso East	Emusala	744	Borehole, RWHS	3	Improved
	Shikoti	616	Borehole	4	Improved
Butsotso South	Ematsayi	179	Borehole	6	Improved
	Esokone	403	Borehole	5	Improved
Shieywe	Kakamega Muslim	374	Shallow well, RWHS	3 (one functional)	Improved
	Ebwambwa	658	RWHS, Stream	2	Mix of Improved/Unimproved

Table 1 shows that schools primarily rely on improved water sources, including shallow wells, municipal piped water, roof-top rainwater harvesting and storage systems (RWHS), and boreholes. All water sources, except the stream at Ebwambwa Primary School, fall under the improved category. However, despite the improved categorization, maintenance and seasonal

reliability issues affect water availability across many schools. Key informant interviews revealed additional challenges related to water supply, such as seasonal inconsistencies with rainwater harvesting, high maintenance costs for water tanks, overcrowding at handwashing stations, and frequent breakdowns of water pumps. These issues indicate that the presence of improved water sources alone may not suffice for consistent water availability, ultimately affecting handwashing practices.

Table 2: Pupils' Knowledge about Handwashing in the Sampled Schools (n = 315)

Survey Statement - When Do You Wash Hands?	YES (F %)	NO (F %)
After using the toilet	305 (97.4%)	8 (2.6%)
Before meals	269 (85.9%)	44 (14.1%)
After play	208 (66.5%)	105 (33.5%)
After work	187 (59.7%)	125 (39.9%)
What is the benefit of handwashing with soap and water?		
Health promotion	297 (94.9%)	16 (5.1%)
Disease prevention	295 (94.2%)	18 (5.8%)
To be beautiful	43 (13.8%)	269 (86.2%)
To be smart	44 (14.1%)	268 (85.9%)

Table 2 shows that a significant portion of students understand the critical times for handwashing and the health benefits associated with the practice. The majority (97%) reported washing hands after using the toilet, and 86% before meals, indicating strong awareness of basic hygiene practices. However, fewer students washed hands after play (66.5%) or after work (59.7%), suggesting that while general awareness is high, there is room for improved awareness in these specific situations. Most students also understood the health implications of handwashing, with 95% acknowledging its role in disease prevention and health promotion, while a small fraction associated handwashing with beauty (13.8%) and personal cleanliness (14.1%). This awareness demonstrates a solid foundation of hygiene knowledge among students but highlights potential areas for additional education.

Table 3: Association Between Water Service Reliability and Pupil Handwashing Proportion

Category of School by Status of Reliability of Water Sources	Number of Schools	LOW (Below a Third of Total School Population)	MODERATE (At Least 50% of School Population)	HIGH (More than Half of School Population)
Less Reliable (RWHS, Piped)	2	2 (100%)	0	0
Reliable (Borehole, Shallow Well)	8	3 (42.9%)	3 (42.9%)	1 (14.1%)
Total	10	5	3	1

Table 3 shows that schools with less reliable water services, such as rainwater harvesting and municipal piped water, consistently exhibited lower handwashing participation rates among students, with no schools in this category achieving moderate or high handwashing levels. In contrast, schools with more reliable sources, such as boreholes and shallow wells, had a mixed range of handwashing practices, with 43% exhibiting moderate handwashing participation and one school achieving high rates. These findings suggest that the reliability of water services is positively associated with increased handwashing practices, although other factors, such as the adequacy of handwashing facilities, also play a role.

Table 4: Association Between Reliability of School Water Service and Pupils' Practice of Carrying Water from Home for Handwashing

Category of School by Status of Reliability of Water Sources	Carry Water from Home to School for Handwashing	YES (F %)	NO (F %)
Less Reliable (RWHS, Piped)	48 (81.4%)	11 (18.6%)	
Reliable (Borehole, Shallow Well)	74 (29.5%)	177 (70.5%)	
Total	122	188	

Table 4 shows that students from schools with less reliable water sources were more likely to bring water from home, with 81% of pupils engaging in this practice. This reflects students' proactive efforts to ensure hand hygiene despite inconsistent school water availability. In contrast, students from schools with reliable water services exhibited a lower tendency (29.5%) to bring water from home, suggesting that reliable on-site water sources reduce the need for students to supplement their hygiene resources externally.

Table 5: Gender and Pupils' Practice of Bringing Water for Handwashing

Gender of the Participant	**Carry Water from Home to School for Handwashing**	**YES (F %)**	**NO (F %)**
Male	51 (41.8%)	85 (45.2%)	
Female	71 (58.2%)	103 (54.8%)	
Total	122	188	

Table 5 shows a notable difference in water-carrying practices based on gender, with female students more likely (58.2%) than male students (41.8%) to bring water from home for handwashing purposes. This trend may be influenced by cultural norms or heightened hygiene awareness among girls, underscoring the potential impact of socialization on health-related behaviors.

CONCLUSIONS

The study concluded that there is a statistically significant association between the reliability of water services and handwashing practices among primary school pupils. Schools relying on rainwater harvesting and municipal piped water faced reliability challenges, leading to lower handwashing participation (about one-third of the student population or less). In contrast, schools with shallow wells and boreholes were more reliable, although reliable water sources alone did not automatically ensure high handwashing compliance. Many schools with reliable sources recorded low to moderate handwashing rates, with only one school showing high practice levels. In addition, students possessed substantial knowledge about handwashing, recognizing critical times for washing hands, understanding its importance in disease prevention, and acknowledging the need to use clean water and soap. However, reliable water services without consistent management and adequate handwashing stations posed barriers to effective handwashing. Factors such as insufficient or malfunctioning stations, lack of piping systems, and maintenance issues limited students' handwashing opportunities, ultimately affecting practice levels.

RECOMMENDATIONS

To improve handwashing in schools, this study recommends securing funding to enhance water services, focusing on durable storage tanks, rainwater harvesting, and reliable boreholes for consistent water access. Schools should expand and upgrade handwashing stations to reduce overcrowding and ensure accessibility for all students. Continued handwashing education, with regular demonstrations and reminders, is essential, alongside the reliable availability of soap and water. Addressing gender disparities through inclusive education and community engagement will promote equal participation. Government support for infrastructure, piping, and hygiene education integration will foster a culture of health, benefiting student well-being and reducing disease spread.

REFERENCES

Barasa, P., Obare, L., & Ombati, C. (2015). Determinants of access to improved sanitation and hygiene in Kakamega County, Kenya. *Journal of Public Health and Epidemiology, 7*(4), 122–130. https://doi.org/10.5897/JPHE2014.0687

Berhanu, A. (2021). Factors affecting hand-washing practices among public primary school children in Eastern Ethiopia. *Journal of Environmental Health, 18*(2), 57–64.

Besha, T., Bekele, A., & Tefera, W. (2016). Assessment of handwashing behavior and associated factors among school children in Ethiopia. *African Journal of Primary Health Care & Family Medicine, 8*(1), e1–e6. https://doi.org/10.4102/phcfm.v8i1.1057

Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education* (2nd ed., Vol. 3, pp. 37-43). Oxford, Elsevier.

County Water Supply and Urban Sewerage Strategic Plan 2015-2019. (2015). Kakamega County Government, Kenya.

Dreibelbis, R., Kroeger, A., Hossain, K., Venkatesh, M., & Ram, P. (2013). Behavior change without behavior change communication: Nudging handwashing among primary school students in Bangladesh. *International Journal of Environmental Research and Public Health, 10*(8), 4081-4093. https://doi.org/10.3390/ijerph10084081

Freeman, M. C., Greene, L. E., & Caruso, B. A. (2012). Assessing the impact of school water, sanitation, and hygiene improvements on pupil health and hygiene practices in Bangladesh: A two-year prospective cohort study. *Tropical Medicine & International Health, 17*(1), 5–10. https://doi.org/10.1111/j.1365-3156.2011.02864.x

Greene, L. E., Freeman, M. C., & Akoko, D. O. (2012). Water, sanitation, and hygiene in schools: Results from a cross-sectional study in Kenya. *BMC Public Health, 12*(1), 1-11. https://doi.org/10.1186/1471-2458-12-654

Greenland, K., Cairncross, S., Cumming, O., & Curtis, V. (2016). Can we afford to overlook hand hygiene in schools? *Public Health, 137*, 65–69. https://doi.org/10.1016/j.puhe.2016.03.021

Jasper, C., Le, T. T., & Bartram, J. (2012). Water and sanitation in schools: A systematic review of the health and educational outcomes. *International Journal of Environmental Research and Public Health, 9*(8), 2772-2787. https://doi.org/10.3390/ijerph9082772

Kenya National Bureau of Statistics (KNBS) & UNICEF. (2019). Water, sanitation, and hygiene in schools: Survey results. Nairobi: KNBS & UNICEF.

Kumwenda, S. (2019). Infrastructure constraints and handwashing practices among school children in developing regions. *International Journal of Hygiene and Environmental Health, 229*, 113–122. https://doi.org/10.1016/j.ijheh.2019.01.002

Lanfer, J., Altman, M., & Hopf, K. (2021). Socio-ecological approaches to hand hygiene among school-aged children in Sierra Leone. *Health Education Research, 36*(3), 277–290. https://doi.org/10.1093/her/cyab008

Migele, J., Ombeki, S., Ayalo, M., & Ram, P. (2007). A handwashing intervention to reduce diarrhea among primary school children in Kenya. *American Journal of Tropical Medicine and Hygiene, 76*(2), 351–353. https://doi.org/10.4269/ajtmh.2007.76.351

Ministry of Health. (2015). Kenya Environmental Sanitation and Hygiene Policy 2016-2030. Nairobi, Kenya: Government Press.

Mwakitalima, A., Mukama, T., & Kitua, A. (2018). Handwashing practices in primary schools in Tanzania: A mixed-methods study. *Journal of Public Health in Africa, 9*(1), 36–41. https://doi.org/10.4081/jphia.2018.795

O'Reilly, C. E., Freeman, M. C., Ravani, M., & Migele, J. (2008). The impact of school water, sanitation, and hygiene interventions on handwashing behavior in Zimbabwe. *Journal of School Health, 78*(12), 861–869. https://doi.org/10.1111/j.1746-1561.2008.00383.x

Saboori, S., Greene, L. E., Moe, C. L., & Freeman, M. C. (2011). Impact of regular water supply on hand hygiene behavior among primary school children in Kenya. *American Journal of Public Health, 101*(6), 1029–1034. https://doi.org/10.2105/AJPH.2010.300021

UNICEF. (2020). Progress on drinking water, sanitation, and hygiene in schools: Special focus on COVID-19. *UNICEF and WHO*.

UNICEF. (2021). Handwashing practices in schools: The role of reliable water services. New York: UNICEF.

Watson, J., Dreibelbis, R., & Gensch, R. (2020). Water and sanitation challenges in schools in low-income countries: Insights from Malawi. *Environmental Science & Policy, 109*, 9–17. https://doi.org/10.1016/j.envsci.2020.03.011

World Health Organization. (2020). WHO global report on hand hygiene in health care. Geneva: WHO.