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Research Article

Assessment of Water, Sanitation, and Hygiene [WASH] in Health Care Facilities within Schistosomiasis Endemic Districts in Ghana

Robel Lambisso Wamisho*[1], Awurabena Quayeba Dadzie[2], Baridueh Badon[3], Delalih Manteau[4], Prince Addey Owusu[5], Ibrahim Suglo-Konbo[6], Joshua Rolland Baidoo[7], Solomon Minyila[8], Bona-domson Meshack[9], Martin Nyaaba Adokiya[10]

[1,2,5,6,7,8,9]Strategy and Integrated Programmes Department, World Vision Ghana (WVG), Ghana

[3,4]Global Health Institute of Merck, Merck KGaA, Darmstadt, Germany

[10]Department of Epidemiology, Biostatistics and Disease Control, University for Development Studies, Tamale, Ghana

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ABSTRACT

Globally, Schistosomiasis remains a significant public health problem and burden in the tropical regions which affect millions of people. Poor water, sanitation and hygiene [WASH] services and infrastructure increases the risk of occurrence of Schistosomiasis. Although there are existing studies on schistosomiasis prevalence and risk factors in Ghana, there is a scarcity of information regarding WASH services specifically within healthcare facilities in highly endemic regions. This study aimed to assess WASH in healthcare facilities across schistosomiasis endemic districts in Ghana's Oti and Upper East regions. The study assessed WASH services and infrastructure in all 197 healthcare facilities in Ghana's Oti and Upper East regions using a quantitative study design. The research employed the WHO/UNICEF Water and Sanitation for Health Facility Improvement Tools [WASH FIT] for data collection from healthcare workers and analysed using STATA version 16. The study focused on districts with high schistosomiasis endemicity. The ethical approval was received from the Navrongo Health Research Centre, Institutional Review Board [NHRCIRB] and appropriate consent was sorted from all health facilities heads and Ghana Health Service. WHO/UNICEF WASH FIT evaluation tool revealed critical deficiencies in 197 healthcare facilities, including 22.3% lacking improved water sources, 66.7% better water supply, and 67% low water availability and sufficiency. Additionally, sanitation facilities faced challenges, with 14% improved toilets, and 33.33% less usable toilets. The study highlights the gaps in WASH in health care facilities which can result in increased transmission of schistosomiasis. This implies the need for policy interventions to improve healthcare WASH services through targeted investments, infrastructure enhancements, and comprehensive programs, while also recommending further longitudinal studies.

Keywords: Schistosomiasis, healthcare facilities, WASH assessment, endemicity

Introduction

Schistosomiasis is a devastating disease which has the most common chronic conditions in tropical countries like Ghana[1,2]. Globally, it is estimated that 251.4 million people are infected with the disease, out of which 75.3 million were treated [2,3] and around 280,000 estimated deaths every year[4].The disease is transmitted when infected persons contaminate freshwater sources with urine or fecal containing the eggs of the parasite, which multiply in numbers through hatching the water bodies [1–3]. The prevalence rate of schistosomiasis as 23.3% across Ghana[1]. A more recent cross

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crossectional study using 336 school age children in Nakolo in the Kassena-Nankana East District of northern Ghana revealed 12.8% prevalence of schistosomiasis [5].

Factors accounting for the high prevalence of schistosomiasis included poor access to WASH facilities and sanitary practices in households (Campbell et al., 2018; World Health Organization, 2023). Despite efforts to address schistosomiasis through various interventions like preventive chemotherapy and mass drug administration (World Health Organization, 2023), the disease remains a public health problem particularly in the Upper East and Oti region. This can be attributed to a lack of improved access to WASH services and infrastructure. In Ghana, the problem has been linked to poor sanitation and poor access to water in healthcare facilities and endemic communities[7,8]. Ensuring improved WASH in healthcare facilities also demonstrates the effort of eliminating schistosomiasis as well as other water-borne neglected tropical diseases [3,9,10].

Although there are existing studies on schistosomiasis prevalence and risk factors in Ghana, there is a scarcity of information regarding WASH services specifically within healthcare facilities in highly endemic regions. Besides little is known about the WASH theories in determining prevalence of schistosomiasis in healthcare facilities in Ghana. Thus, the study seeks to assess WASH services and infrastructure in Healthcare Facilities within Schistosomiasis Endemic Districts of Oti and Upper East Regions using ecological systems theory.

Findings from this study will inform policy formulation and interventions aimed at improving WASH services and infrastructure in healthcare facilities. Such improvement can have far reaching impacts on disease prevention, patient care, and overall improved community health status, which can be extended beyond schistosomiasis control to a broader infectious disease. The study will significantly bridge the gap, offering insights into the conditions within these critical settings and how they might contribute to the reduction in transmission of schistosomiasis. Lastly, the study will provide a deeper understanding of the underlying factors influencing WASH practices in the two endemic regions of Ghana.

The integration of ecological system theory[11] can offer valuable insights into designing more effective interventions tailored to address specific challenges. The theory considers multiple levels of influence including individual, interpersonal, institutional, community and societal on behaviour[11]. The theory will help in understanding how factors at different levels like facility infrastructure, community norms, and policy support impact WASH practices in healthcare settings[1] to prevent schistosomiasis. The research question used is what are the water, sanitation, and hygiene access rate of all Health Care Facilities in the 6 high schistosomiasis endemic districts in the Oti and Upper East Regions?

Methods

Study Philosophy, Site, and Design

The study adopted a positivist philosophy, coupled with a quantitative design, to assess the accessibility and availability of WASH facilities within healthcare settings across the Oti and Upper East regions which are schistosomiasis endemic districts. A quantitative approach to research was employed to allow a systematic assessment of WASH infrastructure and its accessibility in 197 healthcare facilities distributed across Krachi West, Krachi East, Nkwanta South, Kassena Nankana, Kassena Nankana West and Builsa South districts. The methodology facilitated a comprehensive evaluation of WASH in healthcare facilities across the six selected districts. By utilizing quantitative methods, the study focused on gathering numerical data regarding the availability and accessibility of WASH, offering a clear and measurable assessment of the current state of WASH infrastructure in healthcare facilities within the 197 facilities.

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Study Population, Inclusion, and Exclusion Standards

The study employed all facilities in the six selected districts. Healthcare personnel, including nurses, cleaners, ward assistants, midwives, and doctors stationed within Health Care Facilities [HCFs] and who have worked in the facility for the past six months, were included in this study to describe the current state of WASH in healthcare settings across the six districts selected for the study. These calibres of staff were employed due to their exposure to and experience with WASH in the facilities. Healthcare staff that had worked less than 6 months at the time of the study and those stationed outside the facility's premises were excluded from this study.

Sample Size and Sampling Technique

All the health facilities in the study districts were sampled for the study. A total of 197 healthcare facilities in six districts in the Oti and Upper East regions constituted the sample size for this study. Data collection was conducted by trained enumerators. All the facilities in the six districts were included in this study. The six districts and facilities were purposefully selected based on the endemicity of schistosomiasis [districts where schistosomiasis is prevalent]. The assessment team, in collaboration with the Ghana Health Service, purposefully selected the region's districts based on their relatively high schistosomiasis prevalence.

Data Collection Procedure, Data Validity and Reliability

A cross-sectional study evaluation was conducted by the research team employing the WHO/UNICEF Water and Sanitation for Health Facility Improvement Tools [WASH FIT]. The research team deployed this tool to comprehensively evaluate diverse dimensions of WASH across health facilities in the designated study districts. These individuals actively contributed information crucial to assessing several WASH-related elements, spanning water availability, sanitation provisions, hand hygiene, environmental cleanliness, healthcare waste management, and specific aspects related to energy, building, and facility management. To ensure the quality of the quantitative data, modern digital tools like the Open Data Kit [ODK] for data collection.

Data Analysis and Report Writing

The data analysis and processing underwent a comprehensive preliminary cleaning and validation process, ensuring its integrity and reliability for subsequent analysis. This meticulously curated dataset, already coded within an excel framework, was utilized in its original form without further adjustments for missing data or potential errors. This approach was undertaken to safeguard the data's completeness and accuracy, aligning with the study's emphasis on maintaining the fidelity of the information. Following this, the excel-formatted dataset received was systematically structured and organized based on the specific research focus areas. This systematic categorization enabled a focused and targeted quantitative analysis tailored to address the study's objectives. Leveraging the analytical capabilities of STATA version 16, the data was quantitatively analysis. Descriptive statistical methods, including percentages and frequency distributions, were employed to vividly depict and elucidate the accessibility of water, sanitation, and hygiene [WASH] facilities. These statistical measures were chosen for their ability to present a clear and easily interpretable representation of WASH accessibility, facilitating a comprehensive understanding of the findings.

Ethical Consideration

The ethical approval was received from the Navrongo Health Research Centre, Institutional Review Board [NHRCIRB] for the review of the study protocols. Data generated from this study is handled by

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only staff working on the study and only available to other staff with the right justification and approval. The study also collected and documented consent from all respondents. Further, the study ensured that information collected was used only for the purposes indicated in the study. Anonymity and confidentiality of respondents were ensured in this research by hiding personal identifiable attributes of respondents and health facilities. Relevant institutions such as Ghana Health Service and the various health care facilities related to the research were presented with introductory letters to authenticate the relevance of the research and get the necessary stakeholder support for the research. Participants were informed that only the analysed and group data would be disseminated with the scientific community and conferences. Participants were informed that they are free to refuse to answer the questions they were not comfortable with or end the interview when they wish with or without explanation.

Informed Consent

The informed consent for the interviews were read and explained to participants and they were given a written and signed consent before the start of the interviews. The most common local language [twi] was used, thus there were no cultural barriers to language. Stringent measures were in place to ensure the confidentiality and integrity of the data obtained. Access to the data was restricted solely to the designated personnel involved in the study, with additional access requiring formal justifications and approvals. These measures were implemented to safeguard the privacy and security of the information gathered, maintaining its integrity throughout the research process.

Results

As shown in Figure 1, as high as 22.3% of all facilities have no improved water sources on premises. This is relatively high in CHPS compounds at 25.6%. Also, as high as 59.9% of all facilities have improved water supply accessible on premises [but outside of the facility building].

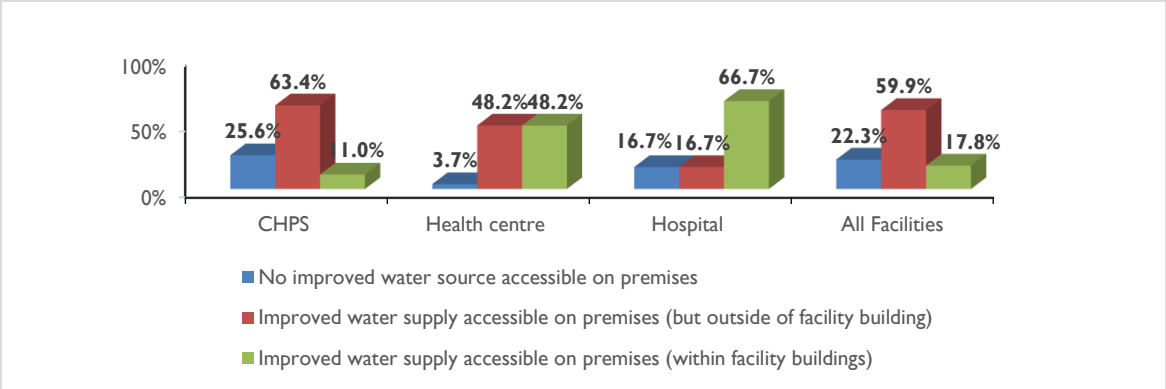

Figure 1: Healthcare Facility with Improved Water Supply

The facilities with improved water supply accessible on premises [but outside of the facility building] is widespread in almost all the study districts [except Krachi East and Krachi West] as most facilities have improved water supply accessible on premises [but outside of the facility building] than all the other water sources. In terms of connection to an available and functioning water, CHPS and health centres recorded 62.5% and 66.7% availability and functionality of water whereas the hospitals assessed recorded 60% availability of water. On the average, all facilities recorded 63.6% of water availability and functioning. In terms of water sufficiency for uses, the study revealed lower percentages. The hospitals and CHPS recorded a little above 60% sufficiency whereas the health

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Research Article

centre recorded about 80%. On the average, all facilities recorded a 67% sufficiency of water for all uses.

Sanitation

Toilet facilities in the various HCFs were assessed to ascertain their condition and sufficiency. Only about 14% of all health facilities had two or more improved toilets [either flush toilets into managed sewer or septic tank or soak-away-pit, VIP latrines, pit latrines with slab and composting toilets]. From Figure 2, all toilets in the various Hospitals [100%] were improved toilets, of which a large majority are flush toilets into managed sewer or septic tank and soak-away pit and a few of them are VIP latrines. On the other hand, 53.7% of CHPS assessed did not have enough either impatient or outpatient's improved toilets.

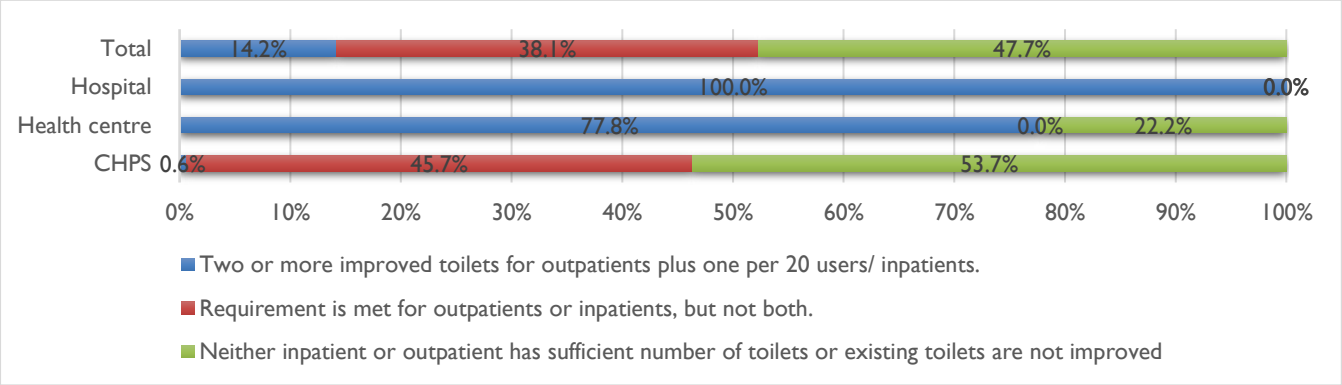

Figure 2: Facility has enough improved toilets for patients

Only 53.1% of the available toilets were found to be usable [having a door which is unlocked or for which a key is available at any time and can be closed from the inside, is not blocked, and has no major holes in the structure]. Interestingly, even though it was discovered that all toilets in the various hospitals are improved, only 33.3% are available and usable. Whereas as seen in Figure 3, only a good number of CHPS and Health centres had improved toilets, more than 50% of them are available and usable.

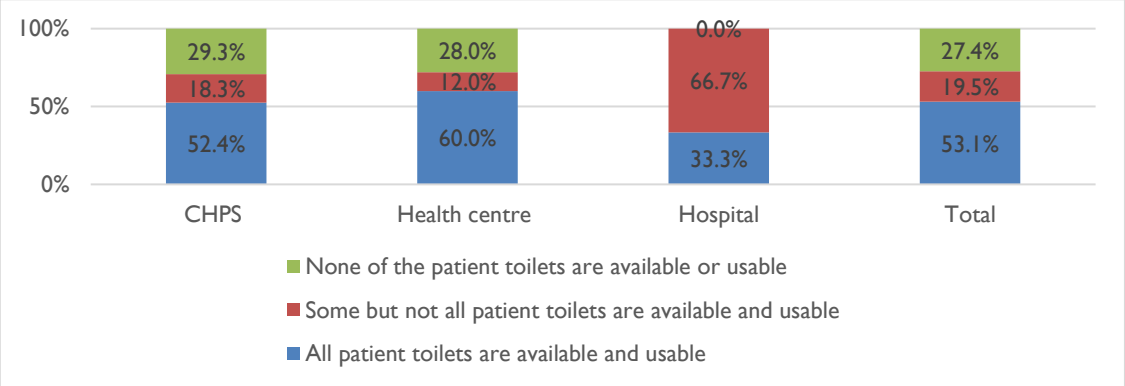

Figure 3: Toilets are available and usable

With reference to Figure 3, 34.2% of the assessed HCFs [26.7% of CHPS, 48.2% of Health centres and 83.3% of Hospitals] had improved and functional toilets with hand washing stations within 5 metres.

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About 61.1% of CHPS recorded fewer than 50% of their toilets having functional hand washing stations within 5 metres. More health facilities (50%) in Kassena Nankana East recorded having hand washing stations within 5 metres radius to toilet compared to only 5.6% of health facilities in Builsa South.

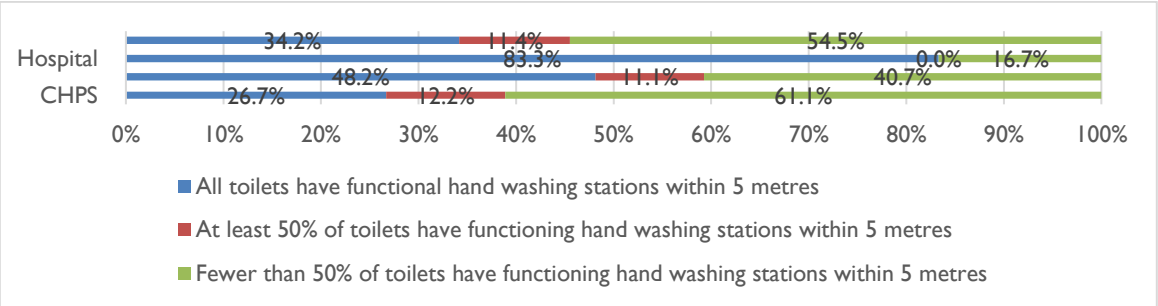

Figure 4: Toilets with functioning handwashing station within 5 metres

Waste Storage and Treatment

Most HCFs did not have a dedicated waste disposal areas which are fenced onsite [62.4%]. Sharps, infectious waste, and pathogenic liquid waste are typically disposed on flat ground and unlined pits. Whereas as seen in Figure 5, about 33.3% of Hospitals recorded a dedicated and fenced waste storage area available with sufficient capacity to store waste separately, only 11.1% and 8.5% of Health centres and CHPS had similar service. This is compounded by the finding that in most health facilities, as high as 79% do not have waste treatment technology [incinerator or alternative treatment technology] either built to correct standards or not of sufficient capacity.

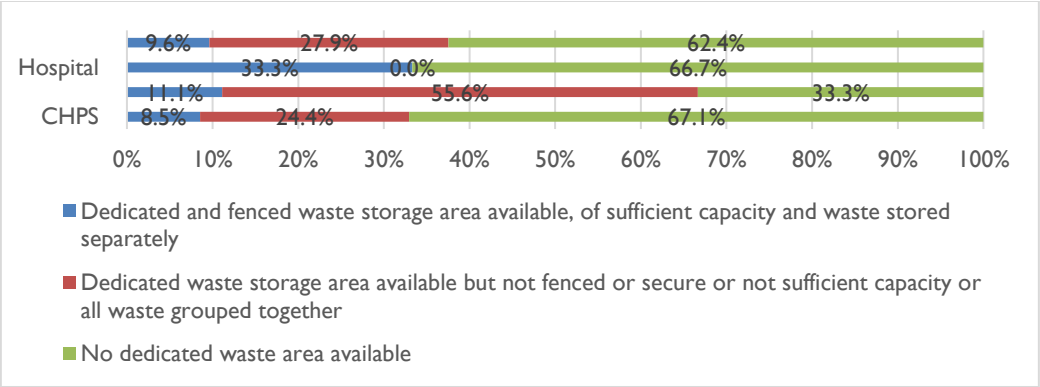

Figure 5: Availability of waste area in health facility

Hand Hygiene

The results shows that only about 28.9% of all health facilities assessed had a functioning hand hygiene (either water and soap or alcohol hand rub solution). About 66.7% of all hospitals assessed have all points of care with functioning hand hygiene compared with 25.6% and 40.7% of CHPS and health centres as shown in Figure 6. In Builsa South, only about 37.5% of the health facilities assessed had at least 75% of its points of care with functional hand hygiene stations present. The situation is no better in the other districts with the Krachi East district recording the highest of 50% for each indicator. This means that most of the health facilities in Builsa South have less than 75% of its points of care have functioning hand hygiene stations present.

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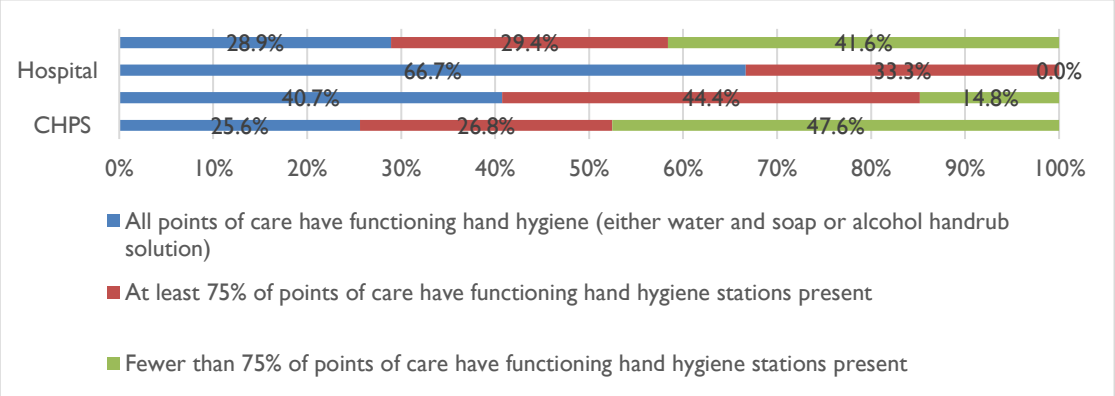

Figure 6: Availability of Functioning Hand Hygiene Stations

Discussion

The assessment highlighted concerning inadequacies in water sources within healthcare facilities, with approximately 22.3% lacking improved water sources on premises, a particularly notable issue in CHPS compounds at 25.6%. This points to reliance on distant or unimproved sources, jeopardizing hygiene standards. The results are consistent with the World Health Organization report on WASH in health care facilities[7,12]. Moreover, 59.9% of facilities had improved water supply accessible on premises (but outside the facility), indicating limited services or intermittent availability, often from off-site sources. Furthermore, the unavailability of improved water in the facility increases the risk of schistosomiasis in the health facility as some facilities use contaminated water from the streams and rivers [5,6,10]. Dsane-Aidoo et al (2022) found similar risk factors in their urogenital schistosomiasis research in Ghana. The assessment of toilet facilities indicated deficiencies in both quantity and usability. Only about 14% of health facilities had multiple improved toilets, with 53.7% of CHPS facilities lacking adequate or improved toilets. Despite all hospitals having improved toilets, the availability and usability were significantly lower, around 33.3%. The unavailability of toilets and sanitation facilities enhances open defecation around the health facility which might increase the transmission of schistosomiasis infections[5,13,14]. Regarding handwashing stations, only 34.2% of assessed healthcare facilities had improved and functional toilets with handwashing stations within 5 meters. There were notable districtwide variations, with Kassena Nankana East recording higher rates compared to Builsa South, highlighting geographical disparities in sanitation amenities. Most healthcare facilities lacked dedicated waste disposal areas, leading to improper waste disposal practices, especially in CHPS and health centers. The absence of adequate waste treatment technology in about 79% of facilities raises concerns about environmental and health hazards and increase the risk of infectious disease like schistosomiasis[15]. Hand hygiene facilities, critical for infection control, were notably insufficient across facilities, with only about 28.9% having functional hand hygiene stations. Hospitals demonstrated better provision (66.7%) compared to CHPS (25.6%) and health centers (40.7%), aligning with the urban-rural and facility-type disparities. Based on the ecological systems theory, different levels of WASH services like facility level infrastructure and community norms need to be improved to eradicate schistosomiasis. These deficiencies contradict WHO advocacy for increased hand hygiene materials in all patient care areas[7]. In conclusion the assessment revealed significant WASH service deficiencies in healthcare facilities, including inadequate water sources, limited availability, deficient toilets, insufficient hand hygiene stations, and inadequate waste storage and treatment facilities which increase the risk of schistosomiasis. The study provides evidence for policy formulation and intervention strategies to enhance WASH services and infrastructure in healthcare settings, urging stakeholders to advocate for increased investment and targeted programs. The assessment of WASH services in healthcare facilities has limitations, including not assessing the quality of water and not capturing temporal variations, requiring further longitudinal research for better representation. Future research should focus on comprehensive

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assessments of healthcare facilities across regions, long-term monitoring, and evaluation studies to understand WASH service dynamics and societal factors affecting WASH.

Contributors: AQD, RLW and JRB led the drafting, ISK prepared the tables and prepared the supporting information. BB & DM conceptualized the consensus project, BDM supervised data collection and PAO supervised the data analysis. All authors contributed to the interpretation and writing of the paper. AQD provided overall leadership and technical guidance in the authorship, peer-reviewing process and paper finalization. All authors approved the final version.

Declaration of interests: We declare no competing interests.

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Data Availability

The data used by this study can be accessed free of charge from the websites of the World Health Organization. Global Progress Report on Wash in Health Care Facilities (https://www.who.int/publications/i/item/9789240017542), WHO / UNICEF Water and Sanitation for Health Facility Improvement Tool (WASH FIT)

(https://www.unicef.org/documents/who-unicef-water-and-sanitation-health-facility-improvement-tool-wash-fit) and WASH FIT: A practical guide for improving quality of care through water, sanitation and hygiene in health care facilities. Second edition(https://www.who.int/publications/i/item/9789240043237)

Readers should kindly consider when the authors accessed these datasets as detailed in the reference list.

Clinical trial number: not applicable

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