

Water, Sanitation and Hygiene Services in Healthcare Facilities in Bayelsa State Nigeria: A Primordial Prevention Strategy for Infectious Disease Control

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Abstract

Lack or inadequate Water, Sanitation and Hygiene (WASH) in Healthcare Facilities (HCF) have been reported severally as having an impact on the transmission of infectious diseases or outbreak of infectious diseases in a healthcare setting. The study conducted in Bayelsa State, South-South of Nigeria was an institutional-based survey that utilized observational checklist and a key-informant interview for data collection. Eleven (11) HCFs comprising of 6(54.5%) primary healthcare facilities and 5(45.5%) secondary healthcare facilities was used for this study. While 8(72.7%) of the HCFs were owned by the Government 3(27.3%) were owned by private individuals and faith-based organizations. All HCF had tap water drawn from borehole as their main source of water supply but only 4(36.4%) have alternative source of water supply. All water supplies were within the HCFs and are less than 500 m from the point of care. Only 1(9.1%) out of 11 HCFs surveyed lacked water at the time of assessment. The type of toilet present in all the HCFs is the flush (water system) and they are all within the HCF premises. Over ninety percent (90.9%) of the HCFs had no toilet designed for those with limited mobility. Wash hand basins for hand hygiene were found to be available in all the HCFs except 1(9.1%). Four (4) (36.4%) of the HCFs had separate bins for the different categories of healthcare wastes while 7(63.6%) had not. There were posters of handwashing and disease prevention in 6(54.5%) of the HCFs. In all the HCFs, there was no WASH monitoring team. The study therefore advocates for WASH monitoring team and focal persons in all the HCFs to ensure adequate provision of WASH services. The study equally recommends further study involving more HCFs and assessing the constraints militating against the provision, use and maintenance of WASH infrastructures at HCFs in Bayelsa State.

Keywords: Water; Sanitation; Hygiene; Healthcare facilities; Infectious disease; Primordial prevention.

Introduction

Prevention strategies focus on preserving and enhancing health, mitigating risk factors that contribute to injury and disease. One of the preventive strategies is primordial prevention and it is directed towards having a healthy population and

healthy environments. The aim of primordial prevention is to reduce or prevent the emergence of risks and promote healthy lifestyles and practices [1]. It consists of actions like provision of Water, Sanitation and Hygiene (WASH) facilities. The avail-

ability of Water, Sanitation, and Hygiene (WASH) facilities plays an essential role in a healthcare setting for primordial prevention of infectious diseases and the reduction of transmission of Healthcare-Acquired Infection (HCAI). Proper utilization of these facilities is considered as a cornerstone for providing good quality healthcare [2]. An improved WASH condition at health care facilities establishes trust and encourages patients to seek medical treatment and even delivery in the healthcare facilities [3,4]. Access to WASH facilities in HCFs is a cornerstone of safe healthcare services [5]. The absence of these facilities poses significant health risks to patients, healthcare workers, and the whole community. WASH facilities in HCFs are fundamental to health security, preparedness, and response efforts, including the effort to stop infectious disease outbreaks [6]. According to WHO, in 47 least-developed countries, approximately half of HCFs do not have basic water services and two-thirds of HCFs lack basic sanitation services, seven out of ten HCFs do not have basic healthcare waste management services and 74% had basic hand hygiene facilities at the point of care [6]. Other studies have reported disparities in WASH services/infrastructure and practices in healthcare facilities in some African regions [7-10].

The Sustainable Development Goal (SDG) 6 is a call for universal access to WASH services in HCFs [10]. This is reasonable because WASH facilities have the capacity for primordial prevention and to prevent at least 9.1% of the disease burden in disability-adjusted life years or 6.3% of all deaths [11]. Adequate, functional, and affordable WASH services are required continuously in HCFs to be able to meet the target towards achieving Sustainable Development Goals (SDGs) of 2030. The proposed global action plan for WASH in HCFs is that by 2030, every HCF should have safely managed, reliable water, sanitation and hygiene facilities and practices to meet staff and patient needs in order to provide quality, safe people-centered care [12,13]. One of the consequences of poor practice of WASH in HCFs is the acquiring of HCAI. It is estimated that HCAI affects millions of people annually with an estimated 15% of patients developing one or more infections during their visit or stay at HCFs [14]. During the Ebola outbreak in Nigeria and other West African countries between 2014 to 2016, the lack of water at health care facilities was a severe logistic challenge to contain the outbreak [15]. Reports have shown that unreliable water supplies are associated with high number of gastrointestinal diseases in sub-Saharan Africa [16-18]. Have both shown that health is compromised when patients visit a HCF that has unsafe water and sanitation services.

According to reports from 145 low- and middle-income countries in 2012 alone, it was estimated that 502,000 diarrhoea deaths were as a result of inadequate drinking water; 280,000 deaths by inadequate sanitation, and 297,000 deaths inadequate hand hygiene [19]. In 2016, WHO estimated that poor WASH access and practices were responsible for 829,000 deaths from diarrheal disease [6]. Poor WASH services have also been reported to have effects on children's level of growth, development, morbidity, and mortality particularly at the very early stage of life and 25% of global mortality of children aged 0-14 has been linked to unsafe water, inadequate sanitation, and hygiene especially in developing countries [20]. Providing these services can reduce the prevalence of diarrheal diseases by a greater extent [7]. Healthcare facilities and Health workers' main responsibility is treating people and without WASH services, this task becomes harder [7] and poor WASH services have been linked to patient dissatisfaction [21].

In their study carried out to explore WASH conditions and Infection Prevention and Control (IPC) practices in traditional birth homes/centres in Abeokuta, Southwest Nigeria, [22], studied 50 traditional birth centres and attendants. Their findings revealed that majority of the centres operated under poor WASH conditions and IPC practices and none met with the WHO minimum standards. In another study conducted in Ethiopia by [23]. To evaluate the access to and challenges in water, sanitation, and hygiene in healthcare facilities during the early phase of the COVID-19 pandemic in Ethiopia: A mixed methods evaluation, their findings from the study showed that most (88.6%) of the HCFs had basic access to water supply. Half (51.5%) of the HCFs had limited access to sanitation facilities. Less than a quarter of the HCFs 15(21.4%) had basic access to handwashing facilities, while half 35(50%) of the HCFs did not. Hence, this study is conducted to find out the state of WASH services in healthcare facilities in Bayelsa State, Nigeria and how WASH is prioritize in the State as a sure way to prevent related infectious diseases.

Methods and materials

Bayelsa state: Is one the largest oil producing states in Nigeria. It is a wetland that is greatly blessed with water resources as the state has numerous rivers and tributaries. In the south, Bayelsa State is bordered by the Atlantic Ocean, northwest by Delta State, and northeast by Rivers state. It has been estimated that water covers about 90% of Bayelsa State while 10% only is land.

Study design: This was an institutional based study. World Health Organization guidelines for WASH services in healthcare facilities were used for data collection. Eleven (11) healthcare facilities comprising of primary and secondary HCFs in the State were randomly selected for the study. Care was taken to make sure HCFs were taken from the 3 senatorial zones in the State. Results were analyzed using frequency and simple percentages.

Table 1: Background information of the study health facilities.

Variable		Primary facility n=6	Secondary facility n=5	Frequency (n)	%
Ownership	Public	4	4	8	72.7%
	Private	2	1	3	27.3%
Location	Rural	4	4	8	72.7%
	Urban	2	1	3	27.3%
Senatorial zone	Bayelsa central	2	1	3	27.3%
	Bayelsa West	2	2	4	36.4%
	Bayelsa East	2	2	4	36.4%
Presence of WASH monitoring team	Yes 0	0	0		0
	No 6	5	11		100%

Results and discussion

The background of the HCFs showed that 8(72.7%) are owned by the government while 3(27.3%) are owned by private individuals and faith-based organizations as shown in (Table 1). According to location, 8(72.7%) are located in the rural area of the state while 3(27.3%) are located in the urban area of the state. The study HCFs are drawn from the 3 senatorial zones of the state, Bayelsa central 3(27.3%), Bayelsa west 4(36.4%) and Bayelsa east 4(36.4%). All the HCFs in the study do not have any WASH monitoring team.

Table 2: Water services in healthcare facilities in Bayelsa state.

Variable	Category	Primary	Secondary	Frequency	Percentage
Main source of water	Borehole	6	5	11	100%
Alternative source of water	Yes	2	2	4	36.4%
	No	4	3	7	63.6%
Water source also for drinking	Yes	3	4	7	63.6%
	No	3	1	4	36.4%
water available at the time of assessment	Yes	5	5	10	90.9%
	No	1	0	1	9.1%
Water adequately available for laundry services	Yes	3	5	8	72.7%
	No	3	0	3	27.3%
Water adequately available for handwashing	Yes	5	5	10	90.9%
	No	1	0	1	9.1%
Mean distance of water source to point of care	<50m	4	5	9	81.8%
	51 m - 100 m	1	0	1	9.1%
	101 m - 500 m	0	0	0	
	Not applicable	1	0	1	9.1%
Number of taps available		18	13	31	
Number of functional taps available		5	11	16	51.6%

As shown in Table 2, all HCFs have borehole as their main source of water and 4(36.4%) have alternative water source. In 7(63.3%) healthcare facilities, people use the available water as drinking water. 10(90.9%) had water at the time of assessment and reported having water all through the year while 1(9.1%) had no water at the time of assessment and reported not having water for the past 3 years. All water supplies by this particular healthcare facility are gotten commercial by the management or the patients' relatives. Water was adequately available for laundry services in 8(72.7%) health facilities and was not readily available in 3(27.3%) health facilities. This is as a result of one of the primary healthcare facilities uses rain water at the time of assessment because the piped water is so turbid and another primary healthcare facility had their water supply on repair for the past 3 months and so gets water commercially. One primary health facility also gets water commercially just enough for administration of medication. Water was readily available for handwashing in 10(90.9%) of the healthcare facilities

while 1(9.1%) had no water anywhere for hand washing. All healthcare facilities under study had water within the premises and the water source is less than 500 m from the point of care.

All the healthcare facilities under study had improved sanitation facilities even though one of the primary healthcare facilities had sanitation facilities that were not functional at all. There were functional doors in toilets of 10(90.9%) of the study healthcare facilities while there is none in one of the healthcare facilities. 8(72.7%) facilities had separate toilets for male and female patients while 6(54.5%) facilities had separate toilets for patients and staff and 5(45.5%) health facilities had separate toilets for female and male staff. All toilets in the study health facilities were 30m from points of care. Only 1(9.1%) facility had toilet for disabled persons. Ratio of toilets to beds is 4.1 beds: 1 toilet and only 3(27.3%) facilities have toilets at the laboratory section. The overall cleanliness of the toilets in the healthcare facilities was high (27.3%), medium (27.3%) and low (45.4%) and some toilets had bad odour.

Table 3: Sanitation facilities available in healthcare facilities in Bayelsa state.

Variable	Category	Primary	Secondary	Frequency	Percentage
Type of toilet	Flush	6	5	11	100%
Total number of toilets	Functional	45	89	134	95.0%
	Non-functional	7	0	7	5.0%
Presence of functional doors in toilets	Yes	5	5	10	90.9%
	No	1	0	1	9.1%
Separate toilets for men and female patients	Yes	3	5	8	72.7%
	No	3	0	3	27.3%
Separate toilets for patients and staff	Yes	2	4	6	54.5%
	No	4	1	5	45.5%
Separate toilet for male and female staff	Yes	2	3	5	45.5%
	No	4	2	6	54.5%

Distance from point of care to toilet	<10 m	0	3	3	27.3%
	10-30 m	5	2	7	63.6%
	>30 m	0	0	0	0%
	n/a	1		1	9.1%
Toilet for those with limited mobility	Yes	0	1	1	9.1%
	No	6	4	10	90.9%
Mean Ratio of beds to toilet		2.8:1	5.4: 1	4.1:1	
Availability of laboratory toilet	Yes	1	2	3	27.3%
	No	5	3	8	72.7%
Overall cleanliness of toilets	High	2	1	3	27.3%
	Medium	2	1	3	27.3%
	Low	2	3	5	45.4%

Table 4: Hygiene facilities in study health facilities.

Variable	Category	Primary	Secondary	Frequency	Percentage
Presence of wash hand basins	Yes	5	5	10	90.9%
	No	1	0	1	9.1%
No of wash hand basins	Functional	47	103	150	89.8%
	Non functional	5	12	17	10.2%
Ratio of beds to wash hand basins		3.4:1	5.2:1	4.3:1	
Availability of soap/ABHR at point of care	Yes	1	3	4	36.4%
	No	5	2	7	63.6%
Availability of soap/ABHR in the toilets	Yes	0	0	0	0%
	No	6	5	11	100%
Segregation of types of waste into 3 bins accordingly	Yes	2	2	4	36.4%
	No	4	3	7	63.6%
Distance from wash hand basin to point of care	<10 m	3	2	5	45.5%
	10-30 m	2	3	5	45.5%
	>30 m	0		0	0%
	n/a	1		1	9.0%
Presence hand washing poster on disease prevention	Yes	2	4	6	54.5%
	No	4	1	5	45.5%
Wash hand basin in the laboratory	Yes	3	5	8	72.7%
	No	3	0	3	27.3%

150 wash hand basins were counted as functional wash hand basin in the study facilities. There hand washing soap at the ash hand basins at the points of care in 4(36.4%) healthcare facilities but there were no hand washing soap in any of the toilets in the healthcare facilities study. 4(36.4%) healthcare facilities had their waste separated into different bins but without the coded colours. Distance from point of care to wash hand basins were within 30 m. 6(54.5%) healthcare facilities had posters of hand washing and disease prevention. There were wash hand basins in 8(72.7%) laboratories.

Lack of access to WASH facilities is counterproductive to primordial prevention strategies in healthcare facilities and could possibly lead to outbreak of infectious diseases, nosocomial infectious and attendant high mortality [24]. It is therefore important that WASH services be provided in all healthcare facilities for the use of patients, visitors and health workers. Water is the heart of healthcare because adequate water supply is crucial for reduction of transmission of infectious diseases and maintenance of a safe healthcare environment [8]. All healthcare fa-

cility studied had a supposedly improved water supply but the problem remains that the quality of the water as not assessed hence it could not ascertain how clean and safe the water supply is. Another problem of water supply in the studied healthcare facilities is the lack of fuel to pump water sometimes when it is urgently needed. There was absence of water and indeed wash monitoring team in all the healthcare facilities sampled. All HCF sampled had the flush toilets which are considered to be improved however, a primary healthcare facility had no functional toilet. People who access the facility are left to use the bush behind the facility for sanitation purposes. The focal person met said they didn't consider it necessary because they do not admit people in the facility and if anyone is in need of using the toilet within a short stay in the facility, they will either used the bush behind the facility or go to a nearby general hospital to use their toilet. The ratio of the toilets to patients beds is much lower (4.1 beds: 1 toilet) than WHO (20 beds: 1 toilet) approved standard which is a good point for healthcare facilities in Bayelsa state. Even though the toilets are flush toilets but only one

(1) healthcare facility had toilet designed for those with limited mobility. Some of the toilets were found to be dirty and having bad odour, this is as bad as not having toilets. A systematic review carried out in a low middle income country revealed that lack of cleanliness of toilets is a bigger problem than the absence of toilets [25].

According to WHO standard, functional hand hygiene facilities should be available at all critical points of healthcare facilities [6]. All the facilities studied had no soap in the toilets including the offices' toilet. Only 4(36.4%) of the healthcare facilities had soap at the point of care this was lower than what [26] reported in some part of sub-Saharan Africa (67%). It was reported that they don't get enough funds to buy soap for the toilets. Most of the healthcare facilities had hand washing basin but some of the hand washing facilities were noticed to not dispense water, this was as a result of leaking basins or sometimes water is not running. Some health facilities were also seen to be using plastic buckets and basins as wash hand basin.

Conclusion

Although the healthcare facilities studied had water supply but the concept of clean the water raises another question as we could not carry out physicochemical and microbial analyses on the water samples used the studied HCFs. This calls for concern because patients also drink the water in some healthcare facilities or use it for other things like bathing, brushing of teeth, cooking etc. There was no toilet designed for those with limited mobility, there was no soap found in any of the toilets in the HCFs studied. In all the HCF, there was no wash monitoring team and no special attention is paid to maintaining wash services and facilities. This is really bad for healthcare delivery and infectious disease prevention. Care should be taken to make sure that wash facilities are given top priority in all healthcare facility in Bayelsa state as this will be able to eliminate all barriers to achieving good health. It could be deduced from the study that HCFs in Bayelsa State has limited services of WASH facilities. Health education and promotion in form of posters, radio and television jingles, social media posts etc should always be used to sensitize the public on the need to make use of these facilities and also keep them clean to avoid nosocomial infections. Efforts should also be made to identify constrains that impede on the provision and utilization of WASH services in HCFs in Bayelsa State and solution provided.

Limitations: A small number of HCFs (11) was used for this study and we recommend involving more HCFs especially those in the rural areas of the State. There was no analysis of the physical, chemical and microbial qualities of water used in these HCFs.

Ethical consideration: The study does not involve human or animal investigation; however, approval for the research was given by Bayelsa State Health Research Ethics Committee (BSHREC).

References

- Abdul Raheem Y. Prevention in healthcare practice: An issue with rising importance. *AL-Kindy Col Med J*. 2019; 15(2): 1-3.
- WHO. Water, sanitation, hygiene, and waste management for the COVID-19 virus: Interim guidance. World Health Organization. 2020.
- Russo ET, Sheth A, Menon M, Wannemuehler K, Weinger M, et al. Water treatment and handwashing behaviors among non-pregnant friends and relatives of participants in an antenatal hygiene promotion program in Malawi. *Am J Trop Med Hygiene*. 2012; 86(5): 860-5.
- Bartram J, Cronk R, Montgomery M, Gordon B, Neira M, et al. Lack of toilets and safe water in health-care facilities. *Bull World Health Organ*. 2015; 93: 210.
- Lopez J, Sierra ST, Cardona AM, Sara S. Implementing the Clean Clinic Approach Improves Water, Sanitation, and Hygiene Quality in Health Facilities in the Western Highlands of Guatemala. *Global Health: Science and Practice*. 2020; 8(2): 256-69.
- WHO. Global progress report on water, sanitation and hygiene in health care facilities. 2017.
- Guo A, Bowling JM, Bartram J, Kayser G. Water, sanitation and hygiene in rural health-care facilities: A cross sectional study in Ethiopia, Kenya, Mozambique, Rwanda, Uganda and Zambia. *Am J Trop Med Hyg*. 2017; 97(4): 1033-42.
- Huttinger A, Dreibelbis R, Kayigamba F, Ngabo F, Mfura L, et al. Water, sanitation and hygiene infrastructure and quality in rural healthcare facilities in Rwanda. *BMC Health Services Research*. 2017; 17(1): 1-1. doi: 10.1186/s12913-016-1943-z.
- Mulongo EG, Matte M, Wesuta A, Bagenda F, Apecu R, Ntaro M. Water, sanitation and hygiene service availability at rural health care facilities in southwestern Uganda. *J Environ Public Health*. 2018. <https://doi.org/10.1155/2018/5403795>.
- Odagiri M, Cahyorini KA, Cronin AA, Gressando Y, Hidayat I, et al. Water, sanitation, and hygiene services in public health-care facilities in indonesia: Adoption of world health organization/united nations children's fund service ladders to national data sets for a sustainable development goal baseline assessment. *The American Journal of Tropical Medicine and Hygiene*. 2018; 99(2): 546.
- WHO. Health in: From MDGs, Millennium Development Goals to SDGs, Sustainable Development Goals. WHO Press, World Health Organization, Geneva, Switzerland. 2015; 216. www.who.int.
- Cronk R, Tom S, Jamie B. (2015). Monitoring Drinking Water, Sanitation, and Hygiene in Non-Household Settings: Priorities for Policy and Practice. *International Journal of Hygiene and Environmental Health*. 2015; 218(8): 694-703. <https://doi.org/10.1016/j.ijheh.2015.03.003>. 46.
- WHO, UNICEF. Joint Monitoring Programme. Progress on drinking water and sanitation: Update. WHO Press, Geneva, Switzerland: World Health Organization. 2014.
- Allegranzi B, Nejad S, Combescurc C, Graafmans W, et al. Burden of endemic health care associated infection in developing countries: Systematic review and meta-analysis. *Lancet*. 2011; 377: 228-41.
- WHO, UNICEF. Joint Monitoring Programme. Progress on sanitation and drinking water update and SDG baseline. Geneva, Switzerland: WHO Press. World Health Organization. 2017.
- Majuru B, Suhrcke M, Hunter P. Reliability of water supplies in low and middle income countries: A structured review of definitions and assessment criteria. *J Wate Sanitation Hygiene Dev*. 2018. <https://doi.org/10.2166/washdev.2018.174>.
- Saxena G, Bharagava RN, Kaithwas G, Raj A. Microbial indicators, pathogens and methods for their monitoring in water environment. *J Water Health*. 2015. <https://doi.org/10.2166/wh.2014.275>.
- Adebe L, Karon AJ, Koltun AJ, Cronk RD, Bain RES, et al. Microbial contamination of non-household drinking water sources: A sys-

- tematic review. *J Water Sanitation Hygiene Dev.* 2018. <https://doi.org/10.2166/washdev.2018.080>.
19. Prüss-Ustün, Annette, Jamie Bartram, Thomas Clasen, John M, et al. Burden of Disease from Inadequate Water, Sanitation, and Hygiene in Low- and Middle-Income Settings: A Retrospective Analysis of Data from 145 Countries. *Tropical Medicine and International Health.* 2014; 19(8): 894-905. <https://doi.org/10.1111/tmi.12329>.
 20. Bartram, Jamie, and Jennifer Platt. How Health Professionals Can Leverage Health Gains from Improved Water, Sanitation, and Hygiene Practices. *Perspectives in Public Health.* 2010; 130(5): 215-21. <https://doi.org/10.1177/1757913910379193>.
 21. Bouzid, Maha, Oliver Cumming, Paul R Hunter. What Is the Impact of Water Sanitation and Hygiene in Healthcare Facilities on Care Seeking Behaviour and Patient Satisfaction? A Systematic Review of the Evidence from Low-Income and Middle-income Countries. *BMJ Global Health.* 2018; 3(3): 1-14. <https://doi.org/10.1136/bmjgh-2017-000648>.
 22. Arowosegbe AO, Ojo DA, Shittu OB, et al. Water, Sanitation and Hygiene (WASH) facilities and Infection control/prevention practices in traditional birth homes in southwest Nigeria. *BMC Health Serv Res.* 2021; 21: 912.
 23. Berihun G, Adane M, Walle Z, Abebe M, Alemnew Y, et al. Access to and challenges in water, sanitation, and hygiene in healthcare facilities during the early phase of COVID-19 pandemic in Ethiopia: A mixed- methods evaluation. *PLoS ONE.* 2022; 17(5).
 24. Mwai J, Nyole D, Abdi M, Ahmed I, Mutai J, et al. Assessment of water, sanitation and hygiene practices for prevention and control of COVID-19 in Kenya. *International Health.* 2021.
 25. Ogunsola FT, Mehtar S. Challenges regarding the control of environmental sources of contamination in healthcare settings in low-and middle-income countries-a narrative review. *Antimicrobial Resistance and Infection Control.* 2020; 9(1): 1-9. doi: 10.1186/s13756-019-0662-8.
 26. Kanyangarara M, Allen S, Jiwani SS, Fuente D. Access to water, sanitation and hygiene services in health facilities in sub-Saharan Africa 2013-2018: Results of health facility surveys and implications for COVID-19 transmission. *BMC Health Services Research.* 2021; 21(1): 1-1. doi: 10.1186/s12913-020-05996-8.