Research Paper

'When you preach water and you drink wine': WASH in healthcare facilities in Kenya

Thelma Zulfawu Abu, Susan J. Elliott and Diana Karanja

ABSTRACT

Access to basic water, sanitation and hygiene, waste management and environment cleaning (WASH) in healthcare facilities (HCFs) is critical for infection prevention and control. The WHO/UNICEF 2019 global baseline report on WASH in HCFs indicates that 51 and 23% of those in sub-Saharan Africa have basic access to water and sanitation, respectively. Guided by the political ecology of health theory, this research engaged with 13 key informants, 16 healthcare workers and 31 community members on their experiences on the implementation, use and management of WASH in HCFs. Interviews were conducted in one informal settlement and three rural dispensaries in Kisumu, Kenya from May to September 2019. Findings indicate improvement in water access, yet water quality and other WASH service components remain a challenge even in newly constructed maternity facilities, thus impacting local health promotion efforts. Institutional challenges such as limited financial resources and ecological factors like climate variability and disease outbreaks compromised WASH infrastructure and HCF resilience. To achieve Sustainable Development Goal 3, good health and well-being, as well as Sustainable Development Goal 6, clean water and sanitation, the prioritisation of WASH in HCFs is required at all levels, from the local to the global.

Key words | emergencies, governance, healthcare facilities, politics, WASH

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HIGHLIGHTS

- Access to WASH is essential for quality healthcare services.
- An HCF requires all WASH services components to function adequately.
- Power and politics influence access to WASH in HCF.
- An HCF requires adequate WASH to overcome recurring emergencies.
- Intersectoral nature of WASH requires coordination among all relevant stakeholders to ensure access.

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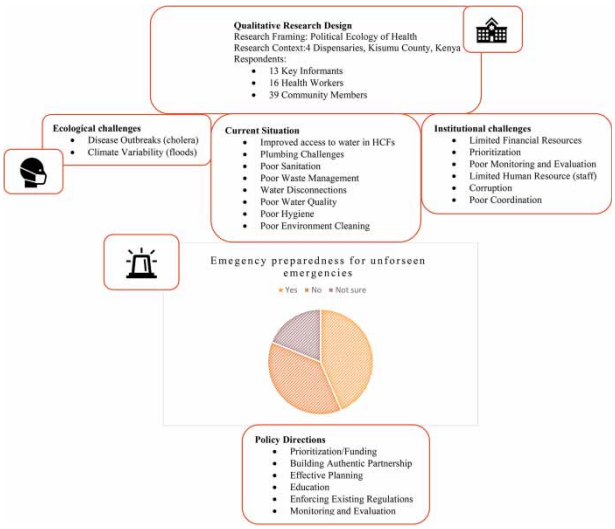
GRAPHICAL ABSTRACT



INTRODUCTION

Healthcare facilities (HCFs) require safe water, sanitation, hygiene, environmental cleaning and waste management (WASH) to provide quality services to promote, restore, maintain and improve health. The lack of access to WASH in HCFs contributes to increasing infection rates (Allegranzi *et al.* 2011), while the inconsistent supply of water limits essential activities like handwashing and cleaning. As a result, some HCFs only minimally fulfil their role of supporting patients (Essendi *et al.* 2015). For example, lack of safe WASH infrastructure has been shown to impact women's safety, privacy and comfort accessing HCFs (Steinmann *et al.* 2015). Research links neonatal sepsis and maternal mortality to poor hygiene resulting from a lack of safe WASH (Blencowe *et al.* 2011). In developing countries, 4–56% of all healthcare-associated infections caused death during neonatal periods; 75% of these cases occurred in South East Asia and sub-Saharan Africa (SSA) (WHO 2013). In SSA, only 51% of HCFs have basic access to water, and only 23% have basic access to sanitation (WHO & UNICEF 2019). The situation of WASH in HCFs is more precarious in rural areas, where 15% of rural HCFs had no access to water services compared to 5% of urban HCFs (WHO & UNICEF 2019). In addition, the quality of WASH services provided remains a challenge; Guo & Bartram (2019) found *Escherichia coli* in sampled water from HCFs in 14 low- and middle-income countries (LMICs).

Major global events such as climate change and disease outbreaks (e.g., Ebola and COVID-19) compound WASH service challenges. For example, water scarcity is expected in drought-prone areas (Paterson *et al.* 2014). Furthermore, recent Ebola outbreaks in SSA resulted in compromised health service delivery due to disease spread and mortality of many, including healthcare workers (Shoman *et al.* 2017). These recurring events require HCFs to be adequately equipped to sustain WASH services provision, even during adverse events. From 1990 to 2014, 18% of reported global disasters were from SSA (IMF 2016). This region experienced 39% of epidemics, 37% of floods and 8% of droughts globally. Building health facility resilience (i.e., the capacity to absorb the shock of an emergency and at the same time continue to provide regular health services, without jeopardising full functioning of other sectors) is critical to achieving Sustainable Development Goal 3 (health and well-being for all) and Sustainable Development Goal 6 (water and sanitation for all). Guidelines such as the

Sendai Framework for Disaster Reduction aim at reducing disaster risk, loss of lives and livelihoods (United Nations 2015). Its fourth target seeks specifically to 'Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030' (United Nations 2015). Achieving this target means ensuring the effectiveness and efficiency of all the components of an HCF, including WASH.

This paper explores the contribution of safe WASH to resilient HCFs, using Kisumu, Kenya as a case study. We undertook in-depth interviews with key informants (KIs) ($n = 13$), healthcare workers ($n = 16$) as well as community members ($n = 39$) in order to explore the social, ecological and institutional challenges hindering access to safe WASH in HCFs. Following this introduction, we frame the paper within the political ecology of health (PEH) theory and then describe the research design and methods used. Results stemming from a comprehensive thematic analysis of the interview data are followed by a discussion and conclusion that includes recommendations for research, policy and practice.

FRAMING ACCESS TO WASH IN LMICs

We are guided in this investigation by PEH, which provides an effective merger between political ecology and population health (King 2010). Using PEH, we can start to understand how health patterns are produced through circumstances of living and arrangements of power and politics (King 2010). Power and politics influence decisions made at the macro scale (national governments and global agencies) as well as the mesoscale (county-level managers) subsequently affecting the quality of health service delivered at the community level. PEH also allows us to explore power struggles at the micro-level, where grassroots actors influence policies, regulations, guidelines and practices. In many parts of the world, marginalised groups have been able to resist oppression from structural processes, thus exhibiting their own power (Bryant & Bailey 1997). For instance, communities with attachments to and responsibility for local hospitals, through identity, politics and activism, have successfully opposed the state and other actors when these hospitals were threatened with cuts or closure (Andrews *et al.* 2012). In the context of WASH, PEH has been used to explore how institutional and individual power influenced access to water in Kenya (Bisung *et al.* 2016). In the context of HCFs, PEH can be used to explore structural factors that influence access to WASH and the agency of facility workers and managers in managing WASH in HCFs.

RESEARCH DESIGN AND METHODS

This cross-sectional research was conducted in Kenya, an east African country with a population of approximately 48 million people (KNBS 2019), identified as a hot spot for both drought and epidemics (International Monetary Fund 2016). With a decentralised system of governance, health functions have been devolved to the county level (Constitution of Kenya 2010). The development of health policies, norms, standards and guidelines, managing national referral HCFs, capacity building and technical assistance to counties are tasks of the national government. Currently, the national government is piloting a universal health insurance coverage scheme in four counties, including Kisumu County where this research was conducted. The county government is responsible for the promotion of primary healthcare and all county health services including waste management. In recent times, the county governments have undertaken new strategies and initiatives to address the health needs of their populations, including the construction of additional health facilities.

Kisumu County has a population of approximately 1.5 million people (KNBS 2019) and shares a boundary with Lake Victoria. Kisumu's communities along the lake are prone to climate impacts including floods (Ajuang *et al.* 2016). Research by Achoki *et al.* (2018) identified access to unsafe WASH as a leading national risk to health in Kenya, with Kisumu County also identified as a hot spot for unsafe WASH. The research reported on in this paper was conducted in four dispensaries located in one informal settlement and three rural communities in Kisumu County. Dispensaries are the first point of care for patients in rural and marginalised areas. These four facilities offer preventive, curative, maternal and childcare services and operate 8 h per day, 5 days a week. This means that during weekends

and at night, community members must seek medical attention at private health facilities nearby or government hospitals in Kisumu town. Typical health issues reported at these facilities include malaria, respiratory diseases, diarrheal diseases, urinary tract infections and E/E (eye and ear) infections.

The research was conducted in partnership with Cohesu, a local non-governmental organisation (NGO) with interest in conducting and translating research into operational and sustainable strategies in health prioritisation in communities in the Lake Victoria region. This research was granted ethical clearance (ORE No.: 40927) from the University of Waterloo Ethical Board as well as the county Ministry of Health. Data were collected through in-depth interviews with stakeholders ($N = 68$) between May and September 2019 in Kisumu, Kenya. Interview guides were developed to direct the scope of the interviews. Thirteen KIs (representatives of NGOs and county government) were purposively sampled due to their knowledge and engagement in decision-making and/or funding of WASH services in HCFs. We emailed or presented letters of invitation to the KIs and healthcare workers, and we proceeded to conduct interviews after a scheduled appointment at their preferred location. KIs were asked a range of questions including their role in providing access to WASH in HCFs. Healthcare workers from four dispensaries were purposively targeted for recruitment, as they used and managed WASH services in HCFs. At each facility, the nurse in charge, a public health volunteer, a community health volunteer and a cleaner were interviewed. All four facilities were managed and cleaned by female nurses and female cleaners, respectively. Healthcare workers were asked a range of questions related to WASH management and use in HCFs. The researchers visited community chairpersons to inform them about the research. Community members (patients and caregivers) were recruited to participate in this study through invitations issued by healthcare workers interviewed. The experiences and observations of community members in the use and management of WASH services in HCFs are germane to understanding access to and use of WASH in HCFs. Community members were asked a range of questions including their experiences with accessing WASH in HCFs. The majority of the interviews were conducted in English. Some interviews were conducted in Swahili and Lou. With the consent of each participant, interviews were recorded and later transcribed for subsequent thematic analysis using NVivo. We developed a coding schedule that highlighted emerging themes from the transcripts.

RESULTS

Interviews were conducted with KIs from both government and NGOs ($n = 13$), a range of healthcare workers ($n = 16$) as well as patients and those who care for them while in the HCFs ($n = 39$) (Table 1). Results are presented around four key thematic areas that emerged from the qualitative analysis of the interviews. We explored the experience and perceptions of WASH in HCFs, the challenges associated with lack of WASH in HCFs, emergency preparedness and potential policy directions.

Table 1 | Characteristics of participants

Groups of participants		Subgroups	Pseudo identifiers	Number per group	Total *N* (participants)
KIs	County level	NGOs	K_1–K_{13}	8	13
		Government officials		5	
	Healthcare workers	Nurses in charge	N_1–N_4	4	16
		Public health officer	P_1–P_4	4	
		Community health volunteers	CV_1–CV_4	4	
		Cleaners	C_1–C_4	4	
Community members		Patients	PC_1–PC_{19}	19	39
		Caregivers	CG_1–CG_2	20	
Total					68

Situation of WASH in HCF

Interviews began by exploring participants' perceptions of WASH in HCFs (Table 2). Improved access was a major theme strongly highlighted by healthcare workers and facility users. As of December 2018, Kisumu Water and Sewerage Company (KIWASCO), responsible for the county piped water system, had connected water to all four communities in this research. Each facility had benefited from this investment with at least a standpipe. However, water challenges persisted and healthcare workers and KIs were concerned about poor water quality as well as availability:

'There is improvement in the facility, first this water from KIWASCO even though it is not clean as such.' (C_4)

Poor water quality was attributed to the interference of water lines by road contractors:

'There are a lot of road contractors, they interfere with the lines, so when they interfere with the lines you can find

Table 2 | Coded themes

	No. of mentions by each group of participants (%)					
Response	**KI**	**HCF staff**	**Patients**	**Caregivers**	**Total mentions**	**Total *N* (participants) (%)**
Situation of WASH in HCF						
Improved access to water in HCFs	2 (5)	22 (55)	10 (25)	6 (15)	40	30 (44)
Plumbing challenges	8 (19)	26 (60)	4 (9)	5 (12)	43	22 (32)
Poor sanitation	6 (21)	8 (28)	9 (32)	6 (21)	28	24 (35)
Poor waste management	6 (25)	14 (58)	1 (4)	3 (13)	24	16 (24)
Water disconnections	7 (36)	4 (21)	3 (16)	3 (16)	19	15 (22)
Poor water quality	6 (38)	7 (44)	2 (13)	1 (6)	16	12 (18)
Poor hygiene	7 (35)	10 (50)	2 (10)	2 (10)	20	12 (18)
Poor environment cleaning	0	4 (57)	1 (14)	2 (29)	7	7 (10)
Challenges implementing and managing WASH in HCF						
Limited financial resources	18 (67)	14 (52)	2 (7)	3 (11)	27	23 (34)
Prioritisation	9 (69)	2 (15)	1 (8)	1 (8)	13	10 (15)
Poor monitoring and evaluation	8 (62)	3 (23)	0	2 (15)	13	10 (15)
Limited human resource (staff)	2 (20)	6 (60)	0	2 (20)	10	9 (13)
Corruption	3 (50)	2 (33)	0	1 (17)	6	6 (9)
Poor coordination	5 (71)	2 (29)			7	6 (9)
Emergency preparedness: are HCFs building resilience for unforeseen emergencies?						
Yes	3 (12)	8 (31)	11 (42)	5 (19)	26	26 (38)
No	11 (37)	7 (23)	2 (7)	10 (33)	30	30 (44)
Unsure	1 (8)	1 (8)	6 (46)	5 (38)	13	13 (19)
Policy direction						
Prioritisation/funding	14 (47)	12 (40)	1 (3)	3 (10)	30	20 (29)
Building authentic partnership	14 (61)	6 (26)	3 (13)	0	23	15 (22)
Effective planning	9 (50)	6 (33)	1 (6)	2 (11)	18	13 (19)
Education	9 (69)	2 (15)	2 (15)	0	13	10 (15)
Enforcing existing regulations	5 (100)	0	0	0	5	5 (7)
Monitoring and evaluation	1 (50)	1 (50)	0	0	2	2 (3)

that a hospital is disconnected, they don't have water and there is a problem with the quality.' (K_{12})

Healthcare workers treated water with water filters and water guards provided by local NGOs and improvised equipment such as tippy taps to ensure running water for handwashing, due to limited plumbing. More concerning for healthcare workers and KIs was the fact that new HCFs were being constructed with little or no plumbing infrastructure. These constructions were spearheaded by members of the county assembly (MCAs) who are also the development agents. They represent their wards in the county assembly in Kenya and are mainly responsible for law-making, approving national budgets and county development plans:

'*A new building has been constructed, there is no septic tank and they (development agents) are insisting they open the facility, so many buildings without WASH facilities.*' (K_{13})

Also, to avoid high water invoices, health facility managers control water availability by locking pipes:

'*You may find that there is water, but it is under lock and key… you may find that in a particular quarter, there is no allocation for bills.*' (CV1)

Officials at the county level intervene when payments are delayed:

'*We have reached out as subcounty medical officers of health to KIWASCO at some point to give them the list of all the healthcare facilities, so that they have a grace period in paying their bills, sometimes these bills pile up too much … So many times, you find health facilities being cut off totally.*' (K_1)

Many participants reported the poor standards of other WASH aspects in the HCFs (i.e., sanitation, hygiene, waste management, environmental cleaning). Waste management was a major concern for healthcare workers as facilities burn their waste and for some participants, open burning was a risk for the community especially children who played in the area. Healthcare workers were also concerned about the risks of storage and transportation of used sharps to the county referral hospital as required by the county Ministry of Health:

'*For the waste, I feel that if we had an incinerator or burning chamber, it will ease our work because we are forced to store and call for a vehicle to come and collect the sharps in the safety boxes to burn them that to me I feel it is not safe. They are to be disposed immediately, in the shortest possible at the right place.*' (P_3)

Although environmental cleaning is an important aspect of the hygiene associated with HCFs, this was mentioned relatively infrequently (Table 2), with HCF workers and caregivers concerned about the bushy surrounding and related risks:

'*The compound of the facility sometimes it's not clean. Even if you look at the compound as we speak, there are many bushes. Sometimes you are a patient and you come with a kid, and the child wants to go to the toilet, she or he can't walk through the bush. For the child to reach the toilet he can even meet with anything bad.*' (C_{15})

Despite these challenges, many HCF users reported positive attitudes towards the WASH situation, simply because it was better than it had been. Participants expressed a variety of emotions about the situation of WASH in HCFs:

'*It makes us feel great because even that water once it is here, it helps us. If my home is even nearer as I have told you, I can come and get water from the dispensary, it has helped me because it is a community dispensary it is not a private dispensary.*' (CG_9)

'*I'm now feeling quite good but not so much because they are still average, they have not come up to the standard that we want as needed by the Ministry of Health. Just like I have said, the water has not been connected to the toilets, so if you use the toilet, you have to come to that tank to wash your hands. But you see most of the toilets in town or other health facilities you will find water is in the toilets.*' (PC_7)

Alternatively, several KIs and healthcare workers felt WASH in HCFs remained inadequate; in addition to infection prevention and control (IPC), WASH in HCFs was perceived as an example to the community, and its availability affected community health promotion where community members are encouraged to practice safe hygiene and refrain from open defecation:

> '*It makes me feel demoralized somehow because when you preach water and you drink wine, it does not go out well with the patients and everybody, because we have to lead by example as health care, as we prevent these diarrheal diseases. We have a lot of diarrheal diseases in this place. So when you tell them to go and wash hands after visiting the toilet and they don't see you do it, you feel demoralized like you are not doing the right thing.*' (N_3)

Challenges

Given the current poor state of WASH in HCFs, participants were asked about some of the challenges associated with the implementation and management of WASH in HCF (Table 2). Not surprisingly, limited financial resources were the most frequently mentioned challenge, with financial resources typically insufficient and/or delayed and with so many competing priorities, WASH may not be at the top of the list:

> '*The money that is dispersed to the healthcare facility sometimes are not very regular, if I could bring in the situation that is happening right now, we have issues with the governors and the government, they have a push and pull about how much money should be allocated, the national government says we don't have much money the county government is saying we need more money to implement our developmental projects so obviously the money comes in late because this standoff has not been resolved yet.*' (K_1)

> '*As much as the facility will want to connect, they have no resources, they don't access any money and most of the money if they get any goes into expenses like drugs, and paying of casual workers, so water is almost number 10 on their hierarchy in terms of needs, because they have more casual workers to be paid*' (K_3)

Funding constraints of course lead to inadequate staffing, with only one person per facility responsible for all cleaning responsibilities:

> '*One thing I can say this building is not small and I'm just alone and sometimes I'm sick there is no one to take charge that one is a challenge. Another thing also about the stipend I'm getting in the facility, it will take three to four months before I get the stipend so that one also is a challenge because I am a mother with a family so if it takes three to four months, it is a challenge to me.*' (C_4)

At the county level, inadequate staffing meant that monitoring and evaluation by county officials were often limited:

> '*There is lack of adequate monitoring and evaluation because when these facilities are done there should be proper monitoring and inspections before they are handed over so we can have so many projects in a county and you will find that the personnel who are supposed to do the monitoring are very few, they are not able to reach all these facilities.*' (K_{11})

Systemic corruption also played a major role in inadequate WASH in healthcare facilities:

> '*The last opinion is corruption, people may do an incomplete project and even be paid because there are corrupt people who may intend not to follow the correct procedure, they may not follow the correct designs or they do the designs and do things halfway or haphazardly.*' (K_{11})

Prioritisation at the national and county levels is essential to ensure the allocation of funds for WASH in HCFs. At these levels, curative measures received much attention compared to preventive even with the universal health coverage (UHC). From the study, the managers of the facilities who are also the nurses-in-charge played very key roles in prioritising WASH in HCFs:

'*For the government of the day, I doubt if it is a priority, because if it is a priority, then I think it could have been the first thing to be installed when this construction was being done, it was just brought by the management who saw the need for this. In fact, it was through their efforts that they managed to install water in this facility though the funds that came from the government but it was their decision to use the funds to install water in this facility but nobody from the Ministry came to sensitise them.*' (CV_1)

At the community level, some participants perceived that the national and county levels prioritise curative, because patients prioritise curative as opposed to preventive and IPC in HCFs:

'*When a patient comes to the hospital, the first thing they want is drugs as opposed to the nurses washing their hands before handling them.*' (K_3)

In addition, KIs and some workers attributed the lack of WASH in HCF to the coordination and consultation process (Table 2). The healthcare managers thought their concerns on WASH in HCFs were not incorporated in the MOH county plans:

'*I don't know after the research how you are going to help us, because maybe someone from outside can be listened to better than somebody on the ground. When you go and give the feedback to the county or the subcounty they may have an ear on what you are talking about, what is on the ground other than us talking about it they see it very usual. So, I will like you after the study to share with the sub county and county so they can know the impact on the ground and the need for those sanitation facilities and water.*' (N_3)

Similarly, at the county level, Ministry officials faced similar challenges with the political leaders and county agents of development:

'*Some of those facilities are built with what we call, a political move, so most of these facilities that are sprouting up are being built for politics so that the area representative says, I built a hospital for you, so because they are done in haste with political mileage, they don't necessarily follow the guideline and that is why many times you will find they don't meet the standards and there is nothing the technocrat and health ministry can do about a political movement, it is beyond them.*' (K_3)

Emergency preparedness

We also explored the role of WASH in emergency preparedness with all the research participants. Compounding the already poor situation of WASH in these HCFs is the threat of impending disasters such as floods, droughts and disease outbreaks. Kisumu County is burdened with frequent diarrheal and malaria outbreaks, which constrain healthcare resources and infrastructure. Sometimes, the disease outbreaks are a result of climate impacts like drought or heavy rain events. A participant recounted cases of facility toilets collapsing due to the local geology:

'*So I will say WASH in healthcare, we have only intervened in areas where there are disasters within the area, maybe emergencies, in Usoma there is a toilet which collapsed, … the toilet collapsed because of the soil, black cotton soil here in Kisumu if you don't have a very good design, when it is raining the toilet will just go down.*' (K_{13})

All participants were asked whether or not HCFs could be resilient to such disasters. In response, 44% said no, 38% said yes and 19% were unsure (Table 2). Some participants were of the view that facilities can withstand emergencies because of the strong referral system:

'*I tend to think that disease surveillance response in Kenya is quite admirable because once an outbreak is reported, there is that channel of communication and a lot of efforts are channelled to ensure that everything is put under control, so again it depends on the healthcare facility, in terms of human resources and the equipment and all those things that are needed to make complete a healthcare facility and but in terms of response we are doing fine with that, from my own perspective.*' (K_2)

Others were of the perspective that HCFs were not building resilience for emergencies and cannot recover should a serious disease outbreak occur due to lack of WASH services. Provisions for IPC measures to prevent the spread of diseases are made only after outbreaks occur:

> '*The plan only comes only after the disease outbreak comes that is when you see people running around. Like even the time when the cholera came, that was when they had to open this building, bring soaps, employ more cleaners. So, the emergency plans are not there.*' (CV_3)

Policy direction

We further engaged respondents in the discussion of potential policy directions to ensure resilient access to safe WASH in HCFs (Table 2). The most frequently mentioned policy direction was the prioritisation of WASH in HCFs across all levels. Participants felt that when WASH is prioritised and adequately funded, WASH infrastructure will improve:

> '*I think it is about prioritizing our needs, as a county and as a country just to realign to the thought that having safe WASH has better outcomes than not … I was working for a maternal child survival programme we came up with this clean clinic approach just to ensure that the facility upholds the standards required to be termed as a safe WASH facility.*' (K_3)

For some participants, especially KIs, the prioritisation of WASH required a significant increase in the knowledge of the links between WASH and health. County officials need education to understand policies. Likewise, community members need to be knowledgeable in WASH in HCFs as issues for advocacy:

> '*So what I will say is that, active citizen engagement or participation for them to be aware of what is really missing so they have the liberation to actually point that out and their needs and to actually speak up because why would a healthcare facility function without water, they have the ability to speak up and say that let it be closed down because it is our right to have WASH in health care facilities.*' (K_2)

Furthermore, partnerships are needed among all WASH stakeholders to ensure consistent regulations that require newly constructed HCFs to have adequate and resilient WASH infrastructure:

> '*If there is a policy where we could construct two facilities and finish two completely, then the next year we go to other wards, construct three like that, so at least within five years, all buildings would be complete but because we are doing it piece by piece then we will have problems.*' (K_{13})

Finally, with the appropriate measures in place, effective monitoring and evaluation should be carried out while enforcing existing regulations. Nurses-in-charge are monitoring their facilities but are burdened by managing and delivering health services:

> '*I think they must form a body, a body that supervises everything, you know as you work some people do this work of supervising other departments but they have their own departments to work in … because maybe if a body could be formed who does the supervision on sanitation and hygiene every time, they could spot that this facility lacks this and this so they put it in their own plans and are solved but so far it is you who is working here you have to know your problems, you have to know what you should be doing, how to improve upon that and make things work for you.*' (N_2)

DISCUSSION

There appears to have been progress in the provision of safe water in HCFs (all four studied had a piped water system within the premises, thus meeting the basic service requirement by WHO/UNICEF), but adequate safe water, sanitation and hygiene remain major challenges, thus threatening health promotion and disease prevention in the facility as well as the community.

A wide range of institutional and ecological factors were reported to affect access to WASH in these HCFs: limited

financial resources, lack of prioritisation, poor monitoring and evaluation, limited human resources, corruption and poor coordination and consultation. These interconnected challenges are founded in power and politics. This was also illustrated by Maina *et al.* (2019) who in a study in Kenya identified infrastructural design challenges, attitude of hospital managers and lack of funds as factors negatively impacting anti-microbial resistance in hospitals. WASH in HCFs was not prioritised at the county level and not adequately funded even with the recent piloting of the UHC (Abu & Elliott 2020). Furthermore, it appears from this research that patients and caregivers prioritise the availability of medication as opposed to access to quality and safe HCF services. Steinmann *et al.* (2015) concluded that access to WASH in HCFs in India was not a main driver for patient satisfaction or the use of an HCF. At the facility level, with insufficient financial resources, the independent actions taken by healthcare workers including nurses resulted in a positive change (e.g., in some dispensaries, mothers were provided with menstrual hygiene materials after delivery). Limited funds in HCFs directly restricted the number of casual staff cleaners employed; all four cleaners interviewed struggled to do their job but viewed it as a service to their community despite their dissatisfaction with conditions of employment. Cross *et al.* (2019) associated the neglect and undervaluing of cleaning and cleaners in HCFs with wider social and institutional arrangements; that is, beyond even limited resources, cleaning was regarded as 'women's work' and hence devalued within the HCF.

Poor consultation and coordination among technocrats at the MOH and the MCAs resulted in the construction of new maternity facilities without the appropriate WASH infrastructure (no running water, septic tanks, placenta pits, sanitation facilities), thus perpetuating the cycle of lack of WASH access. Maina *et al.* (2019) link the absence of plumbing works in HCFs to buildings constructed 40 or more years ago when WASH and IPC were not prioritised. These newly constructed facilities were considered as political lifelines for political leaders, MCAs who were seeking re-election. Compounding this challenge was corruption. Some participants attributed the abandoned new maternity facilities to collusion between contractors and government officials to divert the required funds needed to complete the facilities. Examples of the impacts of corruption on the standards of HCFs in developing countries are not unusual (Stiernstedt 2019).

The further challenges associated with waste management at HCFs (i.e., sharps disposal) could also be attributed to poor consultation, coordination and monitoring. According to the WHO/UNICEF Joint Monitoring Programme for Water supply and Sanitation and Hygiene standards, waste collected in HCFs may also be taken outside for safe disposal. The challenge with this policy is that the county MOH did not take into consideration the challenges associated with safely storing and transporting used sharps. Not all facilities studied had the appropriate storage units. The challenges associated with transporting used sharps resulted in extended storage periods. During the Ebola outbreak, aside from IPC challenges, storage and transportation of the waste and wastewater were unanticipated challenges faced by facilities managers and represented a significant risk of infection (Meyer *et al.* 2018).

Finally, yearly floods from torrential rains and frequent disease outbreaks such as cholera affected the resilience of these HCFs. Soil type – black cotton soil – and floods led to the collapse of some latrines. Also, the high water table from floods pushed up medical waste in disposal pits. This is a significant health hazard especially for children who play in the area. Even though some participants felt that the facilities are prepared for any emergency because of the strong referral system, their abilities to respond and recover from emergencies were clearly linked to available WASH services that were not adequately planned for.

While these are important findings relevant to the population health of Kenya and beyond, this research is not without its limitations. The cross-sectional nature of the data collection process limits the contextual framing of the results and their determinants. Understanding the need for, challenges to, and resilience of WASH in HCFs in Kenya (and beyond) requires further research over time. Despite this, we were able to triangulate the voices of healthcare workers, government agents, as well as patients and caregivers in order to paint a rather comprehensive picture of the experience, perceptions and challenges.

CONCLUSION

This research was informed by theories of PEH – who has access to resources such as water? Those who have the power to make decisions. Access to WASH in HCFs will not change until the balance of power changes. And while WASH in HCFs in Kenya and beyond remains fragile, that fragility is exacerbated in the face of the not unrelated global threats of climate change and disease outbreaks. Major international organisations – WHO and UN – have developed frameworks to address this issue (see, e.g., Sendai framework (United Nations 2015) and the WHO guidance for climate-resilient and environmentally sustainable HCFs (WHO 2020)), but without redressing the balance of power, universal access to safe WASH in HCFs in developing nations remains (pardon the pun) a pipe dream. It remains to be seen how the COVID-19 pandemic will add to this story.

DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

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