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The critical need for WASH in emergency preparedness in health settings, the case of COVID-19 pandemic in Kisumu Kenya

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ABSTRACT

The devastating effects of inadequate basic utilities such as water, sanitation, hygiene, waste management and environmental cleaning (WASH) is underscored by the current global pandemic declared on March 11, 2020. This paper explores the experiences of key informants (n = 15) ie government and non-government organization officials on the impacts of the COVID-19 pandemic in health care facilities (HCFs) and the role of WASH in emergency preparedness in health settings and the communities they serve using Kisumu, Kenya as a case study. The results from interviews with the key informants indicate socioecological challenges shaping access to hygiene services in HCFs and related disparities in social determinants of health such as WASH that serve as barriers to the pandemic response. All participants indicated the healthcare system was ill-prepared for the pandemic. Health care workers experienced such severe psychosocial impacts due to the lack of preparedness that they subsequently embarked on strikes in protest. These situations influenced citizens' perceptions of the COVID-19 pandemic as a hoax and resulted in a surge in other population health indicators (e.g., increased maternal mortality; decreased vaccination rates for other illnesses such as measles). We recommend authentic partnerships among all stakeholders to develop and implement context-driven sustainable solutions that integrate WASH and emergency preparedness in HCFs and the communities they serve across all spatial scales, from the global to the local.

1. Introduction

The Millennium Development Goals (MDGs) were agreed to by world leaders in 2000 to improve basic human needs by 2015 in Low- and Middle-Income Countries (LMICs). Access to safe water, sanitation and hygiene (WASH) is critical to development yet was not represented as one of the 8 goals; rather, ensuring access to safe WASH was integrated as targets under related goals. The MDGs and their targets were unevenly achieved by 2015 and the world transitioned to the Sustainable Development Goals (SDGs), increasing from 8 to 17 goals with 169 targets to reach by 2030. WASH was recognized as a critical tool for development hence SDG 6 articulates the need for ensuring access to water and sanitation for all and is composed of several targets. In addition, some targets of SDG 3 (ensure healthy lives and promote wellbeing at all ages) emphasize the need to reduce the number of deaths and illnesses from water pollution and contamination, ensure access to quality essential healthcare services as part of achieving

universal health coverage (UHC) for all and strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks. In 2015, the Sendai Framework was also adopted to substantially reduce disaster damage to communities including critical infrastructure and disruption of basic services such as health services. Healthcare facilities require efficient infrastructure to enhance their resilience to shocks of emergencies whilst providing health services that are robust in the face of stressors (Kieny and Dovlo, 2015). Safe WASH services are a necessity for disease prevention and quality services in health settings (Sickbert-Bennett et al., 2016; Watson et al., 2019).

WASH interventions are then imperative in responding to the COVID-19 pandemic declared on March 11, 2020. At the time of writing, over 100 million cases and more than 2 million deaths have been recorded globally (Worldometers, 2021). In the absence of a vaccine, non-pharmaceutical interventions (NPIs), such as hand hygiene, facial coverings, and physical distancing became the only weapons against the

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virus, weapons unavailable to large proportions of the population in many LMICs, including sub-Saharan Africa (SSA) (Howard et al., 2020). Indeed, only 60% of the world's population have access to basic hand-washing facilities at the household level (UNICEF & WHO, 2019). The SSA region recorded the lowest progress rate in expanding access to improved water services between 2000 and 2017, where access to piped water was mostly concentrated in urban centres (WHO & UNICEF, 2021). The global COVID-19 pandemic continues to shine a spotlight on existing global inequities among the world's most marginalized populations. Beyond the household level, access to safe WASH services is a major challenge for healthcare facilities (HCFs) providing services in developing countries (WHO & UNICEF, 2019).

In High-Income Countries, households living below the poverty line had to be reconnected to municipal water supplies in order to ensure adherence to public health measures at the beginning of the pandemic. In the United States of America, 90 cities and states suspended water shutoffs in response to the pandemic (Lakhani, 2020). Also, an *emergency water is a human right act* was reintroduced in the USA Congress on January 28, 2021, to legally prevent water departments from shutting off water to poor and populations living in vulnerable situations during emergencies while also forcing them to turn water back on for households that had previously been cut off (Debbie and Tlaib, 2021). In LMICs, there were instances where governments introduced water supply initiatives. For example in Ghana, the national government introduced free water, with costs absorbed by the government during the pandemic (Smiley et al., 2020). This initiative is laudable however, existing water insecurities coupled with piped water implementation and operationalization challenges hindered access to the unconnected and poor populations (Amankwaa and Ampratwum, 2020). The national government subsequently introduced a COVID-19 health levy to offset the cost of the free water initiative in 2021 (Republic of Ghana, 2021). These WASH challenges coupled with other social inequities such as income inequalities continue to amplify the spread of the COVID-19 virus and threaten the existence of many health care facilities even in the global north where health systems are perceived to be more resilient (Jiwani and Antiporta, 2020; Sachs et al., 2020).

1.1. WASH inequities, infection prevention and control and the COVID-19 pandemic

The essence of WASH services in addressing the current COVID-19 pandemic cannot be over-emphasized. Among these services, Lin et al. (2020) in their research in 21 countries established that hand hygiene is a more effective strategy for mitigating the COVID-19 pandemic as compared to nose masking. Several WASH interventions have been piloted and implemented in health settings and communities in LMICs prior to and during the COVID-19 pandemic, however, the majority of these interventions address specific components of WASH and their impacts on infection prevention and control. For instance, Watson et al. (2019) in their systematic review on the role of WASH interventions in reducing healthcare-associated infections (HCAI), indicate all studies included in their review assessed hygiene. Hygiene interventions including hand hygiene education, sterilization, provision of cleaning products and infrastructure were implemented in LMICs to address infection prevention and control (IPC) in HCFs. None of the studies addressed improvements to water quantity or quality, sanitation facilities and their links to HCAIs. This indicates the sparse knowledge of the impacts of other water and sanitation interventions on HCAI.

In the context of satisfaction with inadequate WASH services and environmental conditions in healthcare facilities on the part of healthcare providers, Fejfar et al. (2021) in their study in 14 LMICs established that 68% of healthcare providers were unsatisfied with the sanitation facilities, 65% were unsatisfied with the water services, and 54% were unsatisfied with the hygiene services. Even though access to WASH is important in rendering quality and safe health care services, a systematic review conducted by Bouzid et al. (2018) indicated that access to

WASH is not a significant determinant for health-seeking behaviours among patients in LMICs. WASH was not identified as a driver of accessing HCFs, however, poor WASH service provision was associated with significant patient dissatisfaction with quality care.

In Uganda, Kayiwa et al. (2020) explored the determinants of hygiene practices among mothers seeking delivery services from health-care facilities in the Kampala metropolitan area. Their study indicated inadequate safe water and poor sanitary condition of available bathing facilities were major determinants of hygiene practices in HCFs. This study highlighted the inequities among the types of facilities and locations. For instance, research participants from health centers in peri-urban areas were more likely to encounter unreliable flowing water and poorly equipped bathrooms as compared to those in hospitals in urban areas. Hospitals were prioritized in terms of funding and other large water supply expansion projects. Similarly, Tseng et al. (2020) highlighted inequities in healthcare financing and its impacts on WASH provision across the various levels of HCFs in India. In their study, they stipulated that more than half of the total investment capital for improving WASH services in public health facilities in India within a year will be required in rural HCFs and primary health centers. Further, Abu et al. (2021) established that a wide range of institutional factors including limited financial resources, inadequate prioritization, poor monitoring and evaluation, inadequate human resources, corruption, as well as poor coordination and consultation - all founded in power and politics - were found to shape access to WASH services in HCFs in Kenya (Abu et al., 2021). In addition, ecological factors such as climate variability and disease outbreaks burdened inadequate WASH services. Furthermore, research participants expressed varied perspectives on preparedness towards emergencies which were influenced by the availability of safe WASH services and the efficiency of the health referral system. The majority of research participants indicated plans and provisions for infection prevention and control (IPC) are made available only after disease outbreaks occur.

Researchers have begun to highlight the impacts of the COVID-19 pandemic in communities and health settings in SSA. Gilbert et al. (2020) evaluated the preparedness and vulnerability of African countries to the global pandemic against their risk of importation of the COVID-19 virus. They concluded many African countries were ill-prepared to respond to the COVID-19 pandemic. They also classified Kenya as a moderate risk country with variable capacity to respond, yet high vulnerability to the pandemic. Howard et al. (2020) and Wallace et al. (2020) reiterate the negative impacts of the pandemic globally. They emphasize the need for strong empirical research through a social scientific lens that will explore and understand emergency preparedness, build resilient HCFs and healthy communities. Armitage and Nelums (2020) emphasize the need to prioritize people in water-stressed settings in intervention planning and implementation, especially in the phase of climate variabilities and the pandemic. However, there is limited empirical research on alternative measures for addressing preparedness and building resilience through strengthening basic services including WASH in HCFs.

To better prepare for recurring disease outbreaks and subsequent threats to global development, we contribute to this literature by engaging key informants (n = 15) in Kisumu County government as well as relevant Non-Governmental Organisations (NGOs) to ascertain their experiences on the impact of the COVID-19 pandemic and the role of WASH services in emergency preparedness in health settings and communities they serve in Kenya. Following this introduction, we frame the paper within the theories of political ecology of health and then describe the study context and methods used. Results are followed by the discussion and conclusion that includes recommendations for policy and practice.

1.2. Political ecology of health and WASH

Political ecology of health (PEH) outlines the connections between

large-scale socio-political and ecological processes within a place and across multiple scales that shape population health and wellbeing (King, 2010). Researchers have drawn on this theory to explore and explain issues of disease, health, healthcare and wellbeing across a range of spatial scales and geographies. For instance, King (2010) used political ecology to investigate the AIDS epidemic in South Africa. In this context, King explored how opportunities for healthy decision-making were shaped by political and economic processes including inadequate health infrastructure. He further illustrated how the transmission of cholera disease as well as the ability of health care agencies to effectively respond in Zimbabwe were shaped by political and economic systems (King, 2010). PEH also provides an efficient theoretical framing for research on systematic disparities in determinants of health and the forces that shape and reinforce these disparities at various scales (Cutchin, 2007; King, 2010). King's (2010) research in South Africa concluded that healthcare access is more constrained among residents of rural and marginalized settings as compared to the urban settings where development was improved. PEH has informed WASH research with a focus on the exposure risk to contaminated water as well as the health experiences of populations in such places (Sultana, 2007). Hunter (2003) further examined the links between the construction of agricultural dams and a disease outbreak in the Upper East Region of Ghana. Findings from this study revealed that while a combination of political, economic and social factors were the main catalyst for the construction of the dams, ecological conditions propelled by inadequate infrastructural planning initiated the subsequent spread of schistosomiasis among community residents within this region (Hunter, 2003). Similarly, Mulligan et al. (2012) drew on political ecology of health to depict the links between the spread of dengue fever and processes of economic transformation and urbanization in Malaysia. In their research, dengue fever emerged and spread because infectious disease management was systematically excluded from mainstream urban planning, governance and policy. The planners and policymakers responsible for urban development did not incorporate the biopolitical context and inadequately engaged with public health officials on issues of environmental health in urban policy. Within health equity research, Bisung et al. (2015, 2016) through political ecology of health indicated social, economic and political factors such as privatization of water and scrapping of pro-poor policies by the Kenyan government shaped access to water in Kenya. These factors further constrained social capital and collective action efforts in water provision and were contributory factors to pervasive WASH inequities.

We are guided by the theories of political ecology of health to explore the experiences of relevant stakeholders at different levels of health governance as they navigate and respond to the COVID-19 pandemic in the absence of basic amenities including WASH services.

1.3. Research context

The first case of COVID-19 virus in Kenya was recorded on March 13th 2020. As of January 2022, Kenya has recorded over 300,000 cases and an estimated 5500 deaths (Worldometers, 2021). The Kenya COVID-19 emergency response is led by the Ministry of Health (MOH) and funded by the World Bank (The World Bank, 2020b). A national task force was convened with 5 technical working groups responsible for: coordination, surveillance, case management, IPC, risk communication and logistics. However, achieving positive universal health outcomes requires expanding interventions beyond infrastructural and technical services to address socioeconomic disparities that are strongly linked to development and diverse geographical factors (e.g., living standards, health insurance coverage, educational achievements, wealth inequality) (Ilinca et al., 2019; Kangmennaang et al., 2018). In this context, adhering to the NPIs during the COVID-19 pandemic is a major challenge and contributes significantly to the rapid spread of the virus across the country.

Kenya has an estimated population of 48 million and about 80% of

the total workforce rely on the informal sector (food vending, shop-keeping, farming, art, and craft) (Okungu et al., 2019). According to the Kenyan Demographic and Health Survey, the average number of household members is 3.9 (Kenya National Bureau of Statistics, 2014). Also, 46.5% of the total population live in slums where many household members sleep in one room and lack basic utility services like water (The World Bank, 2020a). UNICEF & WHO (2019) indicate that 59% of Kenyans have basic access to water, 29% have basic access to sanitation and 25% have basic access to hygiene services at the household level. WASH inadequacy extends to HCFs, where only 66% of HCFs have basic access to water and 14% have no sanitation services at all (WHO and UNICEF, 2019). Inadequate access to safe WASH is one of the leading risk factors of disease spread, deaths and disability in Kenya (Achoki et al., 2018; Abbafati et al., 2020). The struggle for access to safe water is worsened in the face of climate variability (Ziervogel et al., 2019). Kenya was the most extreme weather affected country in SSA in 2018 according to the global climate rate index study by Eckstein et al. (2020). Prolonged drought and floods affect the quantity and quality of water available (Hutchings et al., 2017; Valois et al., 2018).

This research was conducted in Kisumu County, the third-largest County and one of three urban centres in Kenya with a population of about 1,224,531 people as of 2018 (Kisumu County Government, 2018). Kisumu is also one of the four counties included in the Kenyan government UHC pilot program launched in 2018 due to the County's high rates of communicable diseases including diarrhoeal diseases (Ilinca et al., 2019). Kisumu shares a boundary with Lake Victoria, the second-largest freshwater lake in the world (Kisumu County Government, 2018). About 60% of the population are employed in the informal sector including trade and agriculture. The rapidly urbanizing County has over 40% of the urban population residing in three main informal settlements in Kisumu city. The County recognized low investment and expansion of basic services in response to the growing urbanizing population is causing adverse environmental degradation as well as poor health outcomes (Kisumu County Government, 2018). The Kisumu County Integrated Development Plan indicates that only 58% of the population have access to water as of 2018 (Kisumu County Government, 2018). The sanitation and hygiene services in the County are no different. Open defecation is still a major challenge and less than one-third of residents in Kisumu County have access to improved sanitation facilities. Kisumu County has 210 registered health facilities, 94 of which are dispensaries providing only for the primary health care needs of residents. Other facility types in the County include hospitals, health centers, nursing and maternity homes and clinics. To improve public health and nutrition outcomes for vulnerable groups, Kisumu County has included the following indicators in their development plan: number of latrines/toilets constructed in health centres/dispensaries, number of health care facilities supported to improve infrastructure and healthcare waste treatment systems, number of health care waste management central coordinating units established and equipped.

2. Methods

This paper employs a qualitative case study design to engage key informants ($n = 15$ government and relevant NGO officials) in Kisumu, Kenya, between August and September 2020 to ascertain their experiences on the impact of the COVID-19 pandemic and the role of WASH services in emergency preparedness in health settings and communities they serve. All KIs were previously engaged in the authors' work on factors and processes shaping access to WASH in HCFs, the role of WASH in building resilient health facilities and emergency preparedness between May and September 2019 (Abu et al., 2021). Of the 15 research participants interviewed, seven KIs were County government officials and eight were NGO officials as indicated in Table 1. Prior to engaging key informants, the authors sought and received ethical clearance from the University of Waterloo Research Ethical Board. We emailed recruitment letters to key informants and subsequently arranged

Table 1
Sociodemographic data of KIs.

Key Informants	Sex	Organization	Education
KI ₁	Male	County Government of Kisumu	Master's Degree
KI ₂	Male	County Government of Kisumu	Master's Degree
KI ₃	Male	County Government of Kisumu	PharmD, Master's degree
KI ₄	Male	County Government of Kisumu	Master's Degree
KI ₅	Female	Research Institute	Master's Degree
KI ₆	Male	County Government of Kisumu	Undergraduate Degree
KI ₇	Male	Non-Governmental Organisation	Medical Degree
KI ₈	Female	Non-Governmental Organisation	Ph.D.
KI ₉	Female	Non-Governmental Organisation	Master's degree
KI ₁₀	Male	Non-Governmental Organisation	Undergraduate Degree
KI ₁₁	Female	Non-Governmental Organisation	Tertiary Education
KI ₁₂	Male	Non-Governmental Organisation	Undergraduate Degree
KI ₁₃	Male	Non-Governmental Organisation	Undergraduate Degree
KI ₁₄	Female	Non-Governmental Organisation	Master's Degree, RN-BC
KI ₁₅	Male	County Government of Kisumu	Undergraduate Degree

appointments for interviews after each KI confirmed their interest to contribute to this research. Interviews were conducted virtually, and we designed an interview protocol to guide the scope of the interviews. All interviews lasted between 20 and 60 min. Each interview was recorded with the consent of the participants. Audio recordings were then transcribed and analyzed using NVIVO 12 deductively and inductively. The broader themes were developed a priori by reviewing literature including the Kenyan Ministry of Health COVID-19 emergency response plan (Kenya Ministry of Health, 2020, 2021), WHO COVID-19 Strategic Preparedness and response plan as well as the authors' previous research work informed by political ecology of health (Abu et al., 2021; Abu and Elliott, 2020) on WASH and emergency preparedness in health care facilities in Kisumu County (Azungah, 2018; Dunn 2016). We developed broad categories of themes (Awareness of the pandemic COVID-19 responses, impacts of the pandemic, barriers to implementing and adhering to the responses and lessons learned) based on the objective of this study. The subthemes were deductively and inductively developed. Sub-themes developed deductively, were also informed by concepts and core aspects of political ecology of health including the structural and ecological factors/processes affecting the local pandemic experience, in addition to the human agency of workers and community members as they experience the pandemic. Subthemes inductively coded, emerged from interview transcripts during coding. All themes are explained in the next section.

2.1. Results

In this section, we present the broader themes deductively coded as well as detailed subthemes developed prior to or that emerged during the coding of key informants (KI₁, KI₂, KI₃...KI₁₅) interview transcripts. We present a summary of the results in Tables 1–5 on KIs views and perceptions on the COVID-19 pandemic, responses within the health systems and communities as well as lessons learned.

2.2. COVID-19 pandemic response measures

Several covid-19 response measures and interventions were implemented in Kisumu County. Table 2 highlights these response measures in the community and health systems.

2.3. Impacts of COVID-19 pandemic and response interventions within the County health system and community levels

The impacts of the COVID-19 virus and experiences vary as indicated in Table 3. Furthermore, some response measures (see Table 2) amplified or resulted in new impacts in Kisumu County. Lockdowns and curfews slowed or shut down economic and other occupational activities as indicated by more than half of the participants. Financial constraints resulting from declined economic activities also increased psychosocial concerns in families:

"I think we lost some of the lives because there were no jobs, there was no money to buy food, so you think until you burst. So, some people died because of stress, some people just went home, people moved back to rural areas, and even paying the rental for the houses was not easy for people". (KI₁₁, F, NGO)

The health system in Kisumu has been experiencing several challenges and COVID-19 pandemic amplified these challenges. In Table 3, key informants (n = 8) suggested the whole continuum of the health system is weak. This subsequently led to the backtracking of some health indicators on the County's scorecard within a very short time at the onset of the COVID-19 pandemic. There were increasing rates of maternal mortality attributed to accessing health care due to pandemic response strategies. For instance:

"Remember I told you Kisumu is still losing so many mothers, so they are trying to manage COVID-19, sadly we are still losing so many mothers ... because of the curfew that was declared by the president, we have a challenge with people accessing care, especially the pregnant women. It's a bit difficult because if it is past 9 pm, we have police brutality, they choose to stay away from the hospital". (KI₁₄, F, NGO)

More than half of the participants mentioned psychosocial stress associated with panic and stigma of the disease highly impacted the health and wellbeing of the residents including healthcare workers. The stresses experienced in health facilities due to uncertainties in case definitions led to the demise of people suffering from other treatable diseases:

Table 2
Awareness of COVID-19 pandemic responses.

Themes	# Mentions	# Respondents mentioning n = 15 (%)
COVID-19 Pandemic County Health System Responses		
Equipping treatment centers to address COVID-19	38	12 (80)
Community education	33	15 (100)
Training health workers	21	11 (73)
Mobilizing a rapid response team	15	8 (53)
Enforcing the countrywide lockdown	15	8 (53)
Contact tracing	11	6 (40)
Enforcing curfews	11	8 (53)
Government financial support	10	6 (40)
Hand hygiene/sanitizing	8	7 (47)
Enforcing responses	5	5 (33)
COVID-19 toll-free centers	4	4 (27)
Practising social distancing	3	3 (20)
COVID-19 Pandemic Communities Level Responses		
Hand hygiene/sanitizing	42	14 (93)
Nose masking	39	15 (100)
Practising social distancing	32	12 (80)
Home-based care for COVID-19 patients	11	7 (47)

Table 3
Impacts of the COVID-19 pandemic and responses.

Themes	# Mentions	# Respondents mentioning n = 15 (%)
Impacts on the County health system		
Declined social and economic activities	11	8 (53)
Decline in health system (health indicators and wellbeing)	16	8 (53)
Impacts at the community Level		
Psychosocial stress	25	8 (53)
Job losses	7	5 (33)
Educational challenges	6	4 (27)

“There were lots of mortality with malaria which were suspected to be COVID cases ... some healthcare workers were not approaching these people, so we even had some mortalities where the healthcare workers thought it was COVID, there was a lot of stigma”. (KI₃, M, County Government-Health)

2.4. Barriers to the implementation of COVID responses at the County health level

Table 4 indicates the challenges associated with implementing and adhering to COVID-19 pandemic. In this section, we expand on the different barriers to implementing the COVID-19 responses at the County level. All participants (n = 15) mentioned inadequate financial and or technical/infrastructural preparedness was a major barrier to adequately responding to COVID-19 pandemic. Health facilities lacked basic hygiene infrastructure and the evolving details of the COVID-19 virus at its onset contributed to inadequate preparedness and widespread misinformation. The COVID-19 virus was first recorded globally in December 2019 and Kenya recorded its first case in March 2020. Key informants stated:

“To say the truth, it is very hard to really describe if we were prepared for COVID-19, but what we did was because this is a new virus there is no clear-cutting stone to tell us what we are supposed to do, but obviously we are following areas of the world which were like centers of the epidemic, we looked at the US, Italy, we looked at the steps, they took on the issues of prevention, so we were just following straight”. (KI₃, M, County Government Health)

Structural and systemic challenges including corruption associated with delivering inappropriate protective and hygiene services to first responders were the second most mentioned barrier to responding to the COVID-19 pandemic:

“So, we’ve unfortunately had some big scandals. Half of the masks that County governments purchased have proven to be inappropriate and they’re paying 4 times the price. So, on paper, the macro-planning looked good, but once you start looking at details you start to see a lot of flaws and we now have a new category of Kenyans called COVID millionaires ... it doesn’t hold well when the people who are supposed to be responding are being investigated for fraud and corruption”. (KI₇, M, NGO)

During the pandemic, healthcare workers embarked on strikes due to unmet basic healthcare, hygiene and safety requirements in facilities they work in:

“Still, these health care providers continue to go on strike because they’re saying they’re not prepared and they are put on the front line to deal with this pandemic, they’re not supported with the necessary material that they need. This tells you that all that is being reported could just be talk”. (KI₅, F, County Government-Health)

According to the KIs, community members felt the economic costs of adhering to the rules and regulations were more harmful than COVID-19 disease itself. Table 4 shows that 12 out of 15 key informants mentioned

Table 4
Barriers to implementing and adhering to the COVID-19 responses.

Themes	# Mentions	# Respondents mentioning, n = 15 (%)
Barriers to Implementing Responses by the County health system Level		
Inadequate preparedness	39	15 (100)
Structural challenges	17	6 (40)
Enforcement challenges	10	7 (47)
Barriers to Adhering to Response Measures at Communities Level		
Economic challenges	27	12 (80)
Misinformation	24	10 (67)
Inadequate basic amenities	16	8 (53)
COVID-19 pandemic fatigue	5	5 (33)
Climate variability and displacement	4	3 (20)

economic challenges hinder community residents’ ability to adhere to pandemic responses. Also, the misinformation about the pandemic, lack of trust in the government by the citizens further deepened by corruption associated with COVID-19 relief packages and misappropriation of funds influenced citizens’ perceptions, preparedness and seriousness attached to the pandemic within communities. The majority of the COVID-19 responses require community members to change their behaviours in ways they are not used to. Enforcing COVID-19 response measures is challenging because there was resistance from the public:

“There was some resistance, most people were like this is not the normal situation of washing hands, so we had to put in some people to enforce such issues, the adaptation wasn’t really bad in the long run, in Kisumu that is a law So, I hope that will reduce the number of community transmissions”. (KI₃, M, County Government-Health)

Access to basic services varies across communities in Kisumu County. Informal settlements also known as slums bear the most burden with accessing basic utilities. Table 3 illustrates key informants (n = 10) mentioned the nature of housing infrastructure, inadequate WASH, as well as family sizes, make it impossible to adhere to some of the NPIs such as isolating and social distancing:

“In the slums, the people stay in small houses ... there is no access to water, there is no space when you ask people to wash their hands, where do they get the water to wash their hands, ... and the places are so small they share with 6 to 10 people, and so people can’t stay in the house the whole day, so there are areas which don’t have clean drinking water. So, if you don’t have clean drinking water, how will you wash your hands when you don’t have water to drink. So, hygiene is a problem.” (KI₁₅, M, County Government-Health)

Participants (n = 3) mentioned weather extremes such as floods resulting from torrential rainfall displaced some Kisumu residents further compounding their inability to respond or adhere to COVID-19 responses:

“The WASH arm is not very strong I’ve mentioned to you that access to water is a challenge and even Kisumu is worse because we had flooding, so you can imagine with COVID-19, flooding, no water. So, but we’ve had partners coming in like UNICEF who have been supporting, refurbishing wells, we have wells that burst because of flooding. So, for me we still have to improve matters of WASH it is a huge challenge”. (KI₁₄, F, NGO)

2.5. Lessons learned at the County and community levels

According to key informants, the COVID-19 pandemic is a wake-up call for all governments, especially in LMICs to invest in emergency preparedness, the most mentioned lesson learned is critical to ensuring a thriving system in future disease outbreak situations (see Table 5):

“I think the government was caught off guard and needs to start establishing a war chest for such future events whenever we have these kinds of

Table 5

Lessons learned.

Themes	# Mentions	# Respondents mentioning n = 15 (%)
Lessons Learned and Way Forward in addressing emergency preparedness		
Invest in emergency preparedness	17	12 (80)
Political will to improve basic services	11	8 (53)
Stakeholder collaboration	9	7 (47)
Invest in long-term/sustainable projects	4	4 (27)
Invest in context-driven solutions/ Interventions	4	3 (20)
Community activism for basic needs	4	3 (20)

things because a lot of the steps that we have taken money away from other sectors or has been taken from loan which we shall have to pay. Dealing with an emergency by borrowing is one of the worst ways to get resources, it would have been good if we had some kind of war chest just for emergencies.” (KI₇, M, NGO)

The government needs to invest in improving basic access to utility services like access to WASH services in HCFs and communities. Moreover, participants (n = 8) highlighted the need for and role of political will in ensuring these basic services are implemented:

“The COVID-19 occurrence has really brought us back to our conscience that the very basic things that we overlook like handwashing go into the core of managing our wellbeing. It is now that the government and others are putting in infrastructure for sanitation, supply of clean and potable water, these are things that ought to have been done much earlier, so I think moving forward, it is now imperative for most governments that they need to look at the basic supplies that their citizens need”. (KI₁₀, M, NGO)

Cases of health and wellbeing are cross-cutting and require a wide range of stakeholders to make sustainable decisions and efficient resource distribution. Key informants expressed the need for collaboration among stakeholders.”

“The national ministry was working alone without involving the counties but later I think they learnt that they need to involve the counties ... and any disease outbreaks is not about health only, it requires a multisector approach like COVID what we have learnt like, health will treat, they do preventive measures, we need the police to do enforcement in certain areas, we need the department of water or the ministry of water to supply water, we need also psychosocial support because we have seen the issue of stigma in all this. So, it is not just about health it is about everybody understanding and being on board right from the word go not later”. (KI₄, M, County Government-Health)

Socio-cultural and political economy factors vary across countries. For some participants, the government of Kenya needs to invest in context-specific emergency preparedness measures taking into consideration the cultural dimensions of the country:

“We are totally reliant on WHO and all the world bodies to give us guidelines but I think sometimes when there is an outbreak of a disease, it depends on the population, the population are different in different regions, you know everybody had their own kind of experience so sometimes I think as managers in the health care sector, we should be able to custom make our own ways to make sure that the population is safe ... We are a sort of a copy-paste of which sometimes I think it doesn't really work for us, especially in Kenya”. (KI₃, M, County Government-health)

3. Discussion

This research was informed by the theories of political ecology of health. We engaged key informants (n = 15), County government as well

as relevant NGO officials to ascertain their experiences on the impacts of the COVID-19 pandemic and the need for WASH in emergency preparedness in health settings as well as communities they serve in Kisumu, Kenya. The Kisumu County government implemented several COVID-19 response measures including social distancing, curfews, nose masking, and hand hygiene in health settings and communities. However, the County government was not adequately prepared for the pandemic. At the community level, residents situated in urban slums and disaster-prone areas were disproportionately impacted by the covid-19 pandemic as well as some response measures. Social determinants of health disparities including inadequate access to basic amenities such as WASH services and poor hygiene practices were barriers to efficiently adhering to the response measures among residents and contributing to the widespread of the virus. Evidence from [Gwenzi \(2021\)](#) work on wastewater-based epidemiological studies indicate the potential of the COVID-19 virus fecal-oral route transmission which is attributed to inadequate WASH services and hygiene practices. Adequately responding and adhering to the COVID-19 response measures and restrictions required drastic and rapid behaviour change. In settings where NPIs such as hand hygiene infrastructure and services were available, enforcement mechanisms were implemented to ensure residents adhered to hand hygiene guidelines in public spaces at the onset of the pandemic. [Mieth et al. \(2021\)](#) in their research on compliance to hand hygiene practices in Germany observed a decline from 94.5% through conventional (direct) surveys to 78.1% through Extended Crosswise Model (indirect) survey where confidentiality of responding is guaranteed among research participants practicing proper hand hygiene during the pandemic. On the other hand, HCFs were not appropriately equipped to respond to the increasing number of COVID-19 cases while managing other morbidities. These inadequacies subsequently led to health workers' strikes during the pandemic. The structural challenges at the national and County levels from IPC and safety procurement further fuelled mistrust in the government, disbelieve in the existence of the COVID-19 virus and subsequent enforcement challenges of response measures. Behaviour change during a crisis can be influenced by how individuals perceive risk, public trust in regulatory institutions as well as protective and preparedness behaviours ([Betsch, 2020](#)). The corruption scandals cemented some community members' belief that the pandemic is a hoax and a plan by government officials and politicians to enhance themselves financially. [Wallace et al. \(2020\)](#) indicated public trust in Rwanda's COVID-19 response is high because of Rwanda's efficient, effective, and transparent governance approach and success in combating Ebola from entering the country through its borders in 2015. Corruption is associated with limited resources in health facilities and consequently leads to poor health outcomes in communities ([Stiernstedt, 2019](#); [Witvliet et al., 2013](#)).

Various impacts of climate variability and change such as floods caused by torrential rain displaced some residents and disrupted water sources as well as housing infrastructure in communities along the Lake Victoria area which made it impossible to adequately adhere to the pandemic interventions. Similarly, [Othoo et al. \(2021\)](#) in their study in urban informal settlements in Kisumu, Kenya found majority of sanitation facilities were highly vulnerable to flood risks due to shorter storm return periods and 44 percent of rainfall received in Kisumu could translate into runoff in the future. [Aura et al. \(2020\)](#) examined the effects of the COVID-19 pandemic and flooding on the major inland capture fisheries in Kenya to illustrate the effect of such calamities on the vulnerable. The pandemic resulted in livelihood losses and the floods lead to displacements, infrastructure, and assets losses. The burden of multiple hazards was recorded in many parts of the world in the Global North and South ([Simonovic et al., 2021](#)). The increasing rates of occurrence of multiple hazards resulting from global environmental change indicate the need to boost community resilience in Kenya a country vulnerable to multiple hazards.

Psychosocial stresses surged during the pandemic among healthcare workers and community residents. In health facilities, the fear of cross-

infection coupled with misinformation caused the death of some residents with diseases like malaria. Findings from this research indicate health workers were not adequately prepared with IPC and safety equipment. In Tanzania, Nigeria and Cameroon, the mental health needs of health workers in contact with patients were very critical in responding to the COVID-19 pandemic and they were provided with the relevant care needed (Wallace et al., 2020). At the time of this research, the County recorded a decline in other health indicators and inefficiencies at the County level could increase the risk of other disease outbreaks and health challenges. For instance, the 2013–2015 West Africa Ebola epidemic resulted in greater morbidity and mortality from other diseases than the public health emergency itself (Wallace et al., 2020). At the community level, psychosocial stress resulted from the advent of COVID-19, economic challenges from job losses or declines during the lockdowns or stay-at-home orders as well as the stigma of infection which were barriers to adhering to the pandemic. Mwai et al. (2021) in their study in Kenya attributed challenges to accessing soap necessary for hand hygiene during the pandemic to economic hardships and other competing priorities like purchasing water and food. Prior to the pandemic, Bisung et al. (2015) drew on the ecosocial and political ecology theories to unveil economic factors constraining access to WASH services and reinforcing inequalities among residents in Kisumu. Financial stability is a critical social determinant of health and a prolonged decline in economic activities has dire implications for citizens relying on the informal sectors where occupations were disrupted. Desye (2021) in their systematic review found inadequate safety and WASH services in HCFs as well as financial constraints in accessing WASH services in communities are drivers of the widespread of the COVID-19 virus. When the COVID-19 pandemic began, the world bank projected a decline in the African economy (United Nations Economic Commission for Africa, 2020) which impacts access to basic services.

Critical lessons going forward have implications for achieving SDGs 6 and 3, especially in the SSA region (WHO & UNICEF, 2021). The Kenyan government needs to invest in emergency preparedness by beginning to prioritize and expand basic human needs and utility services like WASH services, especially in rural and informal settlements. Since the availability of basic utilities and services is embedded in politics, political will among development agents is critical to investing in and expanding these facilities (Howard et al., 2020). According to the JMP, the world is not on track to comprehensively achieving SDG6 and current efforts will have to be quadrupled to achieve universal access to safely managed WASH (WHO & UNICEF, 2021). Vaccine rollouts have begun in response to the pandemic however, there are indications vaccines alone are not sufficient to eradicate the disease. Also, vaccine supply and uptake in Kenya are uncertain. So, there is a need to adhere to public health protocols and guidelines. Lessons from curbing the COVID-19 pandemic indicate the need for multidisciplinary effort among different stakeholders including community to ensure holistic and proactive emergency response plans (Zaitchik et al., 2020). There is the need to integrate and devolve emergency preparedness across sectors to ensure efficiency in service delivery. Communities through their leadership should be involved to foster community trust. In this way, local governments will invest in context-driven emergency preparedness strategies. Alhassan et al. (2021) in their scoping review emphasized the ineffectiveness of the one size fit all approach in SSA problem solving. Howard et al. (2020) also emphasized the need for context-adapted and disease-focused approaches that involve diverse stakeholders in preparedness. By implementing context-specific solutions, we can also begin to address social and health inequities. Finally, institutional challenges including corruption and inadequate budgeting which are deeply rooted in power and politics were significant challenges to responding to the pandemic. Emergency preparedness measures should include the legislature, as well as policy and ensure continuity and long-term benefits to eliminate actions taken solely during emergencies.

4. Conclusion

In conclusion, this research sought to explore the need for WASH in emergency preparedness in health settings as well as communities through the experiences of key informants (n = 15) in Kisumu, Kenya during the COVID-19 pandemic. Several NPIs including hygiene and safety procedures were implemented in response to the covid-19 pandemic however, from this research, structural and ecological factors, and processes shaped access to basic hygiene services and effectively responding to the pandemic. In health settings, inadequate access to hygiene and safety services caused psychosocial stresses among healthcare workers, affected the quality of care provided and subsequently led to healthcare workers' strikes. The interplay of the ineffectiveness and inefficiency of the national government's response measures and healthcare workers' strikes further affected public perception of the pandemic as a hoax. At the community level, slow behaviour changes dynamic, financial constraints, and climate variability impacts (floods) further amplified inadequate access to and utilization of WASH services during the pandemic. We recommend authentic partnerships among all stakeholders to develop and implement context-driven sustainable solutions that integrate WASH and emergency preparedness in HCFs and the communities they serve across all spatial scales, from the global to the local.

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None.

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