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Max Perel-Slater Date

Understanding WASH Actors Response to the COVID-19 Pandemic in Tanzania and Kenya: A Qualitative Case Study

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ABSTRACT

Understanding WASH Actors Response to the COVID-19 Pandemic
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By Max Perel-Slater

The COVID-19 pandemic has posed a major public health challenge due to its fast global spread, the novel nature of the virus, and the viruses' ability to rapidly mutate into new variants. The pandemic response effort has been expansive, involving individuals and organizations from multiple sectors and geographic areas. Notably, WASH organizations have played a crucial role in the advancement of COVID-19 prevention measures given their experience in hygiene promotion and program implementation during crisis situations. As with others involved in response efforts, however, the COVID-19 pandemic has presented unique challenges for WASH actors, who have faced unprecedented circumstances in which to carry out their critical work. This study aimed to understand WASH-related programmatic decision making in this fast paced and high-stress outbreak situation where there was little precedent and constantly evolving evidence to support action, and to prompt reflection within the WASH sector around how to both improve current response efforts and better prepare for future health crises. We describe and compared perspectives from 21 individuals at organizations in Tanzania and Kenya that were involved in coordinating, designing, and delivering hygiene programs during the COVID-19 pandemic. Through comparative thematic analysis, we found that the initial phases of the pandemic were perceived by WASH actors in Tanzania and Kenya as being a potential turning point for the widespread adoption of hand hygiene behaviors. However, despite initial population level adoption of hand washing practices, momentum was lost as community fear dissipated and government priorities changed. Further we found that local small-scale organizations can play a key role in outbreak response efforts, but are often under supported by the sector, donors, and government stakeholders. Finally, the prioritization of M&E and collection of data remains a key challenge for WASH actors in emergency situations.

Keywords: *COVID-19, WASH, Hygiene, Tanzania, Kenya, Pandemic Response*

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Acronym List

WASH: Water, Sanitation & Hygiene

CoVs: Coronaviruses

SARs: Severe Acute Respiratory Syndrome

MERs: Middle East Respiratory Syndrome

COVID-19: Coronavirus Disease of 2019

SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2

VBM: Variants Being Monitored

VOI: Variants of Interest

VOC: Variants of Concern

VBM: Variants of High Consequence

NGO: Non-Governmental Organization

LGA: Local Government Authority

CDC: Center for Disease Control and Prevention

WHO: World Health Organization

IDIs: In-Depth Interviews

UN: United Nations

UNICEF: United Nations Children's Fund

UNHCR: United Nations High Commissioner for Refugees

M&E: Monitoring and Evaluation

IPC: Infection Prevention and Control

IEC: Information, Education and Communication

COVAX: COVID-19 Vaccines Global Access

Chapter 1: Literature Review

Abstract

This review examines SARS-CoV-2, including its epidemiology, surveillance, the efficacy of prevention and control measures, as well as the effect of the COVID-19 pandemic on select vulnerable populations. Further, behavior and hygiene related interventions are highlighted and examined, with special consideration given to the effect of misinformation and rumors on COVID-19 response work. The review starts with an overview of historical and global patterns and shows that Tanzania and Kenya provide valuable examples and lessons that can be used in future pandemic preparation and response.

COVID-19 Disease Description

The first human case of SARS-CoV-2, the pathogenic agent of COVID-19, was first reported in Wuhan City, China, in early November or December 2019 (Amanat & Krammer, 2020; Hoehl et al., 2020). The number of cases increased rapidly, with more than 80,000 reported infections in China by March 15, 2020 (Liu et al., 2020; X. Yang et al., 2020). The disease, termed COVID-19 (or coronavirus disease 2019), became a pandemic with community transmission in over 203 countries and territories (Fontanet et al., 2021; D. Wu, Wu, Liu, & Yang, 2020). As of April 15th 2022, when this review was completed, an estimated 503 million people have been infected by SARS-CoV-2 leading to at least 6.1 million deaths (JHU, 2022).

When new viruses are observed, understanding their origin (Holmes, 2011) allows for identification and isolation of their source, which can prevent future transmission (WHO, 2020c). Identification of origin also can aid in scientific understanding of the epidemiology of the initial outbreak, which is crucial for developing response efforts (Banerjee, Doxey, Mossman, & Irving, 2020). SARS-CoV-2 is part of a large family of viruses known as

Coronaviruses (CoVs), which can cause respiratory diseases in humans (Seyran et al., 2021). Other notable Coronaviruses include Severe Acute Respiratory Syndrome (SARS) and the Middle East Respiratory Syndrome (MERS). Both viruses have high mortality rates and were first identified in 2003 and 2012, respectively. There are four genera of CoVs: alpha, beta, gamma, and delta. SARS-CoV-2 has been classified as belonging to the beta-coronavirus genera (Holmes, 2011; Murray et al., 2020; Pal, Berhanu, Desalegn, & Kandi, 2020; Y.-Z. Zhang & Holmes, 2020). All known CoVs that belong to the alpha and beta genera cause disease in humans (Andersen, Rambaut, Lipkin, Holmes, & Garry, 2020).

The majority of alpha and beta CoVs are believed to have the ability to infect multiple animal hosts (Banerjee et al., 2020). For example, SARS infected civet cats and humans in 2002 and MERS is believed to have been transmitted from camels to humans in 2012 (Jo et al., 2021). In such cases, CoVs are classified as zoonotic viruses as they can be transmitted from an animal to a human host (Munir et al., 2020). Although the zoonotic source of SARS-CoV-2 is unknown (WHO, 2020c), analysis of the virus's genetic makeup suggest that it is genetically similar to other coronaviruses isolated in bat populations (Andersen et al., 2020; Tang et al., 2020).

Genetic sequencing of SARS-CoV-2 has shown evidence that the ecological origin of the virus maybe from bat populations found in Asia, the Middle East, or Europe (Banerjee et al., 2020; WHO, 2020c). To date, all samples of SARS-CoV-2 isolated from infected humans are genetically related to CoVs found in wild Rhinolophus bat populations (Andersen et al., 2020; WHO, 2020c). Further, all genetic information of SARS-CoV-2 sequenced from humans to date is statistically similar, which suggests a single point of introduction into the human population (Y.-Z. Zhang & Holmes, 2020). Some studies have suggested that the introduction of SARS-

CoV-2 into the human population occurred in the last quarter of 2019 (Andersen et al., 2020; WHO, 2020c).

SARS-CoV-2 Variants

All viruses change over time (Duffy, 2018), as is true of SARS-CoV-2 (Pachetti et al., 2020), which is of epidemiological significance to response efforts. The majority of changes that occur in a viruses genetic sequence do not lead to alterations of the virus's properties (W. Zhang et al., 2021). However, over time genetic changes may lead to adaptation of characteristics, such as the virus's transmissibility or severity, as well as changes in the effectiveness of prevention measures, diagnostic tools, vaccines, and therapeutic medicines (WHO, 2021). The scientific community, led by the WHO and the CDC, has monitored changes in the SARS-CoV-2 genetic sequence since January 2020 (CDC, 2021d; WHO, 2021). With the aim of prioritizing effective surveillance, research, and response efforts, the WHO and CDC have created four classifications of SARS-CoV-2 variants: Variants Being Monitored (VBM), Variants of Interest (VOIs), Variants of Concern (VOCs), and Variants of High Consequence (VOHC) (CDC, 2021d; WHO, 2021). The classifications are intended to indicate the potential risk posed by SARS-CoV-2 variants, with the VBM classification indicating the lowest risk and the VOHC indicating the highest risk (Tao et al., 2021). Variant status can be escalated or deescalated based on emerging scientific evidence. At the time of this review (April 2022), there were 12 recognized SARS-CoV-2 variants (CDC, 2021d; WHO, 2021). According to the CDC, 10 have been classified as VBM and two as VOC (CDC, 2021d); currently no variants are classified as VOI or VOHC (WHO, 2021).

The two variants currently classified as VOC have been labeled by the WHO as the Delta and Omicron variants (CDC, 2021d; WHO, 2021). Both have significant genetic changes from

the original Alpha variant, leading to adapted pathogenic attributes (Koyama, Platt, & Parida, 2020; Planas et al., 2021; Tegally, Wilkinson, Giovanetti, et al., 2021). The Delta variant, first identified in India (Singh, Rahman, Ehtesham, Hira, & Hasnain, 2021; Yadav et al., 2020), has been shown to have increased transmissibility and susceptibility to monoclonal antibody treatments, as well as a reduction in effectiveness of sera vaccination (CDC, 2021d). The Omicron variant, first identified in South Africa (Tegally, Wilkinson, Lessells, et al., 2021), exhibits similar viral attributes (CDC, 2021d). However, some studies have shown that the transmissibility of Omicron is greater than Delta (Saxena et al., 2021), but that the severity of illness may be decreased (Cameroni et al., 2021; Karim & Karim, 2021).

Transmission

SARS-CoV-2 can be transmitted from one individual to another when a person infected with the disease releases or sheds the virus from their body into the environment (Harrison, Lin, & Wang, 2020). Viral emission can occur from both individuals who are and who are not experiencing symptoms (Buitrago-Garcia et al., 2020). Currently, the scientific community believes that the primary modes of viral emission for COVID-19 are through coughing, sneezing, vomiting, or defecating (Meyerowitz, Richterman, Gandhi, & Sax, 2021). An uninfected individual then comes into contact with these viruses in the environment. Aerosolized, surface, and fecal-oral routes have been identified as the likely modes of SAR-CoV-2 transmission (Knee et al., 2022).

Infectious Dose

Currently the infectious dose, or quantity of viruses needed to trigger an infectious response is not known for SARS-CoV-2 (Chan et al., 2020). In general, a lower infectious dose means that a higher risk of transmission of a virus. This has led to suggestions that different

variants of SARS-CoV-2 might have different infectious doses (Z. Wang et al., 2020). Additionally, other authors have suggested that the initial dose of the virus and the amount of the virus in the body of an individual might worsen the severity of COVID-19 (Heneghan, Brassey, & Jefferson, 2020). However, as of April 2022, the scientific data to prove either of these hypotheses is not available (Knee et al., 2022).

Symptoms

Symptoms associated with SARS-CoV-2 infection include fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste of smell, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea (Larsen, Martin, Martin, Kuhn, & Hicks, 2020; Menni et al., 2020; Struyf et al., 2021). Some studies have suggested that the Delta variant may cause more severe illness and death (Mlcochova et al., 2021; Wang et al., 2022). However, as of April 2022, it remains unclear if SARS-CoV-2 variants are associated with different or more severe symptoms (CDC, 2022).

Incubation Period

Studies suggest that the incubation period of SAR-CoV-2 is between 2 and 14 days after an individual is exposed to the virus (Qin et al., 2020; Rai, Shukla, & Dwivedi, 2021). Suggestions have been made that some variants may have different incubation periods (Grant et al., 2021). However, as of April 2022, the scientific community has not come to a consensus on this issue (Jansen, 2021).

Viral Detection

There are multiple methods for detecting viruses in the environment (Leland & Ginocchio, 2007). Currently, detection of the unique genetic material of SARS-CoV-2 is used in many laboratory approaches (W. Wang et al., 2020), which can be problematic as the presence of

viral genetic material alone cannot cause infection (Cevik et al., 2021). In fact, the detection of SARS-CoV-2 genetic material suggests that either viable or inactive viruses are present (Pujadas et al., 2020). In the case of inactive or killed SARS-CoV-2, the virus is no longer able to reproduce and cannot cause infections (Cevik et al., 2021).

SARS-CoV-2 Prevention and Control

As the SARS-CoV-2 virus is novel, prevention and control guidelines have changed over time based on emerging scientific research (Somerville et al., 2021). Currently, the CDC recommends individuals use a multifaceted approach to prevention (CDC, 2021b), which includes physical distancing, avoiding crowded and poorly ventilated spaces, use of face coverings, frequent testing and daily health monitoring, hand washing with soap, cleaning and disinfecting high touch surfaces, and vaccination (CDC, 2021c). The following section of this review examines the history and adapting scientific understanding of hygiene-related prevention and control methods' efficacy and modes of implementation.

Physical Distancing and Isolation

Physical distancing, sometimes called 'social distancing,' is the act of one individual staying separated from other individuals with the aim of preventing disease transmission (N. R. Jones et al., 2020). Physical distancing frequently refers to a behavioral choice made by an individual rather than an order or mandate made by a government or health authority (Chu et al., 2020) and has been used in previous public health emergencies, especially with highly infectious diseases like those that involve respiratory transmission (Islam et al., 2020). Staying distant from another individual has been shown to be effective in slowing community transmission of SARS-CoV-2 (N. R. Jones et al., 2020).

Physical distancing was one of the first prevention measures widely advocated by the WHO and other health authorities (WHO, 2020b). However, the specifics of how to safely physically distance have changed over time (Fang et al., 2021; N. R. Jones et al., 2020; Shaw, Butcher, Ko, Zello, & Chilibeck, 2020). Some have recommended that 12 feet (2 meters) is a safe distance (GOC, 2021) while others have said 6 feet (1 meter) is effective (Stewart, 2020). Jones et al. argue that rules stipulating specific distances are not useful as these calculations are based on outdated dichotomous research on droplet size and respiratory physics. Instead, the authors argue for graded recommendations that consider multiple factors in assessing risk (N. R. Jones et al., 2020), noting that greater consideration should be given to the susceptibility of an individual to infection, duration of exposure, and viral load of the emitter (Jarvis, 2020). Including these considerations in physical distancing calculations would allow for greater freedom in lower risk settings and increased protection in high-risk settings (N. R. Jones et al., 2020). The disagreement about the distance by which to safely socially distance has led to changes in official recommendations by the WHO, CDC, and other health authorities since March 2020.

Research into the safe length of physical distancing under different environmental and epidemiological situations is historic and ongoing. Scientists in the 19th century began the study of the mechanics of droplet emission during coughing or sneezing (Papineni & Rosenthal, 1997). The German bacteriologist and hygienist Carl Georg Friedrich Wilhelm Flugge conducted a study in 1897 where samples were collected on mirrors and agar plates. Based on the distance in which visible droplets containing pathogens were observed, Flugge proposed that 6 to 12 feet (1 to 2 meters) was a safe distance of physical space to prevent infection of an illness with a respiratory transmission route (Flugge, 1897). Despite limitations in this and other early studies,

the idea of 6-to-12-foot distancing became entrenched in the thinking of the scientific community (N. R. Jones et al., 2020). However, a recent systematic review of 10 studies found that respiratory 'small' droplets (up to 60 micrometers) could be projected beyond 12 feet (2 meters) when an individual coughs of sneezes (Bourouiba, 2016, 2020). The authors suggested that based on these findings SARS-CoV-2 could be spread beyond 6-to-12 feet (1-2 meters) through sneezing or coughing (Bourouiba, 2020).

Isolation refers to societal-level distancing of individuals from one another, which can take the form of 'stay-at-home orders,' 'lockdowns,' and quarantines. In some scientific literature, the difference between physical distancing and isolation is that the latter is often at a population level and is mandated by a government or health authority (Kucharski et al., 2020). Since March 2020, large portions of the world population have at times been ordered or encouraged to isolate (MacIntyre, 2020; Williams et al., 2021). Justification for isolation is that it is effective in slowing community transmission and decreasing the number of individuals in need of medical care (Kucharski et al., 2020). This epidemiological idea has been popularly referred to as "flattening the curve," meaning changing infection rates from increasing rapidly to decreasing or maintaining a constant rate (Thunström, Newbold, Finnoff, Ashworth, & Shogren, 2020; Villas-Boas, Sears, Villas-Boas, & Villas-Boas, 2020).

Critics of physical distancing and isolation suggest that their combined effect can lead to negative mental health consequences (Giallonardo et al., 2020; Meyer, Landry, Gustat, Lemon, & Webster, 2021). Galea et al. (2020) suggested that physical distancing will have mental health and well-being consequences in the short and long term at both individual and population levels and may manifest in substantial increases in depression, anxiety, loneliness, domestic violence, and substance abuse (Galea, Merchant, & Lurie, 2020). These factors in tandem with the

sequelae of mental health consequences of epidemics more generally is the subject of forthcoming analysis of this research team.

Hand Hygiene

Hand hygiene is recognized as an effective infection control measure for interrupting microorganism transmission (Jumaa, 2005). The practice is widely promoted and practiced across the world as means of preventing numerous types of infections (Ejemot, Ehiri, Meremikwu, & Critchley, 2008). The link between handwashing and health was first made in the 19th century (Carter & Carter, 2017). Many credit the Hungarian doctor, Ignaz Semmelweis, as being the 'founder of hand hygiene' (Best & Neuhauser, 2004). In 1846, Semmelweis anecdotally noticed that there was a difference in mortality rates among women giving birth at two separate wards of the Vienna General Hospital (Kadar, 2019). Over a period of 6-months he observed that women giving birth in the doctor run maternity ward were more likely to develop a fever and die than women giving birth in the midwife-run maternity ward (Best & Neuhauser, 2004). Semmelweis hypothesized that this was due to the doctors conducting autopsies and then transmitting 'cadaverous particles' on their hands to the patients (Carter & Carter, 2017). This idea was supported by the fact that the Midwives did not perform autopsies and did not have any contact with the cadavers (Best & Neuhauser, 2004). Based on this hypothesis. the hospital instituted mandatory handwashing procedures for doctors when leaving the mortuary. The resulting fall in mortality in the doctor run maternity ward was the first proof that clean hands could prevent disease and death (Best & Neuhauser, 2004). Unfortunately, this new idea was not popular with the scientific community and many rejected Semmelweis's findings (Carter & Carter, 2017).

Another early promoter of handwashing was the famous British nurse, Florence Nightingale (Cohen, 1984). In 1854, during the Crimean War Nightingale implemented handwashing and other hygiene procedures in the hospital that she ran (Cook, 1914). While she initially aimed to reduce miasma, handwashing had the effect of reducing infections among patients. Unfortunately, similarly to Semmelweis, Nightingale's break through was largely ignored (Cohen, 1984). It was not until the 1980s that widespread hand hygiene promotion began, largely triggered by an outbreak of foodborne and healthcare related infections in the United States (Geller, Eason, Phillips, & Pierson, 1980; Ojajärvi, 1980). The CDC began promoting hand hygiene as an effective practice for preventing disease transmission, a campaign that led to the first nationally endorsed hand washing guidelines (A. CDC, 1985). These guidelines acted as a catalyst for global promotion of hand hygiene as a cost-effective, crucial tool for human health (GHP, 2019). Large scale initiatives such as the Global Handwashing Partnership (GHP, 2022), UNICEF's Hand Hygiene For All (UNICEF, 2022), and WASH'EM (WASH'EM, 2022), to name a few, have set out to make handwashing universal.

There is general scientific consensus that hand hygiene is an effective measure for interrupting the transmission of microorganisms, which cause infection at community and healthcare settings (Srigley et al., 2015). However, many researchers and implementors argue that hand hygiene should just be a component of an integrated approach to infection and control measures (Kendall, Landers, Kirk, & Young, 2012). Numerous studies have shown that hand hygiene compliance is poor globally (Huis et al., 2012; Kilpatrick et al., 2018). While the mechanics of practicing proper hand hygiene are relatively simple, there are complex and interdependent factors that determine behavior surrounding hand hygiene (Allegranzi et al., 2009; Jumaa, 2005). Some less studied aspects of hand hygiene include hand drying and the

effect of cultural dynamics on hand hygiene behavior (Jumaa, 2005). The significance of these considerations is becoming increasingly documented in the scientific literature (Jumaa, 2005). Accordingly, there has been increased emphasis in recent years on incorporating cultural and social considerations into future handwashing initiatives (Cumbler et al., 2013).

Early in the COVID-19 pandemic, some researchers questioned the efficacy of hand hygiene as a SARS-CoV-2 infection control measure (C. Yang, 2020). It was suggested that, because SARS-CoV-2 is transmitted by small-particle aerosols rather than large droplets, the role of hand hygiene in preventing transmission is "not particularly important." However, many in the scientific community disputed these findings (Cavanagh & Wambier, 2020; Kendziora et al., 2020; T. H. Lai, Tang, Fung, & Li, 2020). As a rebut, many scientists pointed to an environmental study, which examined the detectability of SARS-CoV-2 in air and surface samples taken in isolation wards of COVID-19 patients. The study conducted by Ong et al., (2020) in Wuhan China from January to February 2020, found that all air samples were negative, while many environmental samples were positive. This included detectable levels of SARS-CoV-2 on swabs taken from isolation room tables, bed rails, light switches, and door handles (Ong et al., 2020). The findings of this study became the impetus for hand hygiene guidelines developed by the WHO (WHO, 2020e) and CDC (CDC, 2021b).

The understanding of how hand hygiene methods can effectively kill and remove SARS-CoV-2 has evolved. Handwashing with soap has been shown to be effective (T. H. Lai et al., 2020). Analysis of the composition and density of microflora on different areas of hands found that most microbes reside in areas with high concentrations of oil and moisture (McGinley, Larson, & Leyden, 1988). A soap molecule has a hydrophobic and hydrophilic side. While washing hands with soap, the hydrophobic side attaches to oil and dirt that is nearby. The

hydrophilic side simultaneously attaches to nearby water molecules. So as hands are washed the soap molecules effectively pick up dirt and oil from hands and washes them away (White, 2020). As most microbes are found in oil and dirt, this makes soap a highly effective preventative measure against many pathogens. Numerous studies have shown that soap not only removes SARS-CoV-2 but also deactivates it (Thordarson, 2020). The SARS-CoV-2 virus is encapsulated by a fatty membrane. This membrane dissolves and in some cases can disintegrate when it encounters the hydrophobic side of a soap molecule. Thus, the SARS-CoV-2 virus can be destroyed when the membrane is damaged by soap (White, 2020).

Lack of ease of use is a major barrier to hand hygiene practice, and this has led to wide adoption of non-water-based solutions like alcohol-based sanitizers. A randomized control trial assessing handwashing with soap (control) and using an alcohol-based rub (treatment) in hospitals recruited 8,500 healthcare workers in 14 US states. The study found that hand hygiene compliance was initially low at baseline among both the treatment and control groups. The researchers suggested that this may be due to the limited time available to practice hand washing and the inconvenient placement of hygienic materials. However, at the conclusion of the 18-month study it was observed that increased promotion and availability of alcohol-based hand disinfection led to a statistically significant increase in hand hygiene compliance (Voss & Widmer, 1997). The findings of this study have been replicated in different settings across the world and there is now strong scientific consensus that ease of use and availability of hygienic materials are two primary facilitators to hand hygiene (Dyson, Lawton, Jackson, & Cheater, 2011; Pittet, 2000; Sadule-Rios & Aguilera, 2017). The use of alcohol-based hand sanitizers has grown dramatically during the COVID-19 pandemic, spurred both by their ease of use and effectiveness against deactivating the SARS-CoV-2 virus.

Surface Transmission and Cleaning

Surfaces have been shown to be a potential vector that can transmit infectious diseases (Castaño et al., 2021; Kraay et al., 2018). Surfaces of concern in disease transmission are those that are frequently touched, including doorhandles, light switches, counter tops, mobile devices, and other fomites (E. L. Jones, Kramer, Gaither, & Gerba, 2007; Zhao, Eisenberg, Spicknall, Li, & Koopman, 2012). However, there are numerous factors that affect the likelihood of disease transmission when encountering a surface (Karin Gallandat, 2021), including the infectious dose of the disease, virus survival on different types of surfaces, virus transferability from surfaces to hands and then to openings in the human body (such as eyes, mouth, and nose), resistance of a virus to inactivation by cleaning products, and the quantity of a virus emitted or shed by an infected person (Lei, Xiao, Cowling, & Li, 2020). A recent systematic review of 20 scientific publications examined the current knowledge and understanding of fomite viral transmission and efficacy of common disinfection approaches (Castaño et al., 2021). Castano et al. (2021) found that many viruses including SARS-CoV-2 have the ability to actively persist on surfaces for hours or even days. The potential for surface transmission of SARS-CoV-2 (WHO, 2020a) has led to widespread calls for surface disinfection as an infection and control strategy (CDC, 2021a; WHO, 2020e). However, most of the scientific evidence suggests that surface contamination presents a low risk for COVID-19 transmission when factors such as viral detection and infectious dose are considered (CDC, 2021a; Greenhalgh et al., 2021).

Numerous studies have found that the genetic material of SARS-CoV-2 can be found on surfaces in healthcare settings. Moore et al. (2021) conducted an environmental survey of surfaces in public areas of eight hospitals in England and of the 336 surface samples taken, 8.9% were found to be positive for SARS-CoV-2 genetic material (Moore et al., 2021). A similar study

of surfaces in hospitals in the United States by Marotz et al. (2020) found that of the 972 samples taken from throughout 12 hospitals, 16% were positive. However, the researchers also found that closer proximity to an infected patient significantly increased the proportion of samples testing positive, with 39% of samples taken on or near a hospital bed testing positive (Marotz et al., 2020). The proximal relationship between contaminated surfaces and infected individuals is supported by the environmental sampling of COVID-19 isolation wards in Singapore, which found that 87% of surfaces in 15 isolation rooms tested positive for SARS-CoV-2 prior to cleaning (Ong et al., 2020).

Researchers have also found surface contamination with the SARS-CoV-2 virus in community settings. In Massachusetts, USA, sampling of 346 frequently touched surfaces around the city of Somerville found 8.3% with detectable levels of SARS-CoV-2, albeit with low concentrations of active virus potentially below the threshold needed to cause an infection (Harvey et al., 2020). Similar results have been found in community environmental sampling in Brazil (Abrahão et al., 2021) and Spain (Fernández-de-Mera et al., 2021), leading to a strong suggestion that the corresponding risk of infection from contact with a contaminated surface is low. A systematic review including 78 articles on SARS-CoV-2 surface contamination found that the highest proportion of surfaces that tested positive for the virus were in laboratories, as well as on masks and eating utensils used by COVID-19 patients. The authors concluded that, while SARS-CoV-2 transmission from surfaces was possible, the primary transmission route is airborne and surfaces present a relatively low risk (Bedrosian et al., 2020).

Further research has shown that viruses shed from an infected individual become inactive in the environment and the quantity of active infectious viruses on a surface trend downward with time. The systematic review conducted by Bedrosian et al. (2020) suggested that SARS-

CoV-2 can remain active on a surface for hours to days, with great variability depending on the surface type, humidity, and temperature. On many hard surfaces, such as tile, stainless steel, and concrete, SARS-CoV-2 was found to remain active for between 2.2 and 18 hours (Gallandat, Levy, & Jacqueine, 2021). However, there are suggestions that virus inactivity increases when exposed to heat and UV radiation, this has led some to suggest that the SARS-CoV-2 virus may die more quickly in sunlight (Bedrosian et al., 2020).

Face Coverings:

Social interactions among humans are important for the cycle of transmission of many bacteria and viruses and face masks have been used since the Middle Ages as a method of preventing human to human transmission (Matuschek et al., 2020). However, the use of face masks has in many eras been negative. Even in 1656, during the bubonic plague, so called 'beak-doctors' got their name from the shape of their face masks. In many historical texts they are referred to as a symbol of death. However, more recent research suggests the iconic paintings of doctors wearing black cloaks, dark hats, and bird masks might be fictitious and even one of the earliest recorded examples of intentional misinformation about a disease outbreak (Matuschek et al., 2020).

Some populations in East Asian countries quickly adopted the behavior of wearing masks in the early phases of the pandemic, as the practice was already common during past public health crises. Some suggested that this in part may be responsible for why early in the pandemic western areas, less accustomed to wearing face masks, felt the devastating effect of the pandemic more rapidly (Matuschek et al., 2020). While the rate of infection in different areas may in fact be related for multiple factors, there is a strong argument for the normative application of facemasks to prevent COVID-19 transmission. There is mounting scientific evidence that using

face coverings decreases the chance of transmitting and contracting COVID-19 (Hemmer, Hufert, Siewert, & Reisinger, 2021; Ju, Boisvert, & Zuo, 2021). However, there are challenges in promoting new behaviors to a population. For mask use, there have been clear challenges in promoting widespread mask use. Common challenges related to mask use from the literature include, correctly wearing masks, the comfort or inconvenience of masks, access to masks, safe cleaning and disposal of masks, changing evidence leading to varying mask policies, rumors and misinformation related to masks, promotion of makes use among children, issues related to personal freedom, distrust of government and public health leaders, and cultural practices which lead to mask use challenges (Shirvanimoghaddam et al., 2022; Tirupathi, Bharathidasan, Palabindala, Salim, & Al-Tawfiq, 2020). The following section examines the key literature related to these mask use challenges.

For masks to be effective in preventing the spread of COVID-19 they must be worn correctly (Barrios et al., 2021; Kumar et al., 2020). Common varieties of face masks include cloth masks, surgical masks, and respirators (Santarsiero et al., 2020). Each have different procedures on how they can be used more effectively (Chaabna, Doraiswamy, Mamtani, & Cheema, 2021). However, in general for all mask types it is important that both the nose, mouth, and chin are covered and the mask fits tightly and comfortable against an individual's face (Lee et al., 2020). Several studies have reported common ways that masks are improperly used (Feng et al., 2020; Howard et al., 2020; Purushothaman, Priyangha, & Vaidhyswaran, 2021). The several common ways are for the nose or mouth to not be fully covered, for the mask to be worn upside down or inside out, for masks to be shared (Kumar et al., 2020). Each of these mask misuses can either reduce the effectiveness of mask use in preventing transmission or have the potential for leading to increased risk of infection (Barrios et al., 2021). This has led to general

agreement that use of face covering should become a widespread behavioral change communication message and guidance must be developed and promoted (Van den Broucke, 2020).

Among some groups, sharing of face masks has been shown to be common, which can increase the risk of exposure to respiratory droplets of an infected individual (Chaabna et al., 2021). The WHO has suggested that the primary method for preventing mask sharing is for face masks to be easily accessible and affordable to the global population (WHO, 2020e). However, in early 2020 and at other times during the pandemic supply chain issues have led to shortages of surgical and other types of masks (Tirupathi et al., 2020). In some areas these shortages have been so severe that healthcare workers have had to reuse or even go without face coverings (H.-l. Wu, Huang, Zhang, He, & Ming, 2020). This shortage initially led to widespread calls for face masks to not be used by the general population, with the goal that they could be saved for healthcare workers (Chaabna et al., 2021). This guidance was changed to recommend the widespread use of cloth masks (Esposito, Principi, Leung, & Migliori, 2020). Cloth masks were encouraged as a means of making mask usage more accessible to large portions of the global population (Tirupathi et al., 2020). In fact, several studies have shown that free dispersal of masks can led to as much as a three-fold increase in mask use (Chaabna et al., 2021; Chu et al., 2020; Feng et al., 2020), leading to several notable large scale mask distribution initiatives, including by UNICEF and UNHCR, to distribute millions of masks to vulnerable groups, such as those who live in refugee camps (Mballa et al., 2020; Woldearegay, 2022). However, more recently evidence has shown that the effectiveness of cloth masks, especially for several SARS-CoV-2 variants, may be limited (Cappa et al., 2021). This has led to increased promotion of the use of surgical and respirator masks (Liao et al., 2021).

Chapter 2: Manuscript

Introduction

The COVID-19 pandemic has posed a major public health challenge due to its fast global spread, the novel nature of the virus, and the viruses' ability to rapidly mutate into new variants. Although some experts predicted the danger of an outbreak of a novel virus (CFHS, 2019; Gates, 2015; Knight, 2020), in many areas the lack of preparation and under investment in public health and healthcare have been exposed (Lal, Erondu, Heymann, Gitahi, & Yates, 2021; Sirleaf & Clark, 2021), leading to high morbidity and mortality (Sharma, Borah, & Moses, 2021; M. L. Wang et al., 2020). The pandemic response effort has been expansive, involving individuals and organizations from across multiple sectors and geographic areas. Notably, WASH organizations have played a crucial role in the advancement of COVID-19 prevention measures, as they have relevant experience in program implementation and health promotion during crisis situations, particularly regarding behavior change and handwashing initiatives. However, for WASH actors, as with others involved in response efforts, the COVID-19 pandemic has presented unique challenges given uncertainty about the virus and the unprecedented speed and scope of spread. It is crucial that the public health community, and the world more broadly, learn from the COVID-19 pandemic to be more prepared for the future disease outbreaks, and learning through the experiences of WASH actors, who were actively and widely engaged in prevention programming.

In early 2020, countries across the world began to implement infection prevention and control (IPC) measures to slow the spread of SARS-CoV-2 (GÜNER, Hasanoğlu, & Aktaş, 2020; Kluge et al., 2020) including lockdowns, travel bans, and quarantines. For the first time in

almost four decades, hygiene related prevention measures became prioritized and widely promoted in earnest at a global scale (Signorelli & Fara, 2020; WHO, 2020d). This widespread promotion of hygiene prevention methods was likely due to both their expected IPC effectiveness (Cavanagh & Wambier, 2020; Chen et al., 2020; Tso & Cowling, 2020) and also because they are clear and empowering actions that can be adopted at individual and community levels to slow and prevent the spread of the disease. Common hygiene related prevention methods that were promoted included hand hygiene, physical distancing, surface cleaning, and mask use (CDC, 2020; Gilmore et al., 2020; Kluge et al., 2020). The increased emphasis on hygiene and hygiene-related behaviors positioned water, sanitation, and hygiene (WASH) actors—including practitioners, researchers, policy makers, and funders—to have a critical role in COVID-19 response efforts.

The WASH sector was uniquely positioned to respond to the COVID-19 pandemic given previous experience promoting disease prevention behaviors, whether from regular programing, or from responses to previous disease outbreaks or humanitarian work. Examples of the role of the WASH sector can be seen in the activities of past cholera (D'Mello-Guyett et al., 2020; Wolfe, Kaur, Yates, Woodin, & Lantagne, 2018), Ebola (Czerniewska & White, 2020; Mallow et al., 2018), and other coronavirus outbreaks (Albarrak et al., 2021; Fung & Cairncross, 2007). In these past disease outbreaks, WASH actors played leading roles in the implementation of disease prevention measures, including the promotion of hand hygiene.

While WASH actors were well-equipped with human resources and infrastructural capacity in place to quickly respond to COVID-19, including staff trained in behavior change and hygiene promotion techniques, familiarity in developing information, education, and communication (IEC) materials, and experience in rapidly planning and implementing

interventions in disease outbreak settings, this new and increased role for the WASH sector also led to a new set of challenges. WASH implementors were in an unparalleled position during the COVID-19 pandemic compared to previous outbreaks and responses and had to distinguish key needs and initiate activities rapidly to mitigate transmission, identify and focus interventions on populations that were not only at a high risk to COVID-19 but already vulnerable and marginalized, minimize in-person interactions during project activities, and make decisions based on imperfect and frequently changing evidence and guidelines. There is a need to understand the experiences, challenges, and lessons learned by WASH actors as they responded to COVID-19 so that the sector can improve its response and be better prepared for future disease outbreaks.

The primary aim of this paper is to better understand programmatic decision making among WASH actors responding to the COVID-19 pandemic in two adjacent, geographically and culturally similar, yet politically different East African Countries. We present a qualitative case study comparing the COVID-19 response efforts of WASH actors in Tanzania and Kenya. These two countries have similarities in language, culture, population size, and their respective WASH sectors have experience in responding to disease outbreaks. Yet, despite starting the pandemic with similar perceptions of COVID-19 and IPC measures, just four months into the pandemic there was a major divergence in how each government led COVID-19 response work, presenting distinct challenges to WASH actors in each country. Investigation and comparison of WASH program responses in Kenya and Tanzania can illuminate useful lessons for preparing for future pandemics, particularly in vastly different political climates.

Methods Section

Study Design and Approach:

This study is embedded within a larger, parent qualitative research study carried out with WASH implementors to understand, in real-time, how hygiene response activities were designed, funded, delivered, coordinated, and monitored in low- and middle-income settings globally during the COVID-19 pandemic. This sub-study specifically sought perspectives from individuals at organizations in Tanzania and Kenya that were involved in coordinating, designing, and delivering hygiene programs during the COVID-19 pandemic to understand and compare programmatic decision making among these geographically adjacent yet politically divergent countries.

We conducted in-depth, semi-structured, key informant interviews (KIIs) from March 2021 to July 2021. KIIs are aimed at providing in-depth information from participants, usually those identified as having expertise about a particular subject (Guest, Namey, & Mitchell, 2013). KIIs were identified as being appropriate for this research study as data collection was contemporaneous to the implementation of COVID-19 response activities and the issues that are the subject of this analysis had not previously been represented in the scientific literature. The semi-structured nature of the interviews allowed for reflective and open-ended responses, which enabled examination and consideration of the processes, norms, and decision-making surrounding multifaceted issues (Hennink, Hutter, & Bailey, 2020).

Study Setting:

Participants of this study worked for organizations based in the boarding East African nations of Tanzania and Kenya. These two countries share official languages, Swahili and English (Kenya-GOV, 2010; Tanzania-GOV, 2015), and have relative commonality in history,

culture, population size (Tanzania: 59 million (Mwakisisile & Mushi, 2019), and Kenya 53: million (Wasilwa, 2019)), and political systems (both are unitary republics (Kenya-GOV, 2010; Tanzania-GOV, 2015)). There are also many distinctions between the two countries. Kenya has a higher gross domestic product ($79B compared to $53B (UNDATA, 2020)) while Tanzania has many more ethnic groups or tribes (over 100 compared to 36 (Mamo, 2021)) and larger geographical area (UNDATA, 2021).

Both Tanzania and Kenya have large NGO sectors, including active WASH organizations. According to the 2019/2020 sectoral report Kenya has over 9,200 active NGOs with a total combined budget of over $1.4 billion (NGO-Bureau, 2020) representing a doubling in the number of NGOs and funding since 2009. In 2019/2020 organizations engaged in the WASH sector made up 7% of the total number of NGOs and had 3.76% of the total funding. The most recent NGO sector report from Tanzania shows that in 2015 there were over 8,500 NGOs (NACONGO, 2016), however according to the National Council of NGOs this number may be closer to 2,500, after a 2017 government initiative to authenticate and re-register NGOs (NACONGO, 2017). No official numbers are available on the total combined budget of NGOs in Tanzania, or the proportion of organizations that work in the WASH sector. However, the 2020 Tanzania Water and Sanitation Network's Equity Report suggests that there has been a 25% reduction in funding for the Tanzanian WASH sector since 2015 (TAWASANET, 2020).

National Government COVID-19 Response in Tanzania and Kenya

Initially the governments of Tanzania and Kenya implemented similar COVID-19 response measures. Both enacted non-pharmacological interventions recommended by the WHO and Africa CDC, such as school closures, mandatory quarantines for international travelers, suspension of international flights, and the closure of entertainment establishments (Aluga, 2020;

Mfinanga et al., 2021). However, the Tanzanian Government decided not to implement lockdowns, citing economic and freedom of movement concerns (Mfinanga et al., 2021) while Kenya implemented a countrywide nighttime curfew and lockdowns of major cities (Ahmed et al., 2020). At first large urban centers, such as Dar es Salaam, Tanzania and Nairobi, Kenya were the epicenters of COVID-19 (Nakkazi, 2020). However, within one month of the first official case in each nation, community transmission had been confirmed across both countries (Takele, 2020).

In April of 2020, a major divergence in the COVID-19 responses between the two countries occurred. Specifically, Tanzania's former president John Pombe Magufuli, who passed away in March 2021 (Wamsley & Peralta, 2021), reportedly from a heart condition (BBC, 2021c) amid rumors he had contracted COVID-19 (BBC, 2021b), led a controversial response to the COVID-19 pandemic. The Magufuli administration stopped providing data on COVID-19 cases and deaths (Mwai & Giles, 2021), ended previous COVID-19 prevention and control measures, and promoted herbal medicines (Kombe, 2020), regular exercise, good nutrition (BBC, 2021a), and prayer (Burke, 2021) as remedies to fight COVID-19. In June of 2020, the government declared Tanzania to be COVID-19-free (Ombuor & Bearak, 2021), and refused to accept any vaccines produced outside the country (BBC, 2021a). NGOs engaging in COVID-19 prevention programing were accused of "spreading fear" to the population and were in some cases forced to stop operations (Awami, 2020; OGP, 2020; Singano, 2020), leading to widespread COVID-19 denialism among the general population and an uncoordinated response to the pandemic in both the public and private sector (Buguzi, 2021a; Saleh, 2020). After president Magufuli's passing, in July 2021 his successor president Samia Suluhu Hassan reversed many COVID-19 directives (Buguzi, 2021b) and began to release data on COVID-19,

implement IPC initiatives, accepted and distributed vaccines, and allowed NGOs to resume programing related to COVID-19 prevention (Warah, 2021). Officially, as of the first of March 2022, Tanzania has had 33,726 cases and 800 deaths from COVID-19 (John Hopkins, 2022), but the actual number is suspected of being significantly higher (Mwai & Giles, 2021). On the same date, approximately 2.5 million people have received at least one dose of a COVID-19 vaccine in the country, representing 4.2% of the population (Ritchie et al., 2022).

In contrast Kenya kept in place many COVID-19 response measures, including bans on social gatherings, school closures, and suspension of local and international travel through August 2020 (MoH, 2020). Some community groups and opposition politicians complained of the economic cost of long closures (AN, 2020). Others said that the implementation of the measures was too severe with fines, jail time, and even police killings of those found not following public health orders (Namu & Riley, 2020). The Kenyan government responded that its policies prioritized stopping disease transmission and limiting mortality (Agutu, 2020). The national government encouraged the support of the NGO sector in responding to the pandemic and distributed in-kind and financial support to civil society organizations (Kipkorir, 2022). When COVAX donations became available, Kenya was one of the first countries to receive a shipment and engage in large scale community vaccination campaigns (Analytica, 2020). As of the first of March 2022, Kenya has reported 323 thousand cases and 5,646 deaths from COVID-19 (John Hopkins, 2022). On the same date, approximately 11.6 million Kenyans have received at least one dose of a COVID-19 vaccine, representing about 22% of the population (Ritchie et al., 2022).

Participants:

Eligibility:

To be eligible to participate in the parent study, individuals must have been over 18 years of age, worked in the WASH sector prior to the March 11, 2020 declaration by the World Health Organization (WHO) that COVID-19 is a pandemic, and were involved in response efforts that followed for all or part of the COVID-19 pandemic and their activities included the promotion of COVID-19 prevention behaviors (such as the use of face coverings, hand washing with soap, physical distancing, or COVID-19 vaccine promotion). To be included in this sub-study, interviews must have been conducted with participants specifically involved in response efforts in Tanzania, Kenya, or both. Participants were excluded from this analysis if their activities were not based in either Tanzania or Kenya. To gain specific insights from individuals working in Tanzania and Kenya, additional participants were sought who worked in both or either country, specifically those who worked in local or national entities and were involved in the design, delivery, or coordination of hygiene programing related to the prevention of COVID-19. Relevant entities included Non-Governmental Organizations (NGOs), businesses, coordination mechanisms, civil society organizations, and technical experts.

Recruitment:

Participants were primarily recruited using convenience sampling and were secondarily recruited via response-driven snowball sampling. An initial sampling frame was developed from contacts of the research team, users of the COVID-19 Hygiene Hub (HH, 2021), and members of the Kenyan and Tanzania WASH and Menstrual Hygiene Management national networks. Participant enrollment occurred during three rounds of recruitment, with each round soliciting participation of a limited number of potential participants (~14) to enable ease of scheduling. Prior to a new group of potential participants being engaged, the research team assessed the

organization type (E.g. local, national, or multinational NGO), programmatic focus, geographic area, and role of those already participating and selected individuals from the sampling frame that offered representation from those with diverse or underrepresented backgrounds. Prospective participants were contacted via email, with three unanswered emails considered a refusal. For this sub-study, 43 participants were identified and contacted, 36 responded, and 21 participated in an interview with author MPS after confirmation that they fit the criteria for enrollment.

Data Collection and Management:

Interviews were conducted using an interview guide that focused on exploring participants observations of community risk perception, sources and effects of misinformation, and government regulation as well as hygiene-related COVID-19 prevention programming, including the design process, delivery modalities, populations targeted, prevention behaviors promoted, perceived strengths and challenges, and monitoring and evaluation processes. Finally, participants were asked to make comparisons between their prior work in the WASH sector and during the COVID-19 pandemic to identify what had changed or remained constant. The interview guide was designed by author MPS with feedback from team members at both Emory University and the London School of Hygiene and Tropical Medicine (LSHTM). The research team utilized an iterative process of reviewing and adapting the interview guide periodically based on emerging themes and ideas from the collected data and dynamic conditions of the pandemic.

Interviews were conducted by author MPS in either English or Swahili. All interviews were conducted remotely over Zoom or WhatsApp, depending on the preference of the participant. Interviews lasted an average of 58.5 minutes (range: 43 - 71 minutes). The audio of

each interview was recorded using Zoom. An artificial intelligence transcription assistant, OTTER.AI (A. Lai, 2022), was used for initial transcription. Author MPS, along with an Emory team member, reviewed the automated transcriptions while listening to the audio recordings to improve transcription accuracy, readability, and grammar. Three interviews were translated in their entirety directly from the recordings from Swahili to English by MPS. In other interviews Swahili was used sporadically and translated when necessary. All translation was verified by a Swahili native speaker who was external to the research team. After all transcripts were complete, MPS removed all potential identifiers (including names of locations, individuals, and entities). All audio recordings and transcripts were digitally stored on an encrypted cloud-based system hosted by Emory University and only accessible to research team members with strong passwords and multifactor authentication.

Data Analysis:

After each interview, memos and post-interview debriefs were completed by MPS. The research team periodically debriefed on the study progress and developing themes to make changes to the interview guide as needed. During the transcription process MPS wrote additional memos on emerging and contrasting themes. A codebook for this data set was adapted from one created for the parent study by MPS and Emory and LSHTM team members, given the similar nature of several interview questions. Fourteen new codes specific to this study were developed by MPS using deductive a priori strategies and were reviewed by Emory and LSHTM team members. Further, additional codes were developed during the data coding process via iterative and inductive strategies.

The analytic codes described above were applied to the data using MAXQDA software by MPS. An Emory team member separately coded every fifth transcript (4 total). The coded

sections from each of these 4 double coded transcripts were compared using MAXQDA tools for consistency in code usage and understanding. When inconstancies were observed in code usage adjustments were made to the relevant code definition and coding process.

Analysis started by developing memos and then thick descriptions of the core themes, which were compared between participants from different organizations based on scope and type, as well as between those from Tanzania and Kenya. Themes were then grouped into broader categories, including pandemic phase, safety concerns for staff and beneficiaries, programmatic decision making, monitoring and evaluation, as well as influence from donors, sectoral actors, and government agencies. The categories were then again compared between organization characteristics and geography of operation. Using these comparative thematic analysis methods thick descriptions were written for each theme and category.

Ethics:

The study protocols were reviewed and approved by the Emory University (REF: 00001144) Internal Review Board (Atlanta, USA) and the London School of Hygiene and Tropical Medicine (REF: 22467) Research Ethics Committee (London, England). Each individual was provided with a study information sheet prior to participating in an interview. The information sheet outlined the aims of the study, procedures in place for protecting anonymity, as well as the potential benefits and risks of participation. Verbal consent was received and recorded prior to each interview.

Results

Of the 21 in-depth interviews with individuals from WASH sector organizations in Tanzania (52%) and Kenya (48%), 16 (76%) worked with Non-Government Organizations (NGOs), four (19%) were with Civil Society Organizations, and one (5%) was with a government agency (Table 1). Of these, nine (42%) operate at a local level, six (29%) at a national level, and six (29%) at an international level. All participants were at a senior level (program manager or higher) within their organization and had between four and 41 years of experience working in the WASH sector in East Africa. Fourteen (66%) participants described themselves as Water, Sanitation, and Hygiene (WASH) or Infection Prevention and Control (IPC) specialists, four (19%) as behavior change communication specialists, and three (15%) as specializing in another area (monitoring and evaluation, non-profit administration, and engineering).

Participant Programing Prior to the COVID-19 Pandemic

The participants were asked to self-identify the primary thematic area of their work prior to the pandemic, nine identified hygiene promotion, five provision of essential WASH services, four network or coordination activities, and three governance and policy making. Several participants discussed that their programs often operated in two or more thematic areas, the most common example being provision of essential WASH services in combination with hygiene promotion. However, all three of the participants that engaged in governance and policy making said that the activities of their work only fit into in a single thematic area.

Table 1: Participant Demographic Information and Scope, Type, Thematic Area of Organization

	Tanzania	Kenya	Total
	# of participants		
Participant Recruitment			
Contacted	23 (53%)	20 (47%)	43
Participated	11 (52%)	10 (48%)	21
Participant Gender			
Female	6 (55%)	5 (45%)	11 (52%)
Male	5 (50%)	5 (50%)	10 (48%)
Participant Organization Scope of Operations			
Local	5 (55%)	4 (45%)	9 (43%)
National	3 (50%)	3 (50%)	6 (28.5%)
International	3 (50%)	3 (50%)	6 (28.5%)
Participant Organization Type			
Non-Governmental Organization	8 (50%)	8 (50%)	16 (76%)
Civil Society Organization	2 (50%)	2 (50%)	4 (19%)
Government Agency	1 (100%)	0 (0%)	1 (5%)
Participant Primary Thematic Area of Programing Pre-Pandemic			
Hygiene Promotion	5 (55%)	4 (45%)	9 (43%)
Essential WASH	2 (40%)	3 (60%)	5 (24%)
Governance or Policy Making	2 (66%)	1 (33%)	3 (14%)
Network or Coordination	2 (50%)	2 (50%)	4 (19%)

Participants engaged in hygiene promotion activities prior to the pandemic identified the primary topical areas of their work to include hand hygiene, menstrual health, food safety, and

personal hygiene; identified community, home, and school-based education campaigns as the primary modes of program delivery; and described prioritizing participatory, 'bottom-up,' evidence-based, and localized decision making in their program design. Many of the participants described implementing multipronged hygiene promotion campaigns via several or all of these modalities. These approaches were discussed as being proven and preferential as all the participants aimed for 'holistic population coverage' in the communities that they operated. Several participants discussed a programmatic focus of distributing hygiene materials such as menstrual materials and 'hygiene kits' for personal hygiene. Many of the participants primarily focused their programing in rural or peri-urban locations, including all participants working in Tanzania. However, several participants working in Kenya focused on urban settings, specifically in informal settlements. Participants generally focused on vulnerable groups, such as children and youth, people living with disabilities, impoverished or marginalized groups, and those living with chronic illness; none mentioned programing that specifically targeted adult men.

Participants engaged in provision of essential WASH services prior to the pandemic, described primarily engaging in activities related to water supply and treatment, sanitation, or refuse disposal. These services were provided at community, institution, or household levels. Several organizations were involved in large scale community WASH service provision projects, in some cases in support of government initiatives. The rest supported smaller scale projects, often described by participants as stand-alone systems at homes or institutions which were not connected to municipal infrastructure. Many organizations that provided WASH services to institutions worked primarily with schools, although a minority also supported religious, government, or entertainment-based locations. Some participants specialized in one type of

service provision, while others engaged in all three areas. In contrast to the hygiene promoters, most organizations involved in the provision of essential WASH services primarily focused on urban areas. Some participants justified this focus with discussions of high population density and greater easy in scaling programing in urban areas. However, two organizations did have smaller secondary components of their programing in rural areas. Work in rural areas was limited to water supply and sanitation at schools or households. Outside of students at schools, these organizations did not specifically target one group for their programing. Rather geographic areas of need were identified with services generally provided or made available to the population in these settings.

Participants engaged in network or coordination activities prior to the pandemic were split evenly between those engaged in menstrual health and those working in the WASH sector generally. All the participant organizations engaged in this thematic area were part of umbrella multinational coordination or network structures. These participants had leadership positions in their respective network or coordination as members of secretariats or governing committees. Both WASH sector networks had mandates from their national government (via inclusion in the relevant WASH act or statute) to support sectoral coordination and networking with the aim of building capacity of civil society organizations, to advocate for the prioritization of WASH funding and policies, and to annually produce reports on the state of the WASH sector for review by their relevant government ministries or parliament. The menstrual health networks in both Tanzania and Kenya were much younger organizations with no codification in an act or statute. Instead, they aimed to bring together stakeholders, including for-profit companies, for increased promotion and prioritization of menstrual health.

The participants engaged in governance and policy making described working at regional and national levels. All three organizations worked primary as consultants and were frequently engaged by donors, government agencies, and other non-profits to develop sectoral reports and draft policy briefs, or legislation. All three organizations were staffed with 'WASH sector veterans' with extensive experience in government ministries, UN agencies, or large NGOs. The organizations described supply of essential WASH services as their primary focus area of their work.

Before the pandemic, all participants described engaging in monitoring and evaluation activities, with a strong focus on adequacy and process evaluation. Two organizations also engaged in impact evaluation in collaboration with researchers and academics from education institutions in the United States or Europe. Participants described the motivation for undertaking these activities as being fulfillment of donor requirements, better understanding the needs of target communities, and to improve program design and implementation in the future. All participants described monitoring and evaluation activities as using paper based or manual entry systems. However, several participants mentioned that their organization had started the process of transitioning to digital, cloud-based or automated systems. All participants stated that their respective organization produced annual, or more regular, M&E reports.

Phases of the Pandemic

The COVID-19 pandemic forced WASH actors to suspend their regular programing and respond to the emerging threat. Participants described phases or waves of the pandemic that had repercussions in both their local and national environments. These phases directly affected programmatic decision making and implementation via the following mechanisms: change in donor support, sectoral coordination priority, government regulation, community sentiment, and

safety concerns for their staff and beneficiaries. Although there were contextual differences in Tanzania and Kenya, the experiences of the participants were generally similar and can be categorized into three successive phases: preparation or pre-crisis phase, acute or crisis phase, and then the maintenance phase (Table 2). Participants described the initial progression of the pandemic as going from the preparation phase to the acute or crisis phase, and then finally to the maintenance phase. After this initial cycle, participants discussed that the phases oscillated between acute and maintenance phases depending on local and national conditions.

Preparation or Pre-Crisis Phase

The preparation or pre-crisis phase was described as occurring before community transmission of COVID-19 occurred in the national or local environment of the participant. This period was characterized by apprehension or uncertainty within WASH organizations. Participants described community sentiment during this phase as being characterized by confusion and fear, which led to an increased demand for COVID-19 prevention programing from WASH actors—primarily hand hygiene information and supply provision as well as general prevention and control messaging—as beneficiaries looked for ways to protect their families and communities.

Acute or Crisis Phase

The acute or crisis phase occurred during periods of increasing or high community transmission in the areas of operation of the participants. Participants described both the sentiment in the communities in which they operate and within their organizations as being fearful and frantic. During this phase, demand for COVID-19 prevention programing from WASH actors remained at a high level with similar community drivers as described in pre-crisis phase.

Maintenance Phase

The maintenance phase occurred after the acute phase when community transmission was decreasing or was low. Community members were described by participants as generally becoming apathetic to the risk of COVID-19. In some cases, participants in both locations observed an increase in doubt or denial of the existence of COVID-19. Demand for COVID-19 prevention programing from WASH actors dramatically decreased during this period, leading to many of the participant's organizations to attempt to return to their pre-pandemic WASH programing, like school WASH interventions and promotion of non-COVID-19 disease topics. Safety guidance put into place by participant organizations (like limited number of staff in a vehicle or mask mandates) often continued, but adherence by staff members decreased.

Table 2: Characterizations of the Phases of the COVID-19 Pandemic by WASH actors engaged in response work in Tanzania and Kenya

Phases	**Characterization**	**Community Sentiment**	**Safety Concerns**	**Programmatic Actions**
Preparation (Pre-Crisis)	• Warning stage • Apprehension • "Uncertainty everywhere"	• Confusion • Fear • High demand for programing	• Safety measures for staff and participants prioritized	• Risk management planning • Staff training • Response planning • Stock piling supplies
Acute (Crisis)	• Community transmission • "Frantic"	• Fear • High demand for programing	• Safety measures continue • Office Closures	• Many programs stop or become entirely remote
Maintenance	• "Unwinding" or decelerating • Low Community transmission	• Apathy • Denial • Decreased interest in programing	• Safety measures continue but with decreased emphasis • Some staff stop following guidelines	• Decrease in COVID programing • Intermittent return to pre-pandemic programs

Pandemic Response

The COVID-19 pandemic presented WASH actors with novel challenges due to its scale and complexity. There was no 'roadmap' for developing response activities in such a context, and the participants working in both countries described distinct challenges based on differing conditions. Five thematic areas emerged when examining the experiences of WASH actors, including: hand hygiene momentum, sources of information, program geography and target groups, modes of program implementation, and monitoring and evaluation. The following section presents participants' experiencing while responding to the COVID-19 pandemic across these five themes. Each section describes similarities between Tanzania and Kenya, followed by sections presenting distinct themes described by participants working in each country.

Hand Hygiene Momentum

Many participants, especially those engaged in hygiene promotion before the pandemic, described feeling that the preparation phase of the pandemic was "the moment for hand hygiene," as one female participant from Tanzania described it. Participants discussed a desire to capitalize on the widespread attention on hand hygiene to make population level behavior changes that would last beyond the pandemic. Many organizations developed expansive handwashing health education campaigns centered around COVID-19. Most of the participants said that their organization employed the fear motif in initial behavior change communication materials. These interventions and general response efforts were perceived by the participants to have led to an observable population level hand hygiene behavior change in both Tanzania and Kenya during the preparation phase and initial acute phase of the pandemic. Participants described increased demand for hand hygiene materials (such as hand sanitizer, buckets, and soap) and the widespread establishment of hand washing stations in public spaces as evidence of this. Further, participants described hand hygiene promotion activities as being strongly

supported by the national governments of both Tanzania and Kenya during the preparation and initial acute phases of the pandemic. All participants also described either expanding or establishing hygiene related components of their organization's programing. Common hygiene related topics promoted by participants included surface cleaning, social distancing, and mask use. However, hand hygiene was mentioned as being the major programmatic focus by all participants throughout the pandemic.

Tanzania

Participants working for organizations in Tanzania were unable to directly promote hygiene topics that were perceived as being related to COVID-19 after the divergence of the Tanzanian governments COVID-19 response. Because Tanzania officially declared itself COVID-19 free, any discussion of the disease was characterized by the government as 'bringing fear to the community,' said a male participant working in Tanzania. As a result, organizations stopped promoting social distancing, surface cleaning, and face coverings. As hand hygiene had been an established thematic area for organizations prior to the pandemic and remained an approved topic for promotion by the MoH, all participants indicated that their organizations continued to promote it, despite a dramatic decrease in the perceived importance of hand hygiene in the community. Hand washing stations were no longer widely placed at the entrances of restaurants, offices, and shops, which participants reported to have led to a sharp decrease in the demand for hand washing materials.

Kenya

In Kenya, participants described momentum being lost on hand hygiene during the first maintenance phase of the pandemic. COVID priorities moved to the promotion of face coverings, physical distancing, and later vaccine uptake. Community sentiment during the

maintenance phase became generally apathetic, leading to ineffectiveness of the fear-based hand hygiene programming that was initially promoted. When the next acute phase of the pandemic occurred in Kenya, the public narrative on prevention had only a minor focus on hand hygiene.

Sources of Information

In both Tanzania and Kenya, participants described initial confusion over what information to promote due to frequently changing evidence and guidelines, especially in the preparation phase of the pandemic. However, in both countries' participants identified the WHO, Africa Centers for Disease Control and Prevention (Africa CDC), and the respective national ministries of health as the preferred and most reliable sources of information. Some participants also discussed receiving additional information from their organizational headquarters or from donors.

Tanzania

After the divergence in government policy in Tanzania, which occurred during the acute phase, all participants working in Tanzania stated that they outwardly started to strictly follow the guidelines set by the Ministry of Health. These new mandates diverged from the WHO guidance, but due to fear of government penalties, like losing their non-profit status, WASH organizations were left with little choice. Participants described local government authorities (LGA) (from the district level downward) as being even more strict on NGOs than the national government. Several participants discussed LGA officials conducting unannounced site visits (which was unheard of prior to the pandemic) and making thinly vailed threats to conduct special investigations or even close offices if it was found that NGOs were mentioning COVID-19 in programing. "It felt like each local leader was competing on who could be more anti-COVID. They were not shy in telling us what to do and what to say," said one male participant working in

Tanzania. Fear of government punishments led to many participant organizations to promote government endorsed topics like improved diet, herbal medicines, and exercise as methods for promoting good health and a strong immune system. Participants said that the unacknowledged, but widely understood, subtext was that despite Tanzania officially declaring itself COVID-19 free (which it was not), the government promoted these topics as methods to preventing the spread of the disease.

Some participants described looking for ways to incorporate information in line with WHO guidance on COVID-19 into their programing, albeit in a subtle manner. One participant said, "we had to figure out how to talk about COVID-19 without directly referencing it." This led to the use of commonly understood euphemisms, such as discussing how to prevent 'breathing problems,' 'heart problems,' 'pneumonia,' and general references to 'disease outbreaks.'

Kenya

In Kenya the government provided relatively consistent guidelines, derived from WHO and Africa CDC advice, across geographic locations and levels of the government. Participants did mention several notable outliers where LGA officials promoted inconsistent or incorrect information, including county governors and city mayors publicly expressing COVID-19 doubt or promoting non-evidence-based prevention measures (such as drinking alcohol as a method for throat sterilization). However, participants uniformly said that they followed the national government's evidence-based guidelines over the advice of LGAs. Further, the Kenyan national government provided regular updates on COVID-19 case and mortality rates at both the national and local levels. Participants described this data as being useful in program planning, especially in response to local surges of infection.

Program Geography and Target Groups

Organizations in both countries shifted their programing from rural to urban areas. This shift was primarily due to the perception that large population centers would be more severely affected by COVID-19 and some participants stated that operating in urban areas was easier because it required less travel from their offices or bases of operation. Participants discussed carrying out population level programing, which did not target one specific group, but contributed to the widespread response efforts in their respective country. They also noted targeting vulnerable groups, including people living with disabilities, menstruating adolescent girls, the elderly, people living with chronic disease, and people experiencing homelessness, which many participants perceived this as gap in the wider response effort. All of these groups had been targeted populations of participant programs in both countries prior to the pandemic.

Tanzania

WASH actors in Tanzania quickly moved their primary programmatic focus back to rural areas and restarted their pre-pandemic programs after the divergence in government COVID-19 response. However, many organizations continued the increased emphasis started during the preparation and acute phases on the aforementioned vulnerable groups in their programming.

Kenya

Several participants from Kenya described that for the first time their organization started hygiene promotion and essential WASH service provision in informal settlements and health care facilities. Informal settlements were described as being prioritized because these areas were perceived to be prone to disease outbreaks as they are "population dense as well as lacking WASH and healthcare infrastructure," said a female participant working in Kenya. Prior to the pandemic, the government had not officially recognized many of these areas, which was a barrier

for some organizations to implement programing. However, during the pandemic the national government actively pushed organizations to implement programs in informal settlements in both Nairobi and Kisumu.

Participants also described pre-pandemic barriers to programming as being removed from WASH organizations operating in health care facilities. Prior to the pandemic, participants described the health sector in Kenya as resistant to WASH actors operating programs in their institutions. However, during the preparation and acute phases of the pandemic the government and health stakeholders encouraged WASH organization to assist in planning and implementation of hygiene protocols for waiting and triage areas.

Modes of Programing

Organizations largely shifted away from implementing in-person programing during the preparation phase and initial acute phases of the pandemic in both Tanzania and Kenya, largely due to safety concerns for beneficiaries and staff, as well as restrictive government regulation, which led to an increase in the use of social media and multimedia in hygiene promotion campaigns. For many organizations this was the first time that they had implemented widespread behavior change campaigns using these modalities, though some organizations had experience using social media, radio spots, and public service announcements during previous disease outbreaks. Participants described program delivery via various media channels as being effective in reaching large numbers of people with public health information. But several participants pointed out that raising awareness of an issue does not guarantee a change in behavior. Due to a lack of M&E data, participants were unsure about the actual impact of media-based programing in changing or sustaining behavior.

Tanzania

In Tanzania, the move away from in-person programing was relatively short lived. After the divergence in government COVID-19 response, organizations were instructed to "operate as normally," described a male participant working in Tanzania. All participants indicated that their organizations resumed in-person programing. However, due to the perceived effectiveness of the use of media in reaching large numbers of people, many organizations continued to use media as a secondary modality of program implementation. The major difference was that all public messaging now had to be approved by two government agencies (the vice president's office and the MoH), dramatically decreasing the speed at which organizations could implement these campaigns.

Kenya

In Kenya, many participants stated that the use of remote modalities of programing (such as social and mass media) continued throughout the pandemic due to safety concerns for staff and beneficiaries, and to restrictive government regulations. During the preparation and initial acute phases of the pandemic, movement across Kenya was limited to essential businesses that had received a permit from the national government to travel outside their quarantined areas. Many participants described that their organizations struggled to receive a permit, as the roles of health education and hygiene promotion were not recognized as being essential. The WASH sector coordination mechanism lobbied the MoH on behalf of its members. Due to these efforts, and the lobbying efforts of individual organizations, some larger WASH actors did received travel permits during the initial acute phase of the pandemic. However, restrictions on movement remained a challenge for many smaller WASH organizations that had less influence within the

government and could not afford the time and money required to repeatedly apply for travel permits.

Monitoring and Evaluation (M&E)

All of the participants discussed M&E as being a challenge during the pandemic. No participants said that their organization was able to maintain their pre-pandemic M&E activities. Some organizations stopped collecting M&E data entirely, while others discussed limiting M&E activities. For organizations that were able to collect M&E data, participants described the monitoring of inputs (e.g., the number of bars of soap purchased) or outputs (e.g., the number of communities visited), but feeling largely unable to assess the impact of their programs, particularly on beneficiary behavior.

Many participants stated that they were unable to collect data via the methods that they had utilized before the pandemic, largely due to the fast-paced nature of the pandemic, safety concerns for beneficiaries and staff, and new regulations related to health data collection and dissemination. Many participant organizations had extensive M&E systems in place prior to the pandemic but could not easily or quickly adapt data collection tools, like surveys and questionnaires, to the COVID-19 pandemic, further hampered by the limited number of staff dedicated to M&E activities compared to those in other departments. Many participants reported that their organizations had relied on in-person paper-based data collection methods and that collecting data in-person was limited or prohibited due to safety concerns, especially during the preparation and acute phases of the pandemic. The lack of prioritization of M&E was described as being compounded by the reactionary nature of many organizations COVID-19 response, where quick implementation was prioritized over their regular program planning processes, formative research, or data collection.

Tanzania

Participants described being warned by the MoH and LGAs against collecting or disseminating data related to COVID-19 after the divergence in the Tanzanian government COVID-19 response, leading some organizations to suspend all M&E activities. Other organizations continued to collect data, but removed all mention of COVID-19 from their collection tools or data bases.

Kenya

Several participants described having limited or inadequate time with participants due to travel restrictions put in place. Organizations prioritized program implementation over data collection. To some participants, the pandemic experience made clear the need to update their M&E data collection systems. Several organizations continued with their process of moving to cloud or SMS based data collection during the pandemic.

Discussion

This study aimed to understand programmatic decision making in a fast paced and high-stress outbreak situation where there was little precedent or evidence, and to prompt reflection within the WASH sector around how to better prepare for future outbreak situations. We interviewed individuals at organizations in Tanzania and Kenya that were involved in coordinating, designing, and delivering hygiene programs during the COVID-19 pandemic. We conducted in-depth interviews with 21 individuals that met these criteria. We found that when comparing divergent responses to the pandemic key lessons can be learned which can be leveraged for greater adaptability to uncertain political climates. The initial phases of the pandemic were perceived by WASH actors in Tanzania and Kenya as being a potential turning point for the widespread adoption of hand hygiene, yet despite an initial perceived population level increase in hand washing practices, momentum was lost as community fear dissipated and government priority changed. Finally, the prioritization of M&E and collection of data remains a key challenge for WASH actors in emergency situations.

Key differences and similarities in the experiences of WASH actors in Tanzania and Kenya

Organizations in the two countries were forced to operate into different political environments, which posed unique challenges and opportunities when developing COVID-19 interventions or continuing existing WASH programing. Despite these difference climates, there existed some of the key similarities and differences as well as successes and challenges of resulting divergent approaches.

In Tanzania programing returned to pre-pandemic priorities quickly after the divergence in government policy, forcing WASH actors to abandon COVID-19 activities though also enabling beneficiaries to not experience an extended gap in regular WASH programing. Students

were able to return to school and receive school-based programing and essential WASH services were largely not disrupted by the pandemic. However, the lack of WHO guided prevention measures likely led to increased COVID-19 morbidity and mortality in the country (Buguzi, 2021a). But data was not reported by the government for over one year, and thus the evidence to draw this conclusion is missing (Makoni, 2021). Anecdotal evidence from community members and political leaders on what the COVID-19 situation was like during this period without data points to high rates of cases and deaths, but unfortunately is largely polarized depending on the political affiliation (Buguzi, 2021a; Mfinanga et al., 2021).

In Kenya, the prioritization of COVID-19 prevention and control measures were likely to have reduced COVID-19 cases and death in the country (Brand et al., 2021). Kenya had lower rates of COVID-19 cases and deaths compared to other countries in East Africa (Bamgboye et al., 2021; Bizoza & Sibomana, 2020; Kassegn & Endris, 2021). But this did come without a toll. The Kenyan population lived in isolation for an extended period, with many unable to travel, work, or access essential services. WASH actors in Kenya experienced challenges in operating response activities (due to restrictive government policies on travel and accessing beneficiaries) and were largely unable to restart pre-pandemic WASH programing (due to the extended prioritization of COVID-19 response work).

There were also notable similarities in the lessons learned by WASH actors in Tanzania and Kenya. For example, many NGOs in Tanzania and Kenya focused on targeting vulnerable or marginalized groups including people living with disabilities, the elderly, menstruating women, and those living with chronic disease. WASH actors identified that that these subgroups had special needs that were not being addressed by the population level interventions of their respective governments. Many WASH actors were well positioned to serve these populations

due experience engaging them in pre-pandemic work. This allowed some participant organizations to rapidly conduct formative research to understand gaps in population level response initiatives and design activities that fit the specific needs of these subpopulations.

WASH actors in both Kenya and Tanzania were able to leverage social and mass media in the early stages of the pandemic, bringing awareness to public health issues. Participants described this as being especially effective during periods when populations were in lockdowns and were so called 'captive audiences.' Unfortunately, as restrictions were relaxed, and populations were not limited in their movement, organizations found that there was decreasing rates of response and engagement to social and mass media. This was observed in fewer comments on social media posts and fewer phone calls into radio programs. Participants suggested that media campaigns should continue to have a complementary role to existing intervention modalities after the pandemic.

It is important to learn from the experience of WASH actors in both Tanzania and Kenya to better prepare for future response efforts. Learning from two divergent responses is crucial for the WASH sector, as governments will likely continue to respond differently to future disease outbreaks, given the current political landscape. Despite the potential of different government outbreak responses, the WASH community will need to be adaptable and collectively gain the skills necessary to operate in any political climate. We recommend that further research be conducted by the WASH community to assess and plan how to best achieve this.

Initial momentum for hand hygiene led to temporary behavior gains

During the preparation and initial acute phase of the pandemic there was widespread sentiment throughout the WASH sector, both globally and in Tanzania and Kenya, that hand hygiene was receiving the attention and resources needed to catalyze widespread behavior

change that could last beyond the pandemic, yet change has not been reliably maintained. In response to this, WASH organizations in Tanzania and Kenya initiated large scale campaigns related to hand hygiene. Hand washing facilities were constructed in public spaces, allowing community members ease of use in high-risk environments. However, some participants described challenges with a lack of standards or guidelines on how these facilities should be constructed and maintained, which led to disruptions in service for beneficiaries. Organizations also utilized remote and media-based delivery modalities, such as radio announcements and social media campaigns, with the aim of promoting awareness on the importance of hand hygiene and proper practice, as well as to evoke fear of COVID-19.

When designing behavior change activities WASH organizations relied on the use of the fear motif to motivate beneficiaries to improve hand hygiene behavior. However, use of a single approach to triggering behavior change, such as fear, does not have backing in the scientific literature (George et al., 2017; Mosler, 2012). While in many cases participants described these activities and the broader response effort as initially leading to observable population level changes to hand hygiene adoption, the attention and momentum was short lived. Many participants attributed this loss of momentum to the fear of COVID-19 among many community groups not persisting, with apathy and in some cases COVID-19 skepticism increasing. Similar phenomenon have been observed in past disease outbreaks. In 2014, during the Ebola outbreak in West Africa, hand hygiene received wide attention and adoption (Gidado et al., 2017), however, a cross sectional survey conducted two years later shows that momentum was largely lost (Akinyinka, Bakare, Oluwole, & Odugbemi, 2019; Martins & Osiyemi, 2017). Czerniewska and White suggest in their 2020 publication that the use of fear as a primary motivator was poorly

received by communities in West Africa and this may have in part led to ineffective behavior adoption (Czerniewska & White, 2020).

Through interviews with WASH actors, we found that fear of COVID-19 was susceptible to community apathy, due in part to inconsistent messaging from national response efforts. Participants believed that taking advantage of fear as a motivator could be effective in short term crisis situations, but that its use alone is not sustainable in the longer term. Fear can slowly subside because of apathy, or it can be extinguished because of political will. The political environment of Tanzania and Kenya had a significant influence on local NGOs ability to respond to the COVID-19 pandemic. Hand hygiene is a good example of this. In Tanzania after the divergence in government policy and funding, prioritization for hand hygiene was rolled back. This further led to decreased momentum in behavior adoption at the community level. However, as of March 2021 Tanzania had a new president and the political landscape changed yet again (Miriri & Obulutsa, 2021). Hand washing, and other WHO recommended COVID-19 prevention and control methods, have returned as a priority (Warah, 2021). But for behavior change to be effective it must be consistently maintained with little divergence in messaging (Mosler, 2012).

In Kenya, similar inconsistences in COVID-19 prevention and control messaging were described by participants. Hand hygiene moved from being top priority, during the preparation and initial acute phases of the pandemic, when there were few other preventative behaviors that an individual could engage in, to being a lower priority as fear wore off and attention and emphasis grew for other prevention and control methods (such use of face coverings and vaccine uptake). This in turn led to decreased community prioritization of hand hygiene, typified by community groups moving from making soap and other innovative hand washing materials to

instead sewing masks. The political narrative shifted, and hand hygiene moved down the prioritization totem pole.

The WASH sector must reflect on the successes and failures of hand hygiene promotion during the pandemic and find ways for improving widespread adoption of this critical behavior. Challenges with the use of fear as a motivator show that there is a need to use multifaceted approaches to behavior change. Formative tools are needed to assist responders in rapidly understanding crisis situations and to develop programing to fit local needs. Further, the prominent role of hand hygiene must be sustained. This can be achieved, in part, through the continued implementation and upkeep of public hand washing stations, which will continue to provide a nudge towards positive behavior. However, the pandemic showed there is a gap in guidelines and technical clarity on public hand washing stations. The sector must work together to fill this gap and regain the momentum for hand hygiene adoption.

Challenges of Monitoring and Evaluation

During the pandemic, WASH actors described being unable to collect M&E data and those that were able frequently only collected data on activities or inputs. This led to a systemic inability to assess the impact of response efforts on behavior. Participants described numerous challenges associated with M&E, including the fast-paced nature of the pandemic, safety concerns for staff and beneficiaries, inflexible and antiquated systems for data collection, a lack of standard indicators or guidance from coordination mechanisms and donors, as well as outside pressure or restrictions on data collection and dissemination from national governments. Together these internal and external factors led to the prioritization of program implementation activities over developing and executing COVID-19 M&E systems.

Participant discussion of factors internal to their organizations often started with statements that M&E was time consuming, challenging to do safely and effectively, and could not be realistically achieved in a crisis situation. During the preparation and initial acute phase of the pandemic, organizations had limited time to interact with beneficiaries due to government regulations (such as travel restrictions and curfews), the desire to quickly reach large groups of people with COVID-19 awareness education, and safety considerations for COVID-19 transmission between staff and beneficiaries. Further, most organizations still relied on paper based manual entry data collection methods or had only partially implemented electronic systems. This meant that adapting existing infrastructure or developing and implementing new tools could not be done quickly.

Factors external to the participant organizations also had a negative effect on M&E prioritization. Participants described not feelings supported by coordination mechanisms or donors in developing or enacting M&E systems. While WASH organizations did receive guidance on COVID-19 prevention messaging, and in some cases favored modalities for implementation, no participant was aware of COVID-19 hygiene related standard indicators or methods of data collection promoted by external stakeholders. This led to a need for each organization to individually develop their own COVID-19 M&E system, which as discussed above was often not prioritized or achieved. Further, in both Tanzania and Kenya organizations experienced external pressure from government authorities on data collection and dissemination. In Tanzania, this was due to threat of punishment for organizations who did not follow the governments' divergent policy that the country was COVID-19 free. In Kenya, the government advocated for centralized data collection and dissemination through national agencies which led to concern among WASH actors of collecting or reporting data which was not in line with

government statistics. Similar concerns related to the difficulty of monitoring and evaluating programing have been raised in past crisis situations by response actors (Casey, 2015; Ramesh, Blanchet, Ensink, & Roberts, 2015). However, some humanitarian organizations, that regularly operate in emergency situations, have found success in creating streamlined versions of development sector data collection strategies and standard indicators (Ratnayake et al., 2020; Ruby, Knight, Perel, Blanchet, & Roberts, 2015).

There were several notable successes, discussed by participants, related to M&E during the pandemic. Some organizations made the switch to using electronic or cloud-based data collection and analysis solutions, such as mWater (mWater, 2021) and M&E Cloud (MEC, 2022). Other participants described experimenting with remote methods of data collection such as via SMS or phone calls. The use of these new technologies was generally described by participants as being quick to set up and had functionality that could be expanded or contracted based on need. Several participants mentioned that their organization intended to continue to use these services after the pandemic, but that the price of the software and hardware required might be prohibitive.

Lessons learned from WASH actors in Tanzania and Kenya suggest that M&E needs to receive continued priority from individual organizations as well as the sector as a whole. Coordination mechanisms and donor organizations should lead the development of standardized indicators and data collection methods for future crisis situations. Further, we recommend that funding should be provided to allow the adoption and continued usage of computerized or cloud-based data collection and analysis solutions.

Strengths and Limitations

Past research in the WASH sector has largely focused on beneficiaries of WASH programs, government actors, or staff members from large multinational organizations (Dreibelbis et al., 2013; Ramesh et al., 2015), but we leveraged the voices of WASH actors from local NGOs in a marginalized part of the world to investigate how improvements can be made in sectoral pandemic preparedness. However, as interviews were conducted with mid- and senior-level staff members, important voices may have been omitted, including those from junior staff members who may be more involved with day-to-day operations and other stakeholders like program beneficiaries and the local government officials.

The study sample frame was initial generated with contacts of the research team and the COVID-19 Hygiene Hub. Additional contacts were identified from the members of four WASH coordination mechanisms. The first author is a member and active participants in two of these networks. These convenience and snowball sampling methods may have led to a study population which is not representative of the broader WASH sectors in Tanzania and Kenya. Additionally, as the research team are familiar with several of the participants this may have led to biases in their responses. However, it is also possible that the preexisting professional relationship with some of the participants may have allowed for more genuine and open discussions. Further, through engagement with coordination mechanisms and networks we were able to contact and recruit a diverse group of implementors from organizations across the WASH sectors of Tanzania and Kenya. Bringing to the forefront less heard voices in WASH sectoral discussions.

Participant recruitment and interviews took place while some WASH actors in Tanzania were under pressure to not openly discuss the COVID-19 pandemic. This led to some contacts

and participants to be openly concerned about their privacy. However, the research team followed strict data management procedures to protect the anonymity of the participants. These procedures were outlined to contacts during all initial communications and all participants voluntarily agreed join the study. Despite these efforts, it is possible that outside pressure led to bias in some participants responses or an inability to speak openly on certain topics, especially on contentious issues like government policy or COVID-19 response efforts. Despite this potential bias, we believe that the data collected during these extreme conditions is important to document and contribute towards academic and sectorial learning and reflection.

This study took place over six months during the COVID-19 pandemic. During this period the situation in both countries was in flux, with significant changes occurring in political and epidemiological conditions. This led to challenges when comparing responses from participants interviewed during different points in the study period. Initially, the research team had intended to interview each participant twice. Unfortunately, due to time constraints this was not possible. However, interviewing WASH actors at different points in their respective response efforts provided rich data on the spectrum of experiences during the pandemic.

Conclusion

The political climates in which WASH actors operate will continue to influence the ability to respond to public health challenges. The perspectives of WASH actors who responded to the COVID-19 pandemic in the divergent countries of Tanzania and Kenya can provide valuable insights to the WASH community. The political climate in which WASH actors operate will continue to influence the ability to respond to public health challenges. Now is the time to come together as a sector to reflect on the lessons learned during the COVID-19 pandemic in order to be better prepared for the next disease outbreak.

Public Health Implications

This study aimed to better understand programmatic decision making in a fast paced and high-stress outbreak situation where there was little precedent or evidence, and to prompt reflection within the WASH sector around how to better prepare for future outbreak situations. We achieved this by leveraging interviews from a case study of individuals at organizations in Tanzania and Kenya that were involved in coordinating, designing, and delivering hygiene programs during the COVID-19 pandemic. We conducted in-depth interviews with 21 individuals that met these criteria. We found that when comparing divergent responses to the pandemic key lessons can be learned which can be leveraged for greater adaptability to uncertain political climates. Further, we found that the initial phases of the pandemic were perceived by WASH actors in Tanzania and Kenya as being a potential turning point for the widespread adoption of hand hygiene. However, despite the initial population level increase of hand washing practices, momentum was lost as community fear dissipated and government priority changed. Finally, the prioritization of M&E and collection of data remains a key challenge for WASH actors in emergency situations.

This research engaged WASH actors who are underrepresented in academic research with the aim of learning about their distinct experiences in responding and adapting existing programing to the COVID-19 pandemic. Past research in the WASH sector has largely focused on beneficiaries of WASH programs, government actors, or staff members from large multinational organizations (Dreibelbis et al., 2013; Ramesh et al., 2015), but we leveraged the voices of WASH actors from local NGOs in a marginalized part of the world to investigate how improvements can be made in sectoral pandemic preparedness. Further, this study took place over six months during the COVID-19 pandemic. During this period the situation in both Tanzania and Kenya was in flux, with significant changes occurring in political and

epidemiological conditions. We believe that the data collected during these extreme conditions is important to document and contribute towards academic and sectorial learning and reflection.

It is important to learn from the experience of WASH actors in both Tanzania and Kenya to better prepare for future response efforts. Learning from two divergent responses is crucial for the WASH sector, as governments will likely continue to respond differently to future disease outbreaks, given the current political landscape. Despite the potential of different government outbreak responses, the WASH community will need to be adoptable and collectively gain the skills necessary to operate in any political climate. We recommend that further research be conducted by the WASH community to assess and plan how to best achieve this.

The WASH sector must reflect on the successes and failures of hand hygiene promotion during the pandemic and find ways for improving widespread adoption of this critical behavior. Challenges with the use of fear as a motivator show that there is a need to use multifaceted approaches to behavior change. Formative tools are needed to assist responders in rapidly understanding crisis situations and to develop programing to fit local needs. Further, the prominent role of hand hygiene must be sustained. This can be achieved, in part, through the continued implementation and upkeep of public hand washing stations, which will continue to provide a nudge towards positive behavior. However, the pandemic showed there is a gap in guidelines and technical clarity on public hand washing stations. The sector must work together to fill this gap and regain the momentum for hand hygiene adoption.

Lessons learned from WASH actors in Tanzania and Kenya suggest that M&E needs to receive continued priority from individual organizations as well as the sector as a whole. Coordination mechanisms and donor organizations should lead the development of standardized indicators and data collection methods for future crisis situations. Further, we recommend that

funding should be provided to allow the adoption and continued usage of computerized or cloud-based data collection and analysis solutions.

The perspectives of WASH actors who responded to the COVID-19 pandemic in the divergent countries of Tanzania and Kenya can provide valuable insights to the WASH community. The political climate in which WASH actors operate will continue to influence the ability to respond to public health challenges. Now is the time to come together as a sector to reflect on the lessons learned during the COVID-19 pandemic in order to be better prepared for the next disease outbreak.

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