

## Research Paper

# A socio-ecological perspective of the facilitators and barriers to uptake of water, sanitation and hygiene interventions in a slum setting in Kampala, Uganda: a qualitative study

Charles Ssemugabo, Abdullah Ali Halage, Carol Namata, David Musoke and John C. Ssempebwa

### ABSTRACT

We explored the facilitators and barriers to uptake of water, sanitation and hygiene (WASH) interventions among slum dwellers in Kampala, Uganda using a socio-ecological perspective. This qualitative exploration used focus group discussions with community members and key informant interviews with community leaders and technocrats to collect data. Among facilitators to uptake of WASH interventions were susceptibility to WASH-related diseases and low WASH knowledge levels at individual level, peer practices at household level, and promotion of WASH at organizational level. At community and public policy levels, community engagement and empowerment, and formation and enforcement of ordinances and bye-laws, respectively, motivated slums dwellers to adopt WASH interventions. Conversely, individual knowledge, beliefs, language, and financial status inhibited individuals from taking up WASH interventions. Negative peer practices and upbringing at peer level; unsupportive environments, and engagement of communities at organizational level; cultural beliefs and lack of space at community level; and unexamplary leaders and political interference barred slum dwellers in Kampala from embracing the WASH interventions. Uptake of WASH interventions in the slum community is influenced by a cascade of facilitators and barriers across the socio-ecological realm. Hence, a multi-faceted approach targeting all stakeholders is required in planning and implementation of WASH interventions.

**Key words** | beliefs, community health workers, community leaders, neighbours' practices, perceived susceptibility

Charles Ssemugabo (corresponding author)

Abdullah Ali Halage

Carol Namata

David Musoke

John C. Ssempebwa

Department of Disease control and Environmental Health, School of Public Health, Makerere University College of Health Sciences, Kampala, Uganda

E-mail: cssemugabo@gmail.com

### BACKGROUND

The water, sanitation and hygiene (WASH) situation worldwide and specifically in slum communities is

alarming. Over 2.6 billion people do not have access to improved latrines, and 1.1 billion people have no access to any type of improved drinking water source (UN Habitat 2019). The situation is worse in slums where the ever growing population has to share the insufficient and poorly managed facilities. Due to rapid unplanned urbanization

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doi: 10.2166/washdev.2020.124

in many sub-Saharan countries and specifically Uganda, the majority of urban residents live in slums often characterized by lack of basic WASH services (O'Connor *et al.* 2019). Consequently, this results in sanitary practices and contamination of water sources (Ssemugabo *et al.* 2019). In Uganda, the urban poor in Kampala slums experiences severe outbreaks of cholera and typhoid regularly. In fact, over 11,000 cases resulting in 61–182 deaths from cholera occurred in Kampala in 2013 (Bwire *et al.* 2013). As such, intervention efforts aimed at improving WASH behaviors and practices, and consequently reduce the risk of contraction of diarrheal diseases have been implemented in Kampala slums.

Several efforts have indeed been implemented to improve WASH behaviors and practices in Kampala slums. The Ministry of Health of Uganda in 2001 established the Community Health Workers (CHWs) program to promote WASH within communities (Ministry of Health 2010). Government agencies including Kampala Capital City Authority (KCCA), and Makerere University and non-governmental organizations like Community Integrated Development Initiative (CIDI) have supported communities with sanitation utilities and sensitization campaigns among others (Musoke *et al.* 2018). However, WASH practices are still poor (Musoke *et al.* 2018; Ssemugabo *et al.* 2019). Despite the fact that WASH interventions are expected to yield good WASH behaviors and practices (Tannahill 2009; Wasonga *et al.* 2014), some literature has revealed that low knowledge levels on WASH often have no effect on hygiene attitude and practices (Sibiya & Gumbo 2013).

There are indeed other factors that affect uptake of WASH interventions in Kampala slums. WASH intervention uptake might be due to interrelated multi-level factors including physical (Firdaus 2012), sociocultural (Wasonga *et al.* 2014), economic, and political (Gleaton 2012) issues. However, there is limited evidence on how these factors interact and affect uptake of WASH interventions in slums. Thus, we used the socio-ecological model (SEM) to explore how and why some communities have adopted the WASH interventions and others have not. The model has five aggregate levels that unpack motivators and barriers to uptake of WASH interventions (McLaroy *et al.* 1988). At individual level, the SEM explains the biological and personal

experiences that increase the likelihood of uptake of WASH interventions. At household/interpersonal level, SEM examines close relationships that may increase or reduce uptake of WASH interventions. At the third level, SEM focuses on organizations within the community whose efforts support or oppose uptake of WASH interventions. At community level, the model looks at the settings in which WASH behavior and practices occur and identify characteristics that might promote or hinder their uptake. At policy level, we used the SEM to explore broader societal factors that can create an enabling environment for WASH uptake and vice versa.

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## METHODS

### Study design

This was a qualitative study that collected data from nine key informant (KIs) and five focus group discussions (FGDs). KIs were deliberately selected based on their expertise and experience while FGD participants were selected based on their WASH behaviors and practices. KIs included two health workers from Rubaga Division, a local leader and a CHW from each of the six participating zones. The FGD participants were household heads and/or their spouses who were directly affected by WASH challenges. Three FGDs were conducted with females and two with males. Each FGD was composed of seven to twelve participants.

### Study setting

This study was conducted in six out of the nine zones of Kasubi slum in Kampala, the capital city of Uganda. A slum is defined as a heavily populated urban formal settlement where inhabitants are characterized by substandard housing and low standards of living (Nolan 2015). Kasubi Parish comprises mainly informal and substandard housing and a few businesses. We selected Kasubi slum because many interventions have been implemented yet the WASH situation has not greatly improved.

## Data collection and guides

KIs were invited to participate in the study by the principal investigator through an invitation letter sent a week before the interview while FGD participants were screened by CHW for eligibility a day prior to the meeting. Prior to the interview and group discussion, the participants were introduced to the purpose of the interview and FGD, respectively. Written informed consent was obtained. Semi-structured guides developed by the study team were employed to explore facilitators and barriers to uptake of WASH interventions. The guides were translated to the local language (Luganda) and translated back to English for accuracy. The guides were piloted with community members in Mulago Parish, a slum community in Kampala. The group discussions were moderated by public health specialist Charles Ssemugabo (CS), supported by a community resource person Kule Ayesimwe (KA) and a research assistant who recorded the proceedings of the discussion. The KIIs were conducted by public health specialists CS, Jimmy Osuret (JO), and Tonny Ssekamatte (TS). Each FGD lasted 60–90 minutes while KIIs lasted 20 to 30 minutes. FGDs were conducted until saturation. All KIIs and FGDs were audio recorded.

## Data management and analysis

The audio recordings were transcribed verbatim and translated to English by two experienced researchers fluent both in English and Luganda. Two people read the transcripts and assigned meaning units to each response which were later combined to form a code book. Data were entered into ATLAS ti software version 7.0 for coding. Analysis was carried out using directed content analysis (Assarroudi et al. 2018). We used the SEM as a guiding framework to identify recurrent themes and subthemes by categorizing the codes.

## Ethics considerations

We obtained ethical approval from the Makerere University School of Public Health Higher Degrees, Research and Ethics Committee (101). The study was also approved by Uganda National Council of Science and Technology

(HS 867). Study participants provided written informed consent.

## RESULTS

The findings are organized and presented based on the five levels of the socio-ecological model as shown in (Figure 1), with facilitators presented first.

### Facilitators to uptake of WASH interventions

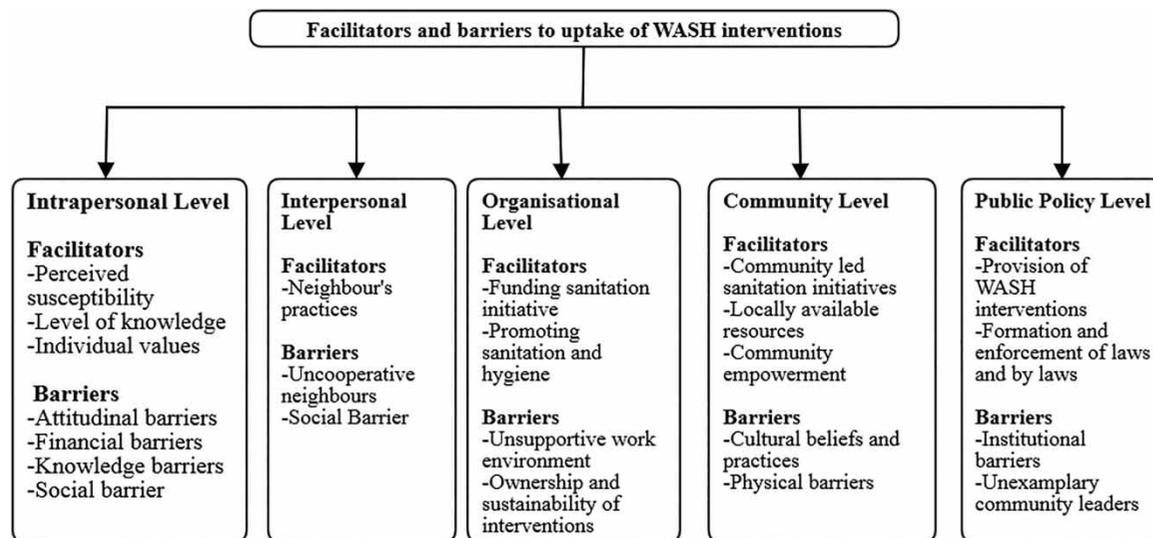
#### Intrapersonal level

*Perceived susceptibility:* Fear of disease and the law was identified as a facilitator for uptake of WASH interventions among slum dwellers. Community members observed that during disease outbreaks people adopted WASH interventions including boiling drinking water and washing hands at critical times to avoid contracting diseases. Also, KCCA's solid waste (SW) ordinance penalizes those indiscriminately disposing of waste. Enforcement of the ordinance facilitated proper disposal of SW in the slums.

*'People have been triggered to observe good sanitation and hygiene practices by the typhoid outbreak. People are scared of contracting the diseases and as a result, they have started boiling drinking water and washing hands.'* (CHW, Kasubi Zone 2)

*Level of knowledge:* Community members revealed that sensitization campaigns had improved members' knowledge on WASH practices. Through these programs, people had learnt how to: sort waste into different categories; make charcoal; and keep their homes clean, among others. WASH knowledge improved people's desire to live and maintain a clean environment.

*'We are taught how to sort waste into plastics, metallic items, [...], and how to use it to make charcoal. We want to keep our homes in a hygienic situation, stay healthy and generate energy resources that can help us.'* (Community member, Kasubi Zone 1)



**Figure 1** | Facilitators and barriers to uptake of WASH interventions using the social ecological model.

*Personal values*: Personal values also facilitated uptake of proper WASH practices in slums. Values inculcated in community members during childhood were cited to facilitate WASH interventions were easy to adopt.

*'I was brought up in a family that prioritizes sanitation and hygiene. Over time, I have tried to maintain sanitation and hygiene habits inculcated in me.'*  
(Community member, Kasubi Zone 3)

### Interpersonal level

*Neighbor practices*: Neighborhood practices such as reuse of solid waste facilitated uptake of WASH interventions. Community members said that they were motivated by their colleagues who used food peelings to make charcoal and to feed animals, as well as cow dung as fertiliser, which inspired them to collect their waste for reuse.

*'My neighbours use the food peeling for feeding their animals and making charcoal for cooking. This has motivated me to reuse my waste hence reducing the amount of waste collected in the community.'* (Community member, Kasubi Zone 3)

### Organizational level

*Funding sanitation initiatives*: Funding sanitation initiatives including construction of drainage channels and public toilets/latrines, protecting springs, among other things, were identified as motivators for uptake of WASH interventions. Several community-based organizations (CBOs) including Community Integrate Development Initiative (CIDI) and Living Earth were funding sanitation initiatives in slums.

*'CIDI, Caritas, and Living Earth have previously funded construction of drainage channels, public toilets/latrines, protected springs among others. This has brought WASH services close to people and hence improved access and use of these services.'* (Community member, Kasubi Zone 2)

*Promoting sanitation and hygiene*: CHWs said that they have been working with organizations such as Living Earth, Makerere University School of Public Health (MakSPH), and Stanbic Bank to educate people on different WASH issues. This increased community knowledge and skills, and resulted in uptake of WASH interventions.

*'Living Earth has previously been engaged in cleaning drains and mounting posters warning against dumping SW in certain places. They also sensitized and encouraged people to take up sanitary behaviors.'* (CHW, Kasubi Zone 4)

### Community level

**Community-led sanitation initiatives:** Routine clean-up campaigns organized by the community facilitated uptake of WASH interventions. During these campaigns, members came together and engaged in collecting SW, cleaning drainage channels, and sensitized each other on WASH.

*'We gather once a month to clean drainage channels and empty pit latrines such that authorities do not close down our facilities/premises. Majority of the slum dwellers collect the waste and put it in one place where trucks for the local authority can collect it while other bring equipment for cleaning.'* (Health worker, Lubaga Division)

**Locally available resources:** Willingness of members in the community to offer land for construction or accommodation of WASH facilities has also eased uptake of WASH services. Some people had provided space for construction of public toilets while other supported their maintenance.

*'Some people are willing to provide space for the construction of sanitary facilities. In my zone, some people had pledge to hire people to maintain the sanitary facilities.'* (CHW, Kasubi Zone 1)

**Community empowerment:** Formation of WASH promotion committees in the different zones of Kasubi parish have facilitated the uptake of WASH interventions. These committees have worked with the communities and empowered them to promote WASH.

*'We formed sanitation committees in every zone in Kasubi. The committees work with and empower the community to promote WASH.'* (Health worker, Lubaga Division)

Empowering CHWs through increased trainings in WASH have facilitated its uptake. CHWs advise households on

proper WASH behaviors and practices. They sensitize community members on WASH and mobilize them for clean-up events.

*'Training us in WASH promotion and community empowerment approaches has greatly strengthen uptake of WASH interventions in Kasubi. We have used the community empowerment approaches to promote uptake of WASH interventions.'* (CHW, Kawaala Zone 1)

### Law and public policy level

**Provision of WASH services:** Provision of WASH services such as waste collection containers and latrine emptying services has promoted use of WASH services. KCCA provided SW collection containers, sisal bags, and cesspool emptiers to Kasubi slum. WASH utilities have increased individual responsibility to replace the sacks that get worn out.

*'Provision of sisal bags for SW collection motivated slum residents. When the sacks got old, the residents find all possible ways of acquiring new sisal bags.'* (Local leader, Kasubi Parish)

**Formation and enforcement of law and bye-laws:** Formation of ordinances and bye-laws by the local authorities also facilitated uptake of proper WASH practices. The ordinances and bye-laws at division and zone level highlight the different punishments or fines to be met by the offenders. These regulations were reported to reduce the volume of waste disposed of indiscriminately within the parish.

*'The KCCA ordinance against SW management subjects to a fine of 30USDs or three months in prison or both to people who indiscriminately dispose of their waste. At Zonal level, bye-laws that require all community members to clean their homes, work places and surroundings every last Saturday of the month were passed.'* (CHW, Kasubi Zone 2)

Law enforcement by KCCA also motivated members to take up WASH interventions. KCCA through their enforcement unit have been apprehending people who do not comply with the law. Some people have been taken to court while

others' structures have been demolished. This influenced people's decision to change.

*'We apprehend people who are stubborn and don't comply with the law. Some of them have listened and do what we require of them.'* (Health worker, Lubaga Division)

## Barriers to uptake of WASH interventions

### Intrapersonal level

*Attitudinal barriers:* Attitude was identified as a barrier to uptake of WASH interventions among slum dwellers. Many slum dwellers have been drinking untreated water for a long time. As such, they feel secure and safe to rely on unboiled water.

*'Some slum dwellers have been taking unboiled water for a long time, as such it is difficult to convince them treat their drinking water.'* (Health worker, Lubaga Division)

*Financial barriers:* Financial barriers were also found to hinder uptake of WASH interventions. People want to live in a clean and safe environment but could not afford to pay for the required utilities and services. Most of the slum residents earned a small salary, yet they have to provide for their families.

*'We do not have money to buy sacs to store SW.'* (Community member, Kawaala Zone 2)

Some people living in the slum communities are tenants. They can move any time, and as such are less concerned with WASH issues affecting the community.

*Knowledge barriers:* The majority of the slum dwellers do not have adequate knowledge of WASH issues and hence exhibit poor WASH practices. Some were called to participate in community clean-up campaigns and refused because they do not value living in a clean environment.

*'Sometimes you call people to clean but they refuse because they do not know the consequences of living in unhygienic environments.'* (Community member, Kasubi Zone 1)

*Social barriers:* Some slum dwellers did not change their behaviors because of failure to understand the language of communication used in sanitation campaigns.

*'Some people do not change because sensitization programmes are delivered in languages they do not understand.'* (CHW, Kawaala Zone 2)

### Interpersonal level

*Uncooperative peers:* Uncooperative neighbors led to relapse in the uptake of WASH interventions. Unsanitary behaviors such as littering the neighborhood, soiling shared latrines, among others, deterred others from observing proper sanitation practices.

*'Our toilets are shared by a number of households. Every time I clean, my neighbours urinate around the squat hole. This demotivates me.'* (Community member, Kasubi Zone 1)

*Social barriers:* Upbringing practices also prevented slum dwellers from abandoning their unsanitary behaviors in slum communities. Some people did not boil drinking water, poured urine in drainage channels, and were not offended by children's feces because of their upbringing.

*'There are some people whose behaviors are not suited for the community because of their upbringing practices. If a child defecates around the house, they do not recognize that it is important to remove the feces immediately. They continue to prepare food in the presence of the feces.'* (CHW, Kasubi Zone 1)

Another social barrier to uptake of WASH interventions at interpersonal level was domestic violence. Violence against women including marital or spousal rape has devastated them and thus they abandon their role of promoting sanitation in the home.

*'You cannot expect a household to promote sanitation and hygiene when there is domestic violence. Marital rape for instance takes away the happiness in the home and women always live under pressure.'* (CHW, Kawaala Zone 2)

## Organizational level

*Unsupportive work environments:* CHWs who were charged with the role of promoting WASH in the communities were working in unsupportive environments. Despite being volunteers, they lacked information, education and communication (IEC) materials, and other necessities such as gumboots, gloves, and personal protective equipment. CHWs also had other responsibilities that they are supposed to meet, such as family needs.

*'You cannot expect CHWs to leave their home and come to clean the road, yet after that other people are going to throw rubbish where they have cleaned.'* (Community member, Kasubi Zone 3)

*Ownership and sustainability of interventions:* Lack of ownership and sustainability of WASH interventions also stood out as barriers for slum dwellers. Community members are often not involved in the planning and design of WASH interventions and thus they are not based on community needs. Hence, the community members do not develop a sense of ownership to the WASH interventions and consequently are not obliged to maintain them.

*'We have had a number of projects aimed at improving the hygiene and sanitation in this slum. However, these projects don't involve the community in planning to identify their most urgent needs but rather implement what they think the community needs.'* (CHW, Kasubi Zone 3)

## Community level

*Cultural beliefs and practices:* Cultural beliefs and practices greatly hindered the uptake of interventions. It was elicited that slum dwellers come from several ethnic backgrounds. Different ethnic groups have different beliefs that affect WASH.

*'Some cultures even prohibit pregnant women from using latrine facilities with the belief that the fetus may drop as she squats to use a latrine facility.'* (Parish chief, Kasubi Parish)

*Physical barriers:* Lack of space to construct sanitary facilities and type of settlement also hindered the uptake of WASH interventions among slum dwellers. CBOs bring interventions to the community but fail to start due to lack of space to station them. Lack of space is compounded by overcrowding, thus giving rise to improper sanitation infrastructure.

*'CBOs bring interventions to this community but we fail to find places to station them especially now that this is a slum area. Finding a small space that someone can sacrifice for construction of the toilet is very difficult.'* (CHW, Kasubi Zone 2)

## Laws and public policy level

*Institutional barriers:* Weak law enforcement as a result of political interference was a major barrier. Some politicians interfere with the work of KCCA. Local leaders who are charged with the enforcement of rules and regulations ask for money from culprits that the community presents to them.

*'When apprehending non-complaint individuals in the community the major challenge we face are politicians. However, the law is in place and we have tried to implement it but the interference is still a challenge.'* (Health workers, Lubaga Division)

Inefficient performance in provision of WASH services by KCCA officials has also hindered uptake of interventions. When the latrines are filled up, the local authority does not provide enough septic tank emptiers for the slum communities and this results in release of fecal matter into drainage channels.

*'KCCA usually announces on a public address system that they are going to empty our latrines at a fee of 60,000 Ugandan shillings (20 US dollars). However, their vehicles get filled up quickly without emptying all the latrines.'* (Community member, Kasubi Zone 1)

*Unexamplary community leaders:* Community leaders' failure to observe the required WASH practices was also a

barrier to intervention uptake among slum dwellers. Some leaders dispose SW and release wastewater into drainage channels. Community members also reported that some local leaders did not engage in community WASH activities including clean-up campaigns.

*‘Our leaders also have to do what is expected of them. Sometimes they set days for cleaning but on such days they do not engage themselves in the cleaning and also do not show up on the scene.’* (Community member, Kasubi Zone 1)

## DISCUSSION

Our findings demonstrate that susceptibility to sanitation-related diseases, level of knowledge and values motivated individuals to adopt sanitation interventions. However, attitudes and cost of sanitation services hinder individuals from maintaining proper sanitation practices. Neighbors’ practices motivate, but on the other hand, hinder uptake of sanitation interventions. Social issues such as domestic violence were also found to hinder uptake of WASH interventions at an interpersonal level. Organizations that fund and promote sanitation and hygiene in resource-limited communities fast-tracked uptake of WASH interventions while unsupportive work environments and ownership of interventions stifle them. At a community level, while community-led initiatives, locally available resources, and community empowerment facilitated uptake, beliefs and practices, and physical limitations hindered them. Ultimately, at policy level, provision of services and formation and enforcement of laws motivated communities to practice WASH interventions. However, corruption and unexemplary leaders were a challenge.

Individual susceptibility to WASH-related diseases and sanitation-related laws and ordinances was a great driver to adoption of appropriate WASH practices in slums. Indeed, treating diarrheal diseases is quite costly, especially in low-resource settings in Kampala (Hutton & Chase 2016). As demonstrated in the health belief model, an individual’s belief that they are susceptible to a given condition triggers them to take preventive action (Jones *et al.* 2015). Slum communities in Kampala, Uganda have been hit by several

cholera and typhoid outbreaks over the years (Bwire *et al.* 2013). These outbreaks have triggered slum dwellers to treat their drinking water and wash their hands at critical times. Our findings are similar to those from a study that assessed uptake of preventive interventions such as physical activity (Boulton *et al.* 2018). However, they disagree with studies that focus on uptake of clinical interventions such as screening for medical conditions where people might be afraid of the outcome of the screening tests (Marmarà *et al.* 2017).

Knowledge was identified as a key facilitator but also as a barrier to uptake of WASH interventions in Kampala slums. Awareness of the efficacy of preventive WASH interventions in Kampala slums could be attributed to an individual’s education level and sensitization campaigns. On the other hand, some slum dwellers do not believe in the efficacy of WASH interventions due to their low levels of knowledge. Several studies have highlighted knowledge as a key factor in the willingness of individuals to participate in health interventions (Balami *et al.* 2019; Mishra *et al.* 2019). This demonstrates the need for WASH interventions to empower communities with adequate knowledge in order to make the right choices for WASH behaviors and practices, especially in such resource-limited settings.

Social issues including beliefs and values were found to play a substantial role in the uptake of WASH interventions at individual, peer, and community level. Slum communities are usually inhabited by people from diverse backgrounds with different values and beliefs. These beliefs and values shape slum dwellers’ ability to appreciate and take up sanitation interventions. Among these is the language barrier that at times limits some slum dwellers from comprehending WASH-related messages. In addition, while some individuals or communities might find it shameful and disgusting to release fecal sludge in drainage channels (Lawrence *et al.* 2016), this practice might be acceptable to others. In fact, some individuals or communities might also think that nothing can be done to avert the health consequences related to inappropriate WASH practices (Massie & Webster 2013). A study carried out in the same settings on cleaning of shared toilets found beliefs had positive and negative influence on sanitation practices (Tumwebaze & Mosler 2014). Our findings demonstrate the need for

WASH promotion interventions to identify and address the existing values and beliefs.

Organizations funding WASH projects within slum areas were found to facilitate uptake of interventions in these settings. Availability of WASH services is expected to increase access to WASH services and consequently improve their WASH status. Our findings corroborate with findings from an evaluation of a community-led total sanitation project in India (Barnard *et al.* 2013) although this impact has also been found to be modest (Garn *et al.* 2017). Conversely, our study revealed that many families cannot afford sanitation utilities such as latrine emptying services, SW collection fees among other. For example, on average, the cost of cesspool emptying services in Uganda ranges from US\$24.4 to 32 (Pieter van Dijk *et al.* 2014). Many households in the slums cannot afford to pay US\$24.2 for a cesspool emptier and, as such, release fecal sludge into the drainage channels. Financial constraints to uptake of sanitation interventions have been reported in a similar study carried out in Kigali, Rwanda (Tsinda *et al.* 2013). Therefore, in order to ensure uptake, WASH interventions deployed in slum settings should be affordable.

The social learning theory emphasizes that individuals learn by observing others and the benefits of their actions (Rimer & Glanz 2005). In our study, neighbors that exhibited proper WASH practices, such as recycling of waste, motivated their peers to practice proper SW management. Our findings are similar to those of a systematic review which found group cohesion and peer pressure as very effective in WASH behavior change (Yates *et al.* 2018). Contrarily, neighbors that exhibited poor WASH practices demotivated their peers to practice proper WASH interventions. In fact, unexemplary community leaders also demotivated slum dwellers. Community leaders play a big role in changing community behaviors and promoting uptake of WASH interventions (Greaves *et al.* 2009). Our findings imply that improvement in slum communities' WASH status requires a collective effort endorsed and adopted by all community members including their leaders.

Community empowerment is very central to key community development programs such as WASH (Laverack 2001). The use of locally available resources such as CHWs and formation of WASH promotion committees at zone (village) level demonstrates efforts to empower slum

communities to make proper WASH choices. This is expected as community members usually feel accountable when they are involved in the planning and implementation of interventions. Our findings are similar to those from studies carried out in urban communities in Paris, France and Tanzania which highlight self-organizing and good relationships with inhabitants as a key factor in ensuring sustainability of WASH interventions (Chaudhuri 2017; Madon *et al.* 2018). In fact, de Snyder *et al.* (2011) emphasize that social inclusion of all stakeholders is essential in designing health promotion interventions. This demonstrates the need for organizations working in the WASH arena in Kampala slums to work with communities as facilitators while the community takes the lead.

Our study also revealed that lack of space for construction of WASH facilities in Kampala slums hindered uptake of interventions. Slum settings in Kampala are usually overcrowded with limited space for construction of proper or good sanitation facilities. According to Tannahill's pillars of health promotion, awareness of proper practices without availability of proper WASH facilities does not often promote healthy choices (Tannahill 2009). Several studies have highlighted insufficient physical space in slums as a challenge to promoting health in slum communities (Corburn & Sverdlik 2017; Yeasmin *et al.* 2017). This is a strong limitation to WASH promotion in slum communities in Kampala that must be taken seriously while planning and implementing interventions in such settings.

It was also revealed that availability and enforcement of laws and regulations facilitates or motivates uptake of WASH interventions in slum communities in Kampala. The Tannahill model highlights that, in order to ensure health promotion, awareness and availability of interventions must be accompanied with laws or penalties to those who might fail to abide by them (Tannahill 2009). In fact, laws have also been emphasized as important in building a competent health workforce and ensuring good governance for health (Marks-Sultan *et al.* 2016). However, laws that govern WASH are at times weak or poorly enforced and abused by the authorities as highlighted in our findings. This hinders uptake of interventions, especially in resource-limited settings. Therefore, there is the need to strengthen existing WASH laws and policies and ensure adequate implementation.

This study truly reflects the facilitators and barriers to uptake of WASH interventions given that sufficient time was allowed between the interventions and this assessment. Thus, we can authoritatively describe uptake of the interventions. However, the study looked at a broad range of WASH interventions, so it is difficult to attribute a specific facilitator or barrier to a specific intervention.

## CONCLUSION

Uptake of WASH interventions in slum communities is influenced by a cascade of facilitators including individual perceived susceptibility, knowledge and values, peer practices community empowerment and resources, funding and enforcement of bye-laws. Barriers such as community members' knowledge and attitudes, cost of WASH utilities, uncooperative neighbors, lack of space for sanitary facilities, lack of community involvement, and failure to enforce bye-laws were also said to affect uptake of WASH interventions as we move from individual to policy/national level. Facilitators and barriers to uptake of WASH interventions are multi-faceted and, as such, require a multi-level and multi-stakeholder approach in their planning, designing, and implementation in slum communities in Kampala.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge Stanbic Bank Uganda Ltd which funded this study. Special thanks also go to TS, JO, and KA who participated in collection of data.

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First received 26 September 2019; accepted in revised form 20 February 2020. Available online 20 April 2020