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Kiyamia Keili Date

Facilitators and Barriers Experienced by Environmental Cleaning Staff in Health Care Facilities in Uganda

By

Kiyamia Keili

Master of Public Health

Hubert Department of Global Health

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Joanne A. McGriff, MD, MPH, JM
Committee Chair

_____

Richard Mugambe, PhD
Committee Member

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Kiyamia Keili

Bachelor of Science in Psychology
Indiana University-Purdue University Indianapolis (IUPUI)
2018

Thesis Committee Chair: Joanne A. McGriff, MD, MPH, JM

An abstract of
a thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Facilitators and Barriers Experienced by Environmental Cleaning Staff in Health Care Facilities in Uganda
By Kiyamia Keili

Background: Health care-associated infections (HCAIs) are a major contributor to morbidity and mortality globally, with a higher burden on developing countries. However, HCAIs can be prevented with proper infection prevention and control (IPC) interventions, including environmental cleaning of the health care facility (HCF). Environmental cleaners play a significant role in the maintenance of HCF cleanliness, but their experiences and the factors influencing their work practices are not well-documented, especially in low-resource HCFs. Therefore, this qualitative study seeks to understand the barriers and facilitators that influence cleaning practices of cleaners in HCFs in urban Uganda.

Methods: Key informant interviews were conducted in nine health centres, in the greater Kampala metropolitan area, with 12 heads of cleaning staff or their assistants. The interview data was analyzed using MAXQDA and themes were identified through multiple rounds of coding.

Results: Themes were categorized as barriers or facilitators and organized using the Person-Environment-Occupation Model (PEO) of Occupational Performance (Law et al, 1996). Barriers to proper cleaning practices included lack of appreciation, poor waste segregation practices by other staff, low availability of cleaning supplies, patients' behaviors, cleaning frequency, and high workload. Facilitators included access to income, appreciation from other staff, sufficient water supply, provision of IPC trainings, adequate waste disposal infrastructure, health workers positive contributions, and sharing of cleaning responsibilities.

Discussion: These barriers and facilitators highlight the point that regardless of how motivated cleaners may be to perform their jobs, without the support of supervisors and health workers environmental cleaning may not be performed according to IPC standards and protocols.

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INTRODUCTION

Health care-acquired infections (HCAIs) are a major burden on health systems globally. HCAIs, also known as nosocomial infections, are infections contracted by patients while receiving care in a health care facility (Nejad et al, 2011). It is important to note that these infections are absent before the patient's visit or admission to the facility. Affecting millions of people annually, HCAIs are prevalent in both developing and developed countries at varying rates. The prevalence in developed countries ranges from 3.5% to 12% compared to 5.7% and 19.1% in developing countries or low-resource settings (World Health Organization (WHO), n.d.). In sub-Saharan Africa specifically, the prevalence has been estimated, with the limited data available, to range from 2% to 49%, with a prevalence of 28% in Uganda (Mbim et al, 2019).

Irrespective of prevalence, HCAIs have dire consequences for both patients and health care systems. First, HCAIs result in increased mortality and morbidity and longer length of stay (LOS) in health care facilities (Cosgrove, 2006). WHO (n.d.) estimates that between 4% and 56% of deaths in newborns in developing countries, are caused by these infections. Secondly, affected patients incur higher costs of care that not only results from longer LOS, but also from additional treatment regimen, diagnostic tests, and more (De Angelis et al, 2010). Multiple studies have found that patients who acquired infections from health facilities incur much higher costs than patients who have not, with one study estimating that the cost associated with HCAIs for affected patients is about 2.8 times higher than in the absence of HCAIs (De Angelis et al, 2010). However, patients are not the only entities affected since health care systems also incur financial costs from various HCAIs. For instance, Zimlichman et al (2013), estimated an annual total cost of $9.3 billion on the U.S. health care system from HCAIs, so addressing the transmission of these infections benefits both patients and health care systems globally.

The negative impact of HCAIs, however, can be mitigated. Transmission of HCAIs is reducible and about 50% of incidences are preventable with the proper interventions (Zimlichman et al, 2013). According to Fernando et al (2017), the most common contributing factors to transmission include the practices of health care staff and the overall cleanliness of the hospital environment. Particularly in low resource settings like Uganda, high risk factors include poor hand hygiene and environmental cleanliness, overcrowded spaces, lack of proper infection prevention and control strategies in facilities, and inadequately trained staff on infection prevention and control, among others (Mbim et al, 2019; WHO, n.d.). These are factors that can be prevented or eliminated in several ways, including the training of staff on proper infection control precautions, practicing proper hand hygiene, and adequate cleaning of the facility (Mbim et al, 2019; Fernando et al, 2017).

The prevention measures mentioned above are embodied in infection prevention and control (IPC) programs, which are a key component in addressing the prevalence of HAIs in health care facilities. A well-established and effective IPC program includes guidelines on proper hand hygiene as well as environmental cleaning standards and protocol, among others (CDC & ICAN, 2019; WHO, n.d.). While hand hygiene has received a great deal of attention as a key practice for the reduction of infection transmission, the role of environmental cleaning has not received as much attention especially in low-resource settings (Fernando et al, 2017; Dancer, 2010).

A further examination of environmental cleaning is important because some studies, in both high-income and low-income countries, have found that pathogens responsible for the transmission of HCAIs, such as Clostridium difficile, are often found on surfaces around the patient's surroundings, and these include the medical equipment used for care, the bed, curtains,

and more (Han et al, 2015; Fernando et al, 2017; Mbim et al, 2019). The pathogens on these surfaces can then be transmitted to the patient through direct contact or indirectly from health care staff (Han et al, 2015). The literature also implies that the likelihood of infection for an uninfected patient increases significantly when that patient is admitted to a room that was previously occupied by another patient who had an infection (Ogunsola & Mehtar, 2020). So, it is vital to address the patient's environment when developing IPC programs that seek to reduce or eliminate HCAI incidence in low-resource settings.

As important as environmental cleanliness is in reducing the burden of HCAIs, it is not always an automatic process and it requires the right resources to achieve proper IPC cleaning standards. One such key resource is the environmental cleaning staff at health care facilities who play a significant role in disinfecting and maintaining the cleanliness of the health facility environment. However, even with their important contribution in the reduction HCAIs, the perspectives of cleaning staff in the healthcare facilities, especially those in low-resource settings like Uganda, has not been studied much and little is known of the challenges experienced by cleaning staff in these settings. Given the relationship between environmental cleanliness and transmission of HCAIs, being aware of factors influencing the work of cleaning staff can help HCFs identify problem areas that could contribute to the transmission of HCAIs in patients.

Therefore, the purpose of this project is to examine environmental cleaning in health care facilities (HCF), as it relates to health care-acquired infections (HCAIs), from key informant interviews conducted with environmental cleaning staff in the greater Kampala metropolitan area (GKMA) in Uganda. Specifically, this study seeks to investigate the following research question: what are the facilitators and barriers that influence the cleaning practices of environmental cleaning staff in HCFS in the GKMA, Uganda?

Chapter 2: Manuscript

Facilitators and Barriers Experienced by Environmental Cleaning Staff in Health Care Facilities in Uganda

By Kiyamia Keili[1], Richard Mugambe[2], Joanne A. McGriff[1]

[1] Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, USA 30329

[2] School of Public Health, Makerere University, Kampala, Uganda

Contribution of Student

The data was collected by Dr. Richard Mugambe and his team at the Makerere University School of Public Health in Uganda, and I conducted analysis of the data using MAXQDA. Additionally, I wrote every chapter of the thesis and manuscript while Dr. Joanne McGriff and Dr. Mugambe provided feedback and edits on the written drafts.

Abstract

Health care-associated infections (HCAIs) are a major contributor to morbidity and mortality globally, with a higher burden on developing countries. However, HCAIs can be prevented with proper infection prevention and control (IPC) interventions, including environmental cleaning of the health care facility (HCF). Environmental cleaners play a significant role in cleanliness of the HCF, but the factors influencing their work are not well-documented, especially in low-resource settings. Therefore, this study seeks to understand the barriers and facilitators cleaners face in HCFs in urban Uganda. Key informant interviews were conducted in nine health centres, in the greater Kampala metropolitan area, with 12 cleaning heads or their assistants.

Identified barriers and facilitators were organized using the Person-Environment-Occupation model of Occupational Performance. Barriers included lack of appreciation, poor waste segregation practices, low availability of cleaning supplies, patients' behaviors, cleaning frequency, and high workload. Facilitators included access to income, appreciation from other staff, sufficient water supply, IPC trainings, adequate waste disposal infrastructure, health workers positive contributions, and sharing cleaning responsibilities. These factors highlight the point that regardless of how motivated cleaners may be to perform their jobs, without the support of supervisors and health workers environmental cleaning may not be performed according to IPC standards.

Keywords: Environmental cleaning, health care-associated infections (HCAIs), cleaners, barriers to cleaning, facilitators to cleaning, low-resource settings, infection prevention and control (IPC)

I. Introduction

Health care-associated infections (HCAIs) are a major source of mortality and morbidity worldwide. These infections are acquired by patients in various health settings during the process of being treated and cared for, and they have significant consequences for patients (Nejad et al, 2011). HCAIs not only increase the rate of mortality and morbidity in patients, but also result in longer length of stay in hospitals and higher costs of care for both patients and health systems (Cosgrove et al, 2006; De Angelis et al, 2010). While it affects all nations, the highest burden of HCAIs is shouldered by developing countries where prevalence falls between 5.7% and 19.1% compared to a range of 3.5% to 12% in developed countries (World Health Organization (WHO), n.d.). Within the region of sub-Saharan Africa, the prevalence is estimated to range from 2% to 49% given limited data, and in Uganda specifically, the prevalence is about 28% (Mbim et al, 2019).

Despite the varying prevalence, a large percentage of HCAIs are preventable with the implementation of effective infection prevention and control (IPC) measures (WHO, n.d.). Of the eight core components of IPC identified by WHO, hand hygiene and cleanliness of the patient's environment are the most important prevention strategies for HCAIs (WHO, n.d.; Collins, 2008). While the impact of good hand hygiene has been well-documented, the importance of environmental cleanliness on transmission of HCAIs has just recently been established in the past decade (Carling, 2016). Multiple studies have found that surfaces and equipment in the health care environment can act as reservoirs for HCAI pathogens which can be transmitted to patients during care from these areas (Carling, 2016; Eckstein et al, 2007). As a result, the cleaning of the patient's environment is very important in reducing the incidence of HCAIs and the associated costs or burden of infection (Carling, 2016; Collins, 2008).

Environmental cleaning staff play a vital role in the cleanliness of the HCF environment, and consequently the reduction of HCAI transmission; hence, it is important to understand their roles and attitudes towards cleaning (Eckstein et al, 2007). Several studies have been conducted on the perception of environmental cleaning staff in health care facilities, in both developed and developing countries. For instance, the REACH intervention study conducted in Australia examined pre- and post-training attitudes and knowledge of cleaning staff and found that knowledge of cleaning practices increased post-training, but attitudes and views towards cleaning and organizational support did not change as much (Mitchell et al, 2018). Additionally, Ni et al (2017) conducted a study in a Chinese hospital in Zhejiang Province to assess the "HCAI knowledge, cleaning procedures, hand hygiene, and attitudes toward environmental cleaning" of cleaners. In both studies, a quantitative approach was utilized and the focus was on examining the knowledge of cleaning procedures and attitudes of cleaners, not on the barriers and facilitators experienced by cleaners in their daily work performance.

On the other hand, a study conducted by Joshi et al (2018) used a qualitative approach-focus group discussions-to investigate challenges faced by health care providers, cleaners, hospital administrators, and undergraduate medical students in maintaining environmental cleanliness in a rural teaching hospital in India. The challenges identified include contamination of the facility by patients and visitors, "surface contamination" by health care staff, shortage of resources including water, and poor sterilization and IPC practices by health workers (Joshi et al, 2018). Even though studies have been conducted to gain the perspective of cleaning staff, very few have used qualitative methods to focus solely on both the facilitators and barriers to cleaning for cleaners in an urban sub-Saharan country. Hence, this study seeks to identify and understand the nature of the work of cleaning staff in urban Uganda and what factors hinder or help the

responsibilities they are tasked with, by using the person-environment-occupation (PEO) model of occupational performance.

Analysis Framework/Model: Person-Environment-Occupation Model (PEO)

The PEO model was originally developed as an occupational therapy tool to assess the barriers and facilitators to an individual's engagement in meaningful daily activities and tasks, otherwise known as occupational performance (Law et al, 1996; Wong & Fisher, 2015). The model takes into consideration the influence of the environment on behavior change, and thus combines environmental behavior theories with occupational therapy practices to provide a client-centered intervention for improving performance (Law et al, 1996). Although it was designed for occupational therapists, the PEO model can be applied to other professions, including nursing and public health, and in various settings such as organizations and communities (Cooper, 2012; Smith & Hudson, 2012; Wong & Fisher, 2015). For instance, the model has been used to conceptualize health literacy, specifically in explaining the assessment of literacy and design of interventions to improve health care navigation and management in both individuals and communities (Smith & Hudson, 2012). Hence, the PEO model can be utilized more broadly to understand the influence of personal, environmental, and occupational dimensions of behavior.

With that said, the strength of the PEO model in this study is its incorporation and emphasis on the influence of occupation on behavior. There are 3 interdependent components of the PEO model. The "person" element embodies their experiences, skills, knowledge, cultural views as well as emotional responses to certain situations; the "environment" includes social, institutional, physical, cultural, and socio-economic aspects of the individual's surroundings; and "occupation" encompasses the "tasks" and "activities" performed by the individual as well as the

"complexity" of those tasks (Law et al,1996; "The Person Environment Occupation Model", 2009). As we consider the focus of this study, the PEO model offers a unique approach to examine what hinders or enables the occupational performance of cleaners and also informs potential interventions to improve performance of cleaning staff.

All three components-person, environment, and occupation- are utilized in this study to discuss the barriers and facilitators experienced by environmental cleaners in various HCFs in the greater Kampala metropolitan area (GKMA) in Uganda. Understanding factors that facilitate or hinder proper cleaning practices can inform necessary changes to improve on environmental cleanliness and help reduce transmission of HCAIs in general.

II. Materials and Methods

Study Setting

This is a secondary analysis of data collected from a study that was conducted in Uganda through a collaboration between Makerere University School of Public Health in Uganda, Center for Global Safe WASH (CGSW) at Emory University, and WaterAid. Uganda is located in the eastern part of Africa and its capital city is Kampala, which, along with the Wakiso and Mukono districts, make up the Greater Kampala Metropolitan Area (GKMA). The GKMA is the most populated region of the country with Wakiso district having the highest population of about 2 million, followed by Kampala with an estimate of 1.5 million while Mukono district holds about 569,804 people (Ssekamatte et al, 2020).

Study Design

A total of 12 key informant interviews were conducted with cleaning staff at nine health care facilities (HCFs) from November 2018 to December 2018. Interviewees were purposively

selected based on position as well as knowledge and experience on working with the cleaning department. Hence, all interviewees had at least one year of cleaning experience in selected health care facilities and only heads of cleaning staff (in-charges) or their assistants were included in the study.

Health care facilities were purposively selected based on their level and mostly health centers III and IV were included. The characterization as III or IV is based on the services provided by the facilities. While both levels III and IV health centers offer basic health services, level IV HCFs cover a larger number of people, have an operating theatre, and provide other services such as outpatient, blood transfusion, and children and adults' wards (Kayiwa et al, 2020). In addition to the level of the health center, facilities were selected to include a mix of high-performing and low-performing HCFs, and the performance level was determined from consultations with key stakeholders in GKMA.

A majority of the interviews were conducted in a local language, Luganda, while some were done in English. The interviews were audio-recorded and then transcribed and translated to English. The study received ethical approval from the Makerere University School of Public Health Higher Degrees and Ethics Committee and administrative clearance from local governments in Kampala, Wakiso, and Mukono districts as well as the management of selected HCFs.

Data Analysis

The transcripts were analyzed thematically using MAXQDA 2020. First, the transcripts were read through to become familiar with the data and a preliminary analysis was conducted based on the original research objectives from the proposal formulated by the primary investigators (i.e., WaterAid, CGSW, and Makerere University). The results from the

preliminary analysis are not included in this article although these results were based on the same data. For this article, codes were initially developed inductively based on the objectives from the original research proposal. The codes were then refined as new objectives were developed and novel themes emerged throughout the review process of the transcripts. The codes were organized into the themes discussed in the results section using the PEO model.

III. Results

From the analysis of the interviews conducted with environmental cleaning staff, various themes were identified and classified into barriers or facilitators. While a few themes were distinctly a barrier or a facilitator, most of the others fell into both categories due to the varying experiences of the interviewees, i.e., some factors were challenges for some interviews but motivators for others. Using the person-environment-occupation (PEO) model of occupational performance, the barrier and facilitator themes were divided into the various components of the model-person, environment, and occupation-and are discussed below.

Barriers to Maintaining Environmental Cleanliness

First, we start with the discussion of the barriers identified and these include: the cleaner's feeling unappreciated, poor waste segregation practices, availability of cleaning supplies, patients' use of sanitations facilities, patients' waste disposal, cleaning frequency of sanitation facilities, and heavy workload.

Person

Feeling unappreciated by other HCF staff: A few of the interviewees expressed their frustration over behaviors by supervisors or other health workers that left cleaners feeling

unsupported or unappreciated. This feeling in turn seemed to make the work more "difficult" and "hard" for the cleaners who already have a demanding responsibility.

> **"***So you have to fetch it from here and take it up there. It's very tiresome and the people there are very inconsiderate. They see you as if you don't work, as if you didn't work but you need to fetch about 6 jerry cans to cover the maternity ward…every day***" (Cleaner at Facility F)**

> **"***The health workers are at times not considerate, for example in the treatment room, they scatter materials on the tables and floor which makes my cleaning difficult. Yet I cannot tell what they will need and not need, so I leave them with the task of first sorting them, with this attitude, the healthcare workers report me to the in charge that I avoid cleaning.***" (Cleaner at Facility G)**

Environment

Poor waste segregation practices: Waste segregation is a vital component of infection prevention and control especially separating medical wastes from regular wastes. Some interviewees reported that health workers failed to segregate medical wastes properly due to inadequate bin liners and/or lack of infection prevention and control training around waste segregation. Consequently, poor segregation practices led cleaners to "handpick" and separate wastes, sometimes putting their health at risk.

> *"For me what I know with infection control you need to have bins of black, red, yellow--isn't that how they should be? But for us we don't have, we only have black and I think red. They are two,* [or] *is it one? They are two; one is in maternity... So now segregation, waste is not properly segregated."* **(Cleaner at Facility B)**

> *"They arranged a training for us because before even the health workers were not practicing segregation of sharps from other waste…I once had to take PEP, (PEP prevents HIV from spreading within someone's body upon exposure)* [meant PrEP: pre-exposure prophylaxis]. *I took PEP* [PrEP] *until we decided to call those responsible on the infectious control committee…and they trained us."* **(Cleaner at Facility E)**

Availability of Cleaning Supplies

A major aspect of maintaining cleanliness is having the right and sufficient cleaning materials and equipment. However, more than half of the interviewees indicated experiencing frequent shortage of cleaning materials, with a few expressing concerns regarding the delay in replenishment of supplies by supervisors, creating an even greater challenge for cleaning staff to perform their responsibilities well.

> *"Though at times, cleaning detergents are not enough yet we cannot complain because it's what is available in the store. Whenever cleaning equipment's like brushes spoilt, we request for some more that's if they are available in the store"* **(Cleaner at Facility A)**
>
> *"We also have shortages in the cleaning materials in the stores. For example, we were told that "a scrubbing broom and the outside brooms are to be used for an entire year," which is not visible* [feasible] *if you use it every day. Hand washing soap and liquid soap is supplied by National Medical Stores (NMS) usually supplies 3 jerrycans each 3 months. As cleaners, we often use a 5 litres jerrycan for picking and that can be used for 2 weeks."* **(Cleaner at Facility G)**

Patients' use of sanitation facilities: A common challenge for more than half of the interviewees was the misuse of sanitation facilities (or toilets) by patients. Inappropriate or poor use of sanitation facilities increased the workload for cleaners, especially for those in HCFs with only one or two cleaning staff.

> *"Some of the patients misuse the toilets so as the cleaner you are supposed to be vigilant and check"* **(Cleaner at Facility C)**
>
> *"People use toilets the way they want which is so inappropriate. All the toilets we use here are water borne toilets so we have challenges of people not knowing how to flush them, sometimes, they just pull it* [flushing handle] *out, which will need repairs. Sometimes there is no water for flushing."* **(Cleaner at Facility G)**

To address the problems with misusing toilets, a few of the HCFs "sensitized" patients on proper utilization of the sanitation facilities. However, the sensitization was not effective in changing behaviors. Patients still continued misusing the facilities, leaving the cleaning staff to handle the consequences.

> **"***…even if you sensitize them, and we do sensitize them here. We have VHTs and health workers, they sensitize them on toilets but you still find they have defecated beside the hole* [or] *they have urinated beside the hole. They take their children there and they urinate beside the hole***" (Cleaner at Facility B)**

Patients' waste disposal: About half of the interviewees who discussed patients' behaviors with regards to waste disposal expressed their concerns with inappropriate utilization of dumping sites.

"Although mostly we have designated places where patients know that that's where rubbish is put. But there are those you find they didn't take it there and you can't also leave it in the room. So you remove it and take it where it is supposed to be" **(Cleaner at Facility D)**

"*The other thing, when people are seated, they do not want to be disturbed incase you want to clean. People also despise us of our jobs, even when you direct them on where to put the rubbish, they can instead place it wherever they want.***" (Cleaner at Facility G)**

Occupation

Cleaning frequency of sanitation facilities: About half of the interviewees expressed concern for the inadequacy of the sanitation facilities due to the large number people using the few toilets and latrines present at the HCF. Consequently, these interviewees reported cleaning the toilets between three to five times per day, with a few staff reporting that they clean about twice every day.

"People are so many that use the same toilet. It always needs regular monitoring for cleaning it in case people have mishandled it [toilet]*"* **(Cleaner at Facility A)**

"*We clean them* [toilets] *every morning on arrival and it also depends on the number of people around. We also go there every after three hours. The more the people, the more frequently we clean there****"*** **(Cleaner at Facility C)**

"*It might take you almost a full day to keep cleaning all the time. With the fact that we have two sections of the facility*." **(Cleaner at Facility G)**

Heavy workload: When discussing responsibilities, most interviewees discussed experiencing heavy workload due to various factors. One was the inadequacy of sanitation facilities and misuse by patients discussed above. Another variable was the number of cleaning staff available. A few interviewees expressed their concern with the workload that resulted from them being the only cleaning staff or one of two in the entire HCF.

"*Big work load and yet I also double as the askari (watchman)*" **(Cleaner at Facility A)**

In order to alleviate such burden, one interviewee decided to personally address the issue by using his/her own income to hire additional help:

> **"***We used to experience a workload, we* (interviewee and colleague) *hired an extra person to support us…that's how we involved this gentleman. So, his payments are contributed from both of us. We earn UGX. 200,000 each, so we have to contribute from each of us until when he can raise UGX. 100,000***" (Cleaner at Facility G)**

Facilitators to Maintaining Environmental Cleanliness

Regardless of the challenges faced by cleaning staff, interviewees discussed several motivators for staying within their role at the HCF. These include access to income from the job, cleaners feeling supported and appreciated, sufficient water supply, adequate waste disposal infrastructure, provision of infection preventions and control trainings, health workers positive contribution to cleaning, and shared responsibilities and flexibility in work schedule.

Person

Source of income and livelihood: the income from the cleaning jobs was a strong motivator because it helped cleaners to further their education and/or sustain their families.

"*What motivates me is, my expectations to get some money and take care of yourself and your children. For me I have educated my children while here. To ensure that you take care of yourself and your life***"** (**Facility F**)

"The job is mine but there are times when you don't want to clean certain places because it's disgusting to a point where you vow to end cleaning this year, but because you want to earn a living, you stay." **(Cleaner at Facility G)**

Feeling supported and appreciated: In contrast to the few interviewees who felt unappreciated, some interviewees reported feeling supported and appreciated. Support, in this case, refers to the responsiveness of supervisors to cleaners' needs as well as the work atmosphere and culture experienced by cleaners. The feeling of being supported and appreciated made the work "easy" with "no challenges."

"*What motivates me is that we are not mistreated here, they are not bad people. What our boss first tells us, even when we are in meetings is to respect one another. Here there is nothing like discrimination or anything else like that; for example in other hospitals they have a way they discriminate* [against] *the cleaners, and they don't like it***" (Cleaner at Facility D)**

"Even when it almost reached that point before VAD came, when there was no water in those different areas I told you about…, we would let the doctor, senior in-charge know and he would call those responsible at National Council and they would come and provide water." **(Cleaner at Facility E)**

"*My bosses have always appreciated my work, this motivates me.***" (Cleaner at Facility I)**

Environment

Water supply: The common sources of water across all nine facilities included "national water," wells and boreholes dug by "VAD (acronym meaning unknown)," "rainwater harvesting tanks," and taps/pumps. Most of the HCFs depended on more than one source for their water supply, while only one facility relied on a tap as the only water source. With regards to availability of water, a majority of interviewees reported that water interruptions were "rare," and during incidents of water shortage, water was brought into the facility in a timely manner. Given the importance of water in cleaning, the consistent supply of water was a significant facilitator in the upkeep the environment.

> ***"****Water is available all the time. We have a tap stand, and a water harvesting tank.****"***
>
> **(Cleaner at Facility A)**
>
> "*The water is always available in the rooms unless when it's off, that's when a vehicle brings* [water]. *But it's usually on; it rarely goes off. And as long as you report that water is off, in very few minutes the vehicle will have brought* [water]." **(Cleaner at Facility D)**

Adequate waste disposal infrastructure: Waste in this case includes food, paper, containers such as bottles, and medical waste such as needles. Across all nine facilities interviewed, either a "dustbin" or a "bucket" was used to collect waste at designated areas of the facility, and in some instances, needles were segregated from other forms of wastes before final disposal. Having the proper waste disposal infrastructure makes it easier for cleaners to manage waste well, a key component of infection prevention and control.

"We have placed dustbins in the compounds where patients throw rubbish anytime. We have dustbins both inside and outside of the patients waiting area" **(Cleaner at Facility A)**

"*We remove the needles. The needles go into the safety box…The papers go alone, gloves go alone, and even the bottles go alone.****"*** (**Cleaner at Facility F**)

"*Every department has waste bins. We have medical bins like the colored bins, the safety boxes, and the general waste bins (big buckets) for patients use*." **(Cleaner at Facility G)**

After the collection of wastes, the most commonly reported final disposal methods included incinerator, pits/ditches, and/or the use of a disposal company. A majority of the HCFs utilized a combination of these methods with only one HCF relying solely on a disposal company that picked up wastes daily or weekly.

"So every day we take [waste] *to the incinerator; every week there's someone who burns. But they burn every day."* **(Cleaner at Facility F)**

"After the day's work we collect the waste bins and put them aside before Green Label [Labour] *collects them on a daily to its final disposal."* **(Cleaner at Facility G)**

Provision of infection prevention and control (IPC) training: About half of the interviewees indicated having attended at least one training whether as a new hire or sometime later. These trainings mainly focused on waste management and use of protective equipment while cleaning. Of those who received trainings, only two interviewees reported that their HCFs provided recurring "refresher" trainings occasionally. These IPC trainings empowered cleaners with the knowledge needed to properly carry out their tasks.

"*I have attended about two trainings that increased my knowledge and these were arranged by Green Labour*.**" (Cleaner at Facility E)**

"Yes we were trained…they teach [us] *how to handle waste"* **(Cleaner at Facility F)**

"We were trained here, how to coordinate things and we also learnt. You cannot come ask for a job and you aren't trained." **(Cleaner at Facility C)**

Health workers contributing positively to cleaning: To maintain environmental cleanliness other staff, including health workers, have an important role to play. Several interviewees discussed the positive behaviors of health workers in maintaining the upkeep of the environment. This behavior helped lighten the workload of cleaners, enabling them to focus on other cleaning duties and areas.

"There is general cleaning that is done by all staff [health workers] *and the cleaners. So every department is aware that we are going to do general cleaning today."* **(Cleaner at Facility E)**

"Sometimes we don't clean the walls and the health workers do it themselves. Mostly the health workers do it for themselves because they are usually there in the wards." **(Cleaner at Facility F)**

Occupation

Sharing of responsibilities and work flexibility: More than half of the interviewees worked in HCFs with three or more cleaners, and a few of these interviewees mentioned the benefit of sharing responsibilities as well as the flexibility in their schedules. Shared responsibilities among multiple staff lightened the work burden and motivated cleaners to perform their tasks well.

"*Each one of us knows the floor they work on…you know where your mops are kept and everything else so you get them out and start. And you are aware that you are responsible for that floor, except for this ground floor which we share. We work for two days then rest for one day***" (Cleaner at Facility D)**

"*You work for like 2hours and you will have completed all your work. If you have another job, you can go to another job. If you're going home; you go home and do other things.*" **(Cleaner at Facility F)**

IV. Discussion

This study was a qualitative examination of the barriers and facilitators experienced by environmental cleaning staff in HCFs in the greater Kampala metropolitan area of Uganda. The themes identified were categorized as barriers or facilitators using the Person-Environment-Occupation (PEO) model of Occupational Performance. A majority of the barriers and facilitators were experienced at the environment level, specifically the health care facility as an institution, with fewer person- and occupation-related factors. In addition, some of the barriers identified in this study, such as heavy workload, shortage of cleaning supplies, and patients' contribution to cleanliness are supported by previous studies conducted in other developing countries or resource-limited settings including India and the Gambia (Cross et al, 2019; Joshi et al, 2018).

Overall, these barriers and facilitators highlight a key point in the prevention and control of HCAIs, and that is, regardless of how motivated cleaners may be, without the support of supervisors and health workers environmental cleaning may not be performed according to IPC standards and protocols. Supervisor and health worker support comes in various forms. For example, the provision of IPC training empowers cleaners with the vital knowledge necessary to

complete the difficult and sometimes risky work of environmental disinfection and cleaning, and, in general, training has been linked to higher performance at work (Khan, 2012). Hence, by providing the knowledge, supervisors are supporting the work of cleaners and facilitating higher quality work performance.

Another form of support is the supervisor and other staff's appreciation of the work done by cleaning staff, and a recognition of the negative influence that lack of appreciation can have on the behaviors of cleaning staff (Matlow et al, 2012). Interviewees who felt appreciated were more motivated to perform their tasks well compared to cleaning staff who felt unappreciated regardless of how hard they work. Feeling unappreciated makes it difficult to perform work responsibilities properly; hence, it is important for health workers and supervisors to acknowledge the difficult tasks carried out by cleaning staff every day (Matlow et al, 2012). In addition to feelings of appreciation, the explicit and perceived treatment of cleaners by health workers and supervisors appeared to affect cleaning. Some interviewees discussed working in an environment where supervisors promoted respect and nondiscriminatory behaviors among all staff regardless of occupation. So having an amicable and respectful work relationship with other health workers was a major source of motivation for these cleaners. This is also supported by the findings from Matlow et al (2012).

In addition, the provision of cleaning materials and supplies (e.g., disinfectants and water) is an important aspect of a supportive work environment. Consistent availability of water, disinfectants, and other cleaning equipment is a key recommendation for best practices in environmental cleaning in resource-limited settings (CDC, 2020). However, more than half of the interviewees discussed often experiencing shortage of cleaning supplies like soap and gloves which makes it difficult to clean the facilities well. In some instances, only water was used for

cleaning since almost all interviewees reported rarely experiencing water shortage or outage. Thus, while the consistent availability of water was a major facilitator, the frequent shortage of cleaning materials was a key barrier.

Besides supervisors, health workers and patients can prove supportive through their behaviors. In some instances, health workers helped with cleaning certain areas of the facilities thus lessening the workload of cleaning staff. This assistance was very helpful to interviewees who indicated that their workload was heavy. Unfortunately, not all interviewees experienced such help. In fact, several interviewees revealed that other health workers often contributed to poor waste segregation in HCFs by inappropriately disposing of sharps such as needle and syringes. Appropriate waste segregation is a critical component of IPC due to the high risk of infection with HIV, hepatitis B or hepatitis C if someone is pricked by a used needle (WHO, n.d.). This was the case for two interviewees who were pricked by used needles while collecting wastes, and both had to start immediate treatment to reduce infection risk. Fortunately, in both cases an infection was not observed, and the situation resulted in the provision of IPC trainings for all health workers and cleaning staff.

With regards to patients, their behaviors generally created barriers for effective environmental cleaning for most cleaners and Joshi et al (2012) discovered a similar finding in their study. According to a majority of the interviewees, patients used toilets and other sanitation facilities inappropriately (e.g., defecating in areas outside of the latrines and toilets); and this created a heavier workload for cleaners who needed to clean sanitation facilities multiple times throughout the day. Patients also failed to properly utilize designated (non-medical) waste collection sites around the HCFs, so that cleaners often had to pick up after them.

In addition to the person and environment-related factors discussed above, there are several occupation-related facilitators and barriers that impact the work performed by cleaners. As previously mentioned, some cleaners experience a heavy workload either due to the behaviors of patients or due to the number of cleaning staff available for each health facility. For environmental cleanliness to be effective, the HCF should have an adequate number of staff to ensure proper performance of IPC protocols and the number of staff per facility is based on different factors including the size of the facility and type of cleaning (CDC and ICAN, 2019). For interviewees with a heavy workload, cleaning is not performed up to IPC standards and there are parts of the HCF that do not get cleaned daily or weekly. Hence, it is important to consider the number of cleaning staff available within the facility when addressing the issues of poor environmental hygiene.

While these facilitators and barriers are separated under different components of the PEO model, it is important to note that there is some interaction among all these factors. The factors in the environment or occupation category can affect those at the personal level. For instance, poor use of sanitation facilities by patients contributes to higher cleaning frequency and heavy workload, and these in turn result in cleaning staff feeling unappreciated when their hard work is unrecognized by supervisors and/or health workers or when patients look down on them because of the nature of their jobs.

Limitations

Although an interview guide was created for the study, the transcripts reflected differences in the questions that were asked in each interview. A few questions, such as motivators to promote proper WASH practices, were only included in a handful of interviews so it cannot be concluded that all interviewees have the same experience or thought, and it reduces

the reliability of the data. In addition to lack of uniformity in questions, there is also nonuniformity in the amount of information elicited from each interviewee with some interviews having a good amount of information and others significantly lacking detail. A general source of this issue seemed to be the failure of interviewers to utilize probing in some of these interviews. To address the issue of nonuniformity in questions asked or probing, there should be an iterative process of reviewing interviews as they are conducted and providing ongoing feedback to interviewers on areas of improvement when conducting the interviews.

A final limitation of this study, and of most qualitative studies in general, is the lack of generalizability of the findings to all environmental cleaning staff in Uganda or other similar settings. In other words, the facilitators and barriers identified in this study cannot necessarily be applied to other cleaning staff in other parts of Uganda. While it is difficult to address this limitation, the findings from this study could be used as a guide in developing similar research in other settings to determine if the same factors affect cleaning staff in other areas of Uganda as well as other developing countries.

Recommendations

Given the importance of environmental cleaning and the role of cleaning staff in addressing the transmission of HCAIs, a major recommendation would be for HCF administrators and other key stakeholders to be made aware of the factors that influence cleaning practices and work to reduce barriers with their available resources and capacity. Each facility is different with regards to availability of resources, size, and other features so solutions should be tailored to match the capacity of the HCF. With regards to the study itself, one recommendation for future studies would be to conduct a focus group discussion with cleaning staff from various

parts of Uganda to gain a general idea of whether the facilitators and barriers identified in this study are similar to those experienced by other environmental cleaners. In addition, future studies should also compare the work of cleaning staff in private HCFs to those in public facilities to examine if there are any significant differences in the factors affecting the work of cleaners.

V. Conclusion

Environmental cleaning plays a significant role in the reduction of HCAI transmission in HCFs, and cleaners are crucial to the maintenance of environmental cleanliness. Thus, it is vital to understand the nature of the cleaning job and the factors that influence cleaning practices especially in low-resource settings which experience a higher prevalence of HCAIs. This study highlights the barriers and facilitators of upkeep of environmental cleanliness in HCFs in Uganda, a low-resource setting. A majority of the barriers were at the environment level, specifically in the HCF as an institution and this could imply that administrators of HCFs have a significant role to play in alleviating challenges of environmental cleaning to make the work of cleaners manageable and easier. Additionally, the role of health workers and patients in the maintenance of environmental cleanliness was an emerging theme and should be studied further when addressing environmental cleaning as a mitigation effort for the transmission of HCAIs.

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Chapter 3: Conclusion and Public Health Implications

As the importance of environmental cleaning in HCAI reduction becomes more and more evident, the role of cleaners and their work environment needs to be examined to provide better support for this vital group of people. This qualitative study highlights that the support of the HCF is a major contributor to the barriers and facilitators experienced by cleaning staff in low resource HCFs. This support comes in various forms including the availability of cleaning materials and supplies, supervisor's appreciation of the work done by cleaners, patient's behaviors with regards to toilet usage and waste disposal, managing the workload of cleaners, as well as the presence of an amicable and respectful relationship with health workers.

The themes identified in this study raise the point that the maintenance of the HCF environment involves other players besides cleaners, including administrators, health workers, and patients. Therefore, when devising or implementing IPC cleaning interventions or measures the role of these other parties should be considered and there should not be a focus solely on the work of cleaners. It is important to note that a few of the barriers identified in this study are supported by previous studies conducted in other low-resource settings, such as heavy workload (mostly related to inadequate staffing) and shortage of cleaning supplies (Cross et al, 2019; Joshi et al, 2018). Hence, some factors that influence cleaner behavior may result from the lack of resources and support at the local or national level, trickling down to the organizational level of the HCF.

With that said, solutions addressing environmental cleaning and IPC should be inclusive. First, stakeholders need to be made aware of these barriers and facilitators and their influence on proper cleaning practices in HCFs; stakeholders including HCF administrators as well as local and national government officials and policymakers, among others. The involvement of these

various stakeholders is important especially for public HCFs that rely on funding and support from the government. Following awareness, HCF administrators need to identify specific areas of improvement in their facilities and devise a mitigation plan that addresses the challenges of cleaning up to IPC standards. While addressing the barriers to proper cleaning, it is also important to leverage the facilitators to encourage cleaners to do a good job, especially those who may be experiencing more challenges than motivators. Future studies should further investigate factors that motivate cleaners to engage in more effective cleaning practices in low-resource settings and how these motivators can be utilized to create a better work environment for cleaning staff.

HCAIs are a major burden on all health systems globally, but even more so on systems in low-resource settings and though environmental cleaning is not the only solution to reducing this burden, it is one of the key approaches. The role of the HCF environment in the transmission of HCAIs is well-documented and makes environmental hygiene a top priority in HCAI reduction. However, environmental cleaning is not automatic and requires a courageous group of people to clean up after patients and health workers and maintain the cleanliness of the HCF. Given the important role of cleaners, understanding and addressing the challenges they face in the work environment results in a domino effect where the clean environment helps to reduce transmission of HCAIs, which can in turn save lives and decrease costs on both patients and health systems. Likewise, acknowledging the facilitators of proper cleaning practice can assist HCF administrators in better supporting the environmental cleaning staff in their facilities.

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Appendix: Interview Guide for Interviews with Environmental Cleaning Staff

Key Questions: Infection Control Practices/Janitorial Practice

1. What types of hygiene practices are available for the cleaning staff?
Probe: hand soap, cleaning products

2. Walk me through the details on how the hospital rooms are cleaned.
Probe: how often, details on how bathrooms and toilets are cleaned

3. What wards/rooms do you clean daily at the HCF?
4. What are infection control practices?
5. Have you ever attended a training on infection control practices? (*if no, skip questions 4 and 5)*
6. How do you feel about the infection protocol trainings?
7. What do the trainings teach about infection control protocols?

Key Questions: Availability and Cleanliness of Water

8. What is your primary source of water at the healthcare facility?
Probe: source of drinking water for staff and patients?

9. What are some restrictions on the availability or cleanliness of water at the healthcare facility?
Probe: main water break, rationing of water, limited resources

10. What do you do when there is no available clean water?
Probe: round trip travel time in minutes to collect water off premises

Key Questions: Availability of Electricity (Power Source)

11. What is the primary source of electricity?
12. How often is the primary source of electricity unavailable?
13. What have you noticed affects the availability and consistency of power?
14. What happens when the main power supply is interrupted for extended periods of time?
Probe: time when protocol was not followed

Key Questions: Waste Disposal

15. How is waste disposed of at this HCF?

Probe: general vs infectious vs sharp

16. What happens when the system in place for waste disposal is not functioning?
17. How are human feces disposed of at the HCF?
18. What effects waste disposal methods?
Probe: seasonal patterns

Closing Questions:

What do you think is the biggest issue regarding WASH services at this HCF?

Thank you so much for taking the time to complete this interview.