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Dominique S. Brown Date

EXAMINING THE ROLE OF CLEANERS AND SUPERVISORS IN EFFECTIVE INFECTION PREVENTION AND CONTROL IN SIX CAMBODIAN HOSPITALS

BY
Dominique S. Brown
Degree to be awarded: Masters in Public Health
Global Health

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

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An abstract of
A thesis submitted to the Faculty of the Rollins School of Public Health of Emory University
In partial fulfillment of the requirements for the degree of Master of Public Health in the Global Health program
2020

Abstract

EXAMINING THE ROLE OF CLEANERS AND SUPERVISORS IN EFFECTIVE INFECTION PREVENTION AND CONTROL IN SIX CAMBODIAN HOSPITALS

BY
Dominique S. Brown

Global rates of healthcare associated infection (HCAIs) remain high across countries and contexts. The burden of HCAIs and the resulting poor health outcomes have inspired infection prevention and control (IPC) programs around the world in efforts to reduce poor outcomes and improve the health of healthcare facility patients. There are several key components to effective IPC programs in hospitals and a major one is ensuring high levels of environmental hygiene in healthcare facilities. Environmental hygiene may include handwashing, clean water, effective disinfection of facilities, and proper waste handling.

Hospital cleaners play an often overlooked and underrated role in environmental hygiene management. They are frontline workers in providing clean facilities for healthcare staff and patients; but are rarely included in specific infection control trainings and protocols. This is especially true in developing settings such as Cambodia.

The purpose of this thesis was to unpack the experiences of supervisors and cleaning staff in six Cambodian hospitals in four key areas - supplies and products, training, hospital cleanliness and roles of cleaning staff- and explore their role in infection control and achieving optimal environmental cleanliness in the healthcare facilities in which they work.

Embedded in a larger WASH in Health Facilities project by the GE Foundation and the Center for Global Safe WASH at Emory University, this study conducted nine key informant interviews with cleaning supervisors and five focus group discussions with cleaners in six Cambodian hospitals. Analysis of the data revealed five main issues related to cleaners that are inhibiting optimal levels of environmental hygiene in their respective hospitals. They include: a lack of effective supervision, visual assessment of cleaning only, a shortage of cleaners, a lack of knowledge around IPC and a lack of and desire for additional IPC training.

When the data from the study is compared with recommended IPC guidelines from major health organizations such as the World Health Organization, these gaps are concerning. Healthcare facility cleaners and their supervisors play a vital role in effective infection control and prevention. The results from this study warrant greater investment in cleaners, particularly in the areas of supervision and training.

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Acknowledgements

To begin, I thank God for providing me with the opportunity to pursue this degree and the hope to persevere through this journey. I pray that I can use this degree and my experiences at Emory to truly make a difference in the world.

I would like to express my deepest gratitude to my thesis committee chair, Dr. Joanne McGriff, for all of your wonderful guidance, support, feedback, encouragement and patience as I worked through this thesis process. I truly could not have completed it without your help. I greatly appreciate the time and energy that you dedicated to helping me navigate the waters of qualitative work.

I would not have been successful without the support, encouragement and love of my family and friends.

To my parents, Bryson and Sharon Brown, thank you for inspiring me through the work that you do and for instilling in me the belief that I can accomplish anything that I put my mind to. I would not be here without your support, advice, love and prayers. I hope I have made you proud!

To my siblings, Janelle, Gabrielle and BJ, thank you for your love and prayers. To my sisters by choice; Katrina, Siera, Emma and Trista, thank you for your support, encouragement and your listening ears. I'm grateful to have you as a support network. This process would have been significantly harder without you rooting for me.

To my Atlanta community; my RSPH family, my Blueprint family and my Old Navy family; thank you for making Atlanta feel like home, these past two years. My time has been made easier and more enjoyable, because of you.

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CHAPTER I: Introduction

Global Burden of Healthcare Associated Infection

At any given time, rates of health care associated infections in developing countries can vary between 5.7% and 19.1% of patients receiving care in health facilities (WHO, 2019). A healthcare associated infection (HCAI) is an infection occurring in a patient during the process of care in a hospital or other health care facility that was not present or incubating prior to admittance to the hospital (WHO, 2019). Depending on the condition, the general timetable can be anywhere from two days to several weeks after the initial admittance to the hospital and can include infections that appear after discharge. The broad category of HCAIs can also include occupational infections that occur among facility staff. HCAIs cover a range of conditions, including but not limited to: central line-associated bloodstream infections, catheter-associated urinary tract infections, ventilator- associated pneumonia, surgical site infections and any number of viral, fungal and bacterial infections. HCAIs have a range of impacts from excess mortality to economic burden to increasing antimicrobial resistance.

The health impacts of HCAIs are significant. For a patient acquiring an HCAI, lengths of stay can increase dramatically. Some European estimates suggest an average increase of 8-9 days (Hunt, 2017). Average increases may be even higher in resource limited settings. If patients contract more than one HCAI, length of stay can increase at even greater rates. Longer stays also increase financial burden, both on patients and on health care facilities. This is particularly harmful in resource-limited settings. Lastly, HCAIs also contribute to antibiotic resistance. Prevention of HAIs leads to fewer illnesses that require antibiotic treatment, which slows the development and spread of organisms resistant to current antibiotics.

Millions of patients seeking care in health facilities fall victim to HCAIs each year (WHO, 2016). Surgical patients and neonates are among those most severely affected. The World Health Organization estimates that in developed countries, seven out of every one hundred patients will acquire at least one health care associated infection. For developing countries, rates are even higher, with estimates of at minimum ten out of every one hundred patients, acquiring a health care associated infection (WHO, 2019). This is especially true with neonates, whose infection rates surge to anywhere between three to twenty times greater than rates in developed countries (WHO, 2019). In intensive care units, rates of HCAIs in developing countries can be up to three times greater than those in developed countries (WHO, 2019). The WHO has also estimated that up to one out of every three surgical patients in developing countries will contract a healthcare associated infection while under care; this rate is an estimated nine times higher than rates in developed countries (WHO, 2019). Rates may also be higher in actuality. Surveillance for HCAIs is often limited in developing contexts, and conditions that appear after discharge or occupation-related infections may not be categorized as healthcare associated infections within surveillance systems.

There are a variety of risk factors for developing HCAIs. They include prolonged and inappropriate use of invasive devices, high-risk and complex procedures, immune-suppression, and insufficient application of isolation protocols. In limited resource settings, other contributors may include inadequate environmental hygiene, inadequate waste disposal, poor infrastructure, insufficient equipment, understaffing in both health providers and cleaning staff, overcrowding, and poor knowledge and application of basic infection control measures and others.

Environmental Transmission as a Contributor to Healthcare Associated Infection

Recently, environmental transmission of pathogens has been *recognized* as a key contributor to high rates of healthcare associated infections (WHO, 2017, Weber, 2013, Yezli, 2014). Contributors to environmental transmission may range from: lack of appropriate cleaning supplies, shortage of cleaning staff, to a lack of investment in training for cleaning staff and lack of appropriate cleaning standards (WHO, 2019, Dancer, 2009, Cross, 2019). In resource limited contexts, all of these may be common contributors to insufficient cleaning standards that can result in environmental transmission of pathogens. A critical but often overlooked piece of this puzzle is found in training of hospital cleaning staff. Often, hospital cleaning staff receive little to no training before beginning the vital job of ensuring that surfaces and instruments have been properly sanitized. In addition, cleaning standards and accountability to those standards may be nonexistent or unenforced.

Cambodia is a lower- middle income country in South East Asia. While it has seen major economic growth and a significant decrease in poverty over the last decade, its healthcare system remains an area in need of major growth. Few studies have been done on rates of healthcare associated infections in Cambodia. Existing studies (Hearn, 2017, Khun, 2012) have focused mainly on hospital rates and more specifically, rates in pediatric wards. One study estimated a 3% rate of HCAIs in a pediatric ICU. Over half of those infections were respiratory infections and lengths of stay were increased from an average nine day stay to twenty-five days (Hearn, 2017). Another study suggested even higher rates of HCAI incidence of up to 13% of patients seen in a pediatric intensive care unit or emergency room (Khun, 2012). Even though Cambodia has recently attained the status of a lower middle income country, many of its healthcare facilities still function with limited resources.

Purpose Statement

The purpose of this study is to unpack the experiences of supervisors and cleaning staff in six Cambodian hospitals in four key areas - supplies and products, training, hospital cleanliness and roles of cleaning staff- and explore their role in infection control and achieving optimal environmental cleanliness in the healthcare facilities in which they work. To achieve this goal, qualitative data from hospital cleaners and their supervisors in two Cambodian hospitals will be examined.

Data was collected in 2016 including: focus group discussions with hospital cleaners and key informant interviews with supervisors of hospital cleaners. The goal is to use the data to examine the current experiences of hospital cleaners in six Cambodian hospitals and determine whether there are gaps in supervision, training, cleaning processes or supply management that may result in insufficient cleaning practices and potentially contribute to environmental transmission of pathogens. MAXQDA software will be utilized to conduct a thematic analysis of the focus group data. The software will also be used to conduct both a thematic and a case-based analysis of the interview data looking for patterns within and across participants. Finally, the data will be used to consider possible recommendations to hospitals regarding training for hospital cleaners. There is a general lack of data regarding training or regulations for hospital cleaners within the context of Cambodia. In addition, there is limited data regarding training or regulations for hospital cleaners in developing countries. For the purposes of the project, results from developed countries may be used for comparison.

Significance

Health care associated infections are a significant public health concern. It is vital to continue to work to understand contributors and establish change that will reduce rates. Environmental transmission of pathogens is well studied, however, there is a gap in understanding the contribution of cleaning staff training to possible environmental transmission. This is especially true in developing contexts. This project aims to start unpacking the experiences of cleaners and their supervisors, specifically exploring cleaning staff training and protocols in Cambodian hospitals in an effort to understand the role of hospital cleaning staff in the larger infection prevention and control narrative.

CHAPTER II: Review of Literature

Despite a dearth of studies on the specific contribution of cleaning staff to preventing and reducing rates of healthcare associated infections, there are many studies on HCAIs and a variety of IPC studies and guidelines. The purpose of this literature review is to explore the global burden of HCAIs, current IPC recommendations and how cleaners and their supervisors contribute to the global narrative of IPC and the reduction of HCAIs.

Even with advances and improvements in health care quality across the globe, healthcare-associated infections (HCAIs) continue to present a major patient health risk in developed and developing country contexts alike. The World Health Organization estimates rates of HCAI to be anywhere from less than one percent in highly developed settings to nearly 30% in some developing contexts (WHO, 2019). Surgical patients, as well as, patients in maternity wards, neonatal units and intensive care units are at increased risk for contracting an HCAI.

Low or Middle Income Countries (LMICs) have significantly higher rates of HCAIs. A WHO literature review from 2010 supports shows that the pooled-prevalence estimates of healthcare associated infections (across a number of resource-limited settings in LMICs) are 15.5 HCAIS per one hundred patients. This is in contrast to a European pooled prevalence of 7.1 HCAIs per one hundred patients (European Center for Disease Control and Prevention, 2014) and a United States prevalence of 4.5 infections per one hundred patients (CDC, 2016).

Looking specifically at rates of HCAIs in intensive care units, reveals an even more striking regional and income discrepancy; with developing country pooled prevalence estimates of ICU HCAIs at 47.9 new infections per 1000 patient days, compared to 13.6 new infections per 1000 patient days in the United States (Allegranzi, 2010). Lack of infrastructure to support

consistent, accurate surveillance of healthcare- associated infections may also contribute to even higher rates of infection than have been reported.

High rates of HCAIs across countries and contexts have inspired infection control programs throughout the years. These programs aim to prevent and stop the transmission of infections, with precautions designed for specific microorganisms. These programs are a vital part of the conversation about patient safety and help improve patient outcomes when implemented effectively (Burke, 2003). Major health organizations such as the World Health Organization, the Pan-American Health Organization (PAHO) and national Centers for Disease Control and Prevention around the world, have emphasized the importance and necessity of effective infection control programs. Many of these organizations have also released guidelines on effective IPC programs and trainings. PAHO estimates state that effective IPC programs alone can result in greater than a 30% reduction in HCAI rates (WHO, 2018). Recommendations for effective infection control programs often include training on and increases in effective hygiene practices (particularly hand hygiene), environmental hygiene, well-functioning equipment, training for healthcare facility staff and HCAI surveillance.

Cleaners in Infection Control Guidelines

An increase in global attention to issues of water, sanitation and hygiene (WA SH) has resulted in a growing focus on environmental hygiene in health care facilities. In analyses of infection control or cleaning protocols across countries, little reference to cleaning staff has been made, though their vital role in maintaining environmentally hygienic health facilities is obvious. An example of this neglect comes from the World Health Organization Essential Environmental Health Standards in Health Care, which extensively details ideal

infection control practices, but fails to address hospital cleaners as key stakeholders in this process (WHO, 2008). This omission appears despite the fact that hospital cleaners are arguably frontline workers in the fight against healthcare associated infections.

The WHO's latest guidelines on effective IPC (2019) outline eight core components for infection prevention programs. Four of those eight guidelines can be affected by hospital cleaning staff. They include:

- "The WHO recommends staff education be a key component of the infection prevention program. Educational efforts should include bedside simulations designed to put HAI reduction strategies into practice.

- Infection prevention programs and relevant staff should be regularly audited and provided with performance feedback.

- A healthcare organization's bed occupancy should not exceed the standard capacity of established for the facility. Also, provider staffing levels should be adequately aligned with the patient workload.

- Healthcare facilities should implement WHO standards for quantity and appropriate position of hand hygiene materials and meet WHO standard for drinking water quality and sanitation. Equipment and the patient environment should also be cleaned appropriately."
  (WHO, 2019, pg. 30)

Cleaners and Infection Prevention and Control

Hospital cleaning is an under-studied contributor to the overall HCAI conversation. There are a variety of factors affecting cleaning staff which may undermine efforts to achieve optimal environmental hygiene. These may include but are not limited to: lack of training for cleaners, poor pay, poor working conditions, lack of supplies, lack of appropriate personal protective equipment, poor furniture selection, poor understanding of environmental hygiene standards, and a lack of value of the cleaning role (Cross, 2017). There is evidence from a number of studies

that suggests that low societal value is attached to the cleaning role, with cleaning roles often being filled by individuals of disadvantaged socio-economic or gender groups (particularly women) (Cross, 2017, Salerno, 2012, Messing, 1998).

There is a general dearth of research on the role of hospital cleaners in preventing environmental transmission of pathogens and an even greater scarcity of literature on either effective or ineffective training protocols for hospital cleaners. Existing literature consistently points to a lack of effective training for hospital cleaners. In a study across four countries with high rates of HCAIs, (Bangladesh, India, The Gambia and Tanzania), over half of facilities surveyed provided no form of infection prevention and control (IPC) training for non-medical staff, which notably includes cleaning staff. In facilities that did provide training, all cleaners had not participated in training and what training provided only included short sessions on appropriate handwashing technique and surface cleaning (Cross, 2017). Surveyed cleaners often recognized the need for additional training and the implications of the existing lack of training, particularly related to effective cleaning and protection of the cleaning workforce. Other studies conducted interviews of hospital cleaners across a variety of countries and revealed the training was often deemed unnecessary by both cleaners and their supervisors. Cleaners often reported approaching their job as if they were cleaning their home; and were unaware of the additional cleaning needs and requirements presented by the healthcare context (Cross, 2017).

There are a few examples of the positive impact of training programs for hospital cleaners on IPC knowledge and hospital infection rates. Training has also been linked to higher reported levels of motivation in cleaning staff and improved performance, as cleaners begin to recognize the importance and value of their role in infection control and prevention. A study in a number of LMIC countries found that after training cleaning staff in ideal infection control

practices, mattress contamination was reduced to levels comparable to those of high-resource settings (Hopman, 2016). A 2014 study on training of hospital cleaning staff showed a 23% increase in IPC knowledge and practice after one training session. Participants stated that prior to the training, they were just "expected to know" how to clean effectively (Felix, 2014). In contexts where routine microbiological environmental screening is not feasible, training of hospital cleaners and their supervisors, improved cleaner supervision presents an opportunity to decrease rates of environmental transmission of pathogens and potentially work to continue reducing rates of healthcare associated infection globally, and especially in low-resource settings.

The purpose of this study is to unpack the experiences of supervisors and cleaning staff in six Cambodian hospitals in four key areas - supplies and products, training, hospital cleanliness and roles of cleaning staff- and explore their role in infection control and achieving optimal environmental cleanliness in the healthcare facilities in which they work. Healthcare facility cleaners and their supervisors play a vital role in effective infection control and prevention. It is vital to understand the processes and protocols that govern cleaners and their supervisors. The data from this study can be compared to the WHO IPC guidelines and determine whether changes need to be made to improve cleaner experiences and outcomes, with the ultimate goal of improving infection control and prevention and decreasing rates of HCAIs in Cambodian hospitals.

CHAPTER III: Methodology

This project was embedded within a larger program- 'Safe Water for Cambodian Health Facilities'- a collaboration between the GE Foundation and the Emory University Center for Global Safe WASH (CGSW). The program ran from 2014-2017 and was aimed at improving WASH in Cambodian public healthcare facilities. Activities ranged from monitoring and evaluation of water treatment systems and needs assessments of WASH knowledge among healthcare facility staff to microbiological assessment of environmental contamination and training for clinical and cleaner staff on WASH topics identified in a needs assessment. CGSW acted as the program's Research and Capacity Building partner. This project fell under two primary research and capacity building objectives including: Needs assessment of the WASH knowledge, attitudes and practices of clinicians and cleaners and advocacy for WASH in HCF among stakeholders including the Cambodian government. This portion of the project took place after the initial needs assessment to provide additional information surrounding the experiences of cleaning staff and their supervisors and before the WASH training that ultimately took place at the end of 2016.

The data for this project was a combination of focus group discussions and key informant interviews across six Cambodian hospitals. The hospitals included were: Oudong, Kampong Tralach, Sampov Lun, Kampong Thom, Baray Santuk, and Thbong Khmom. All data were collected in September of 2016. Figure 1 below provides a visual of the hospital locations, relative to each other.

Figure 1. Study Hospital Locations

A convenience sample was taken from the GE program hospitals as hospital leaders gave recommendations for interviewees for the key informant interviews and for participants in the focus group discussions. Data collection was scheduled in collaboration with hospital directors from each institution.

The focus group discussion facilitators were selected from the Cambodian National Institute of Public Health and received training prior to conducting the discussions. Facilitators for the key informant interviews received no introductory training other than to review the

interview guide. The discussion guides were designed to elicit the experiences of hospital cleaning staff and their supervisors with particular attention to the key areas of: cleaner role, cleaning supplies and products, hospital cleanliness and cleaner training.

Key Informant Interview Sample

Nine key informant interviews with the supervisors of hospital cleaners at each of the previously mentioned hospitals were also conducted. The discussions included nineteen questions divided into four categories: supervisor job duties; working with and training cleaners; supplies and products; and hospital cleanliness. Two participants were interviewed from the Sampov Lun, Kampong Thom, and Thbong Khmom hospitals. One participant from Baray Santuk, one from Oudong, and one participant from Kampong Tralach were interviewed. All interviews were audio-recorded, transcribed into Khmer, and anonymized. Later, the Khmer transcripts for the interviews were translated into English for analysis by Cambodian and Emory partners. Back translation and translation verification using the original audio recording and the Khmer transcripts was completed by a Cambodian masters student fluent in Khmer from the Rollins School of Public Health. For this thesis, all data was analyzed in its English version. This researcher was not involved in the study design, data collection or data translation and has completed the project through secondary data analysis.

Key Informant Interviews

The key informant interviews were conducted with the supervisors of hospital cleaners. Interviews were designed to last approximately one hour. The interviewed supervisors represented a number of different contexts, some serving as program coordinators, others as

doctors and others as chiefs of wards. Table 1 below outlines demographic information for each participant.

Table 1: Key Informant Interviews Participant Demographics

Participant	Sex	Age	Grade/Degree	Hospital	Primary Role	Length of Time in Role
1	Female	49	Secondary Midwife	Baray Santuk	Programme Coordinator for Prevention of HIV Mother to Child Transmission	27 years
2	Male	45	High School Diploma, ISAR Specialist-pharmacy	Kampong Thom 1	Chief of Ward: Anesthetic Unit	20 years
3	Female	53	Grade 7, Lower Secondary Diploma	Kampong Thom 2	Chief of Ward: Maternity Ward	37 years
4	Female	50	Secondary Midwife	Kampong Tralach	Chief of Ward: Maternity Ward	30 years
5	Female	45	High School Diploma in pharmacy	Oudong	Laboratory Unit	19 years
6	Male	49	Grade 2 Skilled ISAR	Sampov Lun 1	Chief of Anesthetic Unit	8 years
7	Male	43	Grade 5 new, Medical Associate, Royal Cambodia University	Sampov Lun 2	Nurse: Maternity Ward, volunteered to oversee cleaning staff	< 1 year
8	Female	46	Secondary Midwife	Thbong Khmom 1	Chief of Ward: Maternity Ward	5 years
9	Male	28	Secondary Midwife	Thbong Khmom 2	Chief of Ward: Surgery Ward	3 years

Key Informant Interview Guide

The key informant interview guide was designed by the Emory research team for interviews intended to last between thirty minutes and one hour. Interviews covered twenty-three questions across four key categories: supervisor duties, working with and training cleaners, supplies and products and hospital cleanliness. The guide was originally written in English, and then translated into Khmer for administration to participants by a Cambodian interviewer (who also served as the facilitator for the focus group discussions). A copy of the full interview guide can be found in Appendix A.

Focus Group Discussion Sample

Five focus group discussions were conducted with hospital cleaners from six Cambodian hospitals. All discussions were semi-structured, conducted according to the pre-determined discussion guide. The discussions for the Oudong and Kampong Tralach locations were combined, due to a small number of cleaners at the Oudong location. The combined Oudong and Kampong Tralach discussion included seven participants in total; five representatives from Kampong Tralach and two from Oudong. The Sampov Lun discussion had eight participants with a notation from the facilitator that one of the participants was mentally slow. The Kampong Thom discussion had eight participants. The Baray Santuk discussion had six participants and the Thbong Khmom discussion had eight participants.

Baray Santuk Referral Hospital is located in central Cambodia. Focus Group Participants from this location were exclusively female and all six participants, with the exception of one, had been in their cleaning role for three years or less. Table 2 outlines participant backgrounds.

Table 2: Focus Group Discussion Participant Demographics- Baray Santuk Referral Hospital

Participant	**Sex**	**Age**	**Grade/Degree**	**Hospital**	**Ward**	**Time in Role**
1	Female	33	Grade 2	Baray Santuk	Emergency	3 years
2	Female	34	Grade 9	Baray Santuk	Pediatrics and Wound Care	2 years
3	Female	31	Grade 4	Baray Santuk	Maternity, Chief of Cleaner	6 years
4	Female	26	Grade 11	Baray Santuk	Administration Office	2 years
5	Female	40	Grade 3	Baray Santuk	Surgery	15 years
6	Female	56	Grade 4	Baray Santuk	General Disease	3 years

Kampong Thom Referral Hospital is located in central Cambodia. The participants from this location were exclusively female and had a wide range of time-in-role, age and educational level. Table 3 outlines individual participant demographics.

Table 3: Focus Group Discussion Participant Demographics- Kampong Thom Referral Hospital

Participant	Sex	Age	Grade	Hospital	Ward	Time in Role
1	Female	39	No formal education	Kampong Thom	Surgery	26 years
2	Female	38	Grade 8	Kampong Thom	Pediatric	2 years
3	Female	23	Grade 11	Kampong Thom	Pediatric	5 years
4	Female	28	Grade 4	Kampong Thom	General Medicine	11 years
5	Female	25	Grade 5	Kampong Thom	Emergency, Wound Care Clinic	1 year
6	Female	42	Grade 9	Kampong Thom	Emergency, General Medicine	4 years
7	Female	33	Grade 7	Kampong Thom	Maternity	2 years
8	Female	32	Grade 7	Kampong Thom	Surgery	1 year

Oudong Referral Hospital and Kampong Tralach Referral Hospitals are both located in south central Cambodia. This focus group contained one male participant, from Kampong Tralach. This group also saw generally low levels of education, with the highest grade level completed being grade four. Two participants had no formal education, with one being illiterate. This group also represented a spread of experience, with three participants being under two years in the role, and the remaining participants representing between 10 and 28 years in role.

Table 4: Focus Group Discussion Participant Demographics- Oudong and Kampong Tralach Referral Hospitals

Participant	Sex	Age	Grade	Hospital	Ward	Time in Role
1	Female	22	Illiterate	Oudong	Emergency, Maternity, Medicine Wards and Administration Office	1 month
2	Female	36	Grade 2	Kampong Tralach	General Medicine Hall	19 months
3	Female	45	No formal education	Kampong Tralach	Pediatric Ward and Wound Care	20 years
4	Male	42	Grade 3	Kampong Tralach	Courtyard	10 years
5	Female	57	Grade 1	Kampong Tralach	Administration Office	28 years
6	Female	46	Grade 4	Kampong Tralach	Maternity Ward	8 months

Sampov Lun Referral Hopsital is located in the far western region of Cambodia. This group had a near equal split of men and women. This group also had a wide range of education and time in role.

Table 5: Focus Group Discussion Participant Demographics- Sampov Lun Referral Hospital

Participant	Sex	Age	Grade	Hospital	Ward	Time in Role
1	Male	22	No formal Education	Sampov Lun	Emergency, Operational District	3 years
2	Male	68	Grade 7	Sampov Lun	Kitchen	17 years
3	Male	40	Grade 9	Sampov Lun	Surgery	11 years
4	Female	40	Grade 2	Sampov Lun	Surgery	11 years
5	Male	38	Grade 3	Sampov Lun	General Medicine and Tuberculosis Center	3 years
6	Female	34	Grade 3	Sampov Lun	Maternity Ward	1 year
7	Female	36	Grade 3	Sampov Lun	Pediatrics	6 years
8	Male	45	Grade 11	Sampov Lun	Pediatrics, Chief of Sanitation	9 years

Thbong Khmom Referral Hospital is located in the southeastern region of Cambodia. This group had an equal split between male and female participants. In addition, this group represented a wide range educational level, from no formal education to grade twelve. There was also a range of time-in role, from one month to nineteen years.

Table 6: Focus Group Discussion Participant Demographics- Thbong Khmom Referral Hospital

Participant	Sex	Age	Grade	Hospital	Ward	Time in Role
1	Female	53	Grade 2	Thbong Khmom	Maternity	19 years
2	Female	29	Grade 8	Thbong Khmom	Pediatrics	3 years
3	Male	53	Grade 3	Thbong Khmom	Courtyard	1 month
4	Male	42	Grade 3	Thbong Khmom	Courtyard	10 years
5	Female	37	No formal education	Thbong Khmom	Eye Care Ward	6 years
6	Male	71	Grade 3	Thbong Khmom	Courtyard	13 years
7	Female	45	Grade 8	Thbong Khmom	Surgery	15 years
8	Male	25	Grade 12	Thbong Khmom	General Medicine	3 years

Focus Group Discussion Guide:

The focus group discussion guide was designed by the Emory research team for group discussions to last around one hour. The focus groups were designed to gather information about the cleaner experience. Topics included twenty-three questions divided into four major categories: the duties of a cleaner, supplies, taking care of the hospital, and training for the cleaner role. The guide was originally written in English and was then translated into Khmer for administration to focus group participants by a Cambodian partner. A full copy of the focus group discussion guide can be found in Appendix B.

Qualitative Analysis Approach

For both the focus group discussion data and the key informant interview data, analysis began by building a list of themes generated from a literature review and the interview and focus group discussion guides. For the key informant interviews, the initial codes included: supplies and products, working with and/or training cleaners, hospital cleanliness and supervisor duties. After an initial review of the key informant interview data, an inductive approach to coding was taken with the addition of a new set of codes generated from the data. The new inductive codes were extensive and included: supply shortage, supply management, sanitizing of cleaning supplies, lapse in cleaning, cleaner shortage, cleaner compensation, cleaner processes, cleaner-supervisor relationships, staff turnover, training needs, lack of training, supervisor assessment processes, personal protective equipment, visual assessment of cleanliness, supervisor definition of cleanliness and direct mention of infection prevention and control.

For the focus group discussions, the initial codes included: supplies and products, training, hospital cleanliness and cleaner duties. After an initial review of the focus group discussion data with these codes, an inductive approach to coding was taken with the addition of a new set of codes generated from the data. These codes included: supply shortage, supply management, cleaning processes, respect/value, non-cleaning work, cleaner/supervisor relationship, cleaner definition of cleanliness and direct mention of infection prevention and control. After the focus group discussion data and the interview data were separately analyzed, the themes from each category were compared with each other and existing literature.

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a new set of codes generated from the data. These codes included: supply shortage, supply management, cleaning processes, respect/value, non-cleaning work, cleaner/supervisor relationship, cleaner definition of cleanliness and direct mention of infection prevention and control. After the focus group discussion data and the interview data were separately analyzed, the themes from each category were compared with each other and existing literature.

Ethics

IRB approval was sought and received in both Cambodia and the United States. Each participant was made aware of the purpose of the study and their role in the study and provided either verbal or written consent for their participation in the study.

Limitations

In the transcripts, there appeared to be multiple instances of leading questions, respondent interruption and double-barreled questions by the interviewer. This may contribute to a level of facilitator bias in respondent answers. To alleviate any issues this may have caused, no conclusions were made from responses that followed particularly leading questions or facilitator interruption of the respondent. In addition, the researcher performing the analysis was unfamiliar with the Cambodian healthcare context.

CHAPTER IV: Key Informant Interview Results

Key Informant Interview Themes

After initial thematic coding and a second round of inductive coding, a number of themes presented themselves from the key informant interviews. It is acknowledged that the key informants cover a spectrum of experience, job expectations and the ward in which they supervise and that these differences may contribute to nuances in interpretation of responses. However, for the purposes of this study – gathering high level information to identify gaps in the existing cleaning structures – a variety of perspectives proves beneficial.

There did not appear to be any major differences of opinion based on factors such as age, gender or amount of time in role. Based on the interview guides, the interviews were originally designed to identify issues in four categories: 1) supervisor duties (as related to management of cleaning staff), 2) resources, including supplies and products, 3) working with and training cleaners and 4) hospital cleanliness. The results will be discussed under these broader categories.

Respondents reported a variety of concerns that inhibited optimal cleaning processes; ranging from issues in infrastructure, training, and insufficient time to supervise cleaners. From the original interview guide categories above, four major themes were identified regarding barriers to achieving optimal hospital cleanliness. They included:

- Supervisor duties: limited cleaner supervision and visual assessment of cleanliness only.
- Resources: shortage of human resources.
- Working with and training cleaners: a lack of cleaner training or supervisor perceived need for additional training for cleaning staff.

Supervisor Duties

Limited Cleaner Supervision and Monitoring

A major theme presented in the interviews was that of cleaner supervision as a secondary role. When describing their responsibilities, respondents often listed several other roles that they filled in addition to managing cleaning staff and noted that their other responsibilities required more of their time. This suggests that managing the cleaning staff is not a priority and leaves cleaners to formulate and manage their own time, processes and expectations of cleanliness.

Interviewer: *what is your daily work basis?*

Participant: *I manage staff*

Interviewer: *Okay, what else?*

Participant: *And the cleaning unit*
Interviewer: *staff and…*

Participant: *the staff at the ward*
Interviewer: *Okay, the staff at the ward*

Participant: *Yes.*
Interviewer: *and cleaner staff*

Interviewer: *What else?*
Participant: *I manage workers both patients' rooms and offices*

Interviewer: *Okay.*
Participant: *Maternity Room. I oversee everything*

Interviewer: *what else?*
Participant: *I also join other activity at the hospital such as I attend the Financial Committee Meeting, Management Committee and so on. I also oversee some works at the hospital for instance care system for the internship programme.*

Interviewer: *Care system for the internship programme?*
Participant: *Yes*

Interviewer: *What else?*
Participant: *I think that's it.*

Interviewer: *Okay.*
Participant: *However, do you have other follow up activity with the Health Centre for example to meet with the midwives?*

Interviewer: *Okay.*
Participant: *I go to meet with the midwives at the health centre or OD at Stoung, Baray in Kamong Thom.*

Interviewer: *Okay.*
Participant: *I am a Chair of Provincial Midwives Committee. I have responsibility in managing the financial contribution from the midwives and provide this financial support to members whenever they are sick and dead.*

Interviewer: *Oh, you have lots of works. Your work also focuses on sanitation and hygiene in the hospital where your ward is.*
Participant: *Yes.*

Interviewer: *Okay, then…*
Participant: *It is not just my ward, but I also monitor the other ward in collaboration with the Chief of Care*

[Participant: Female, Age 53, Chief of Maternity Ward, Kampong Thmom Referral Hospital]

Eight out of nine respondents spent less than two hours each day checking in with cleaners and auditing cleaning processes to ensure sufficient cleaning. Every respondent reported checking cleanliness levels only at the beginning of their shift, most often in the morning. There

There was no mention of follow-up checks throughout the day, suggesting a major gap in cleanliness monitoring. The most common reported time spent devoted to monitoring cleaning staff was thirty minutes to an hour with follow-ups throughout the day only if a problem arose. The two respondents that reported longer times devoted to monitoring cleaning, were in charge of multiple wards. One respondent mentioned only having time to devote to monitoring of the cleaning staff while they were off duty. For example:

Interviewer *: Ok, so you check both inside and outside. So I want to ask that you have two core functions which mean overall supervision and hygiene. In relation to hospital hygiene, to ensure the cleanness of your unit, in general you have spent for how many hours?[interpreted as: In relation to hospital hygiene, to ensure the cleanliness of your unit, how many hours do you spend?]*

Participant*: Er…if talk about the hygiene and hours, maybe not so much because we have lots of work to do. In the morning we help to check the ward, and I also check the outside if in case there's any problem, we tell the cleaner*

Interviewer*: So, approximately for how many hours?*

Participant*: Maybe half an hour*

Interviewer*: So about half an hour*

Participant*: Yes*

[Participant: Male, Age 28, Chief of Surgery Ward, Thbong Khmom Referral Hospital]

Interviewer: *What do you monitor in terms of cleaning?*

Participant: *My daily monitor is to check all places around the block and cleaning the materials.*

Interviewer: *Do you ask them to clean the materials as well?*

Participant: *Yes of course, we always rely on them to take care of it.*

Interviewer: *How long have you spent to monitor it?*

Participant: *At least one or two hours during my off duty. Sometime, I do it by myself when it is not clean.*

[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]

Interviewer*: So how do you monitor the cleaner on how she mix the water with the soap liquid, how she wipes, have you monitor these thing?*

Participant*: No, only tell [interpreted as: supervisor performs daily check in without monitoring the actual work done]*

Interviewer*: Only tell but not daily monitor?*

Participant*: Yes*

[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]

Interviewer*: You don't know they do or not?*

Participant*: Just to see the result if the place clean or not, but I have not closely monitor when they actually perform the job*

[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]

> ***Interviewer:*** *Do you monitor them directly?*
>
> ***Participant:*** *Sometime we are busy with other works, so we watch them from the distance.*
>
> **[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]**

> ***Participant****: Talk whenever I met her but not so much now as I do not want to talk, unless whenever the smell is too strong, so that I check if she changes the water? [interpreted as: supervisor only checks in with cleaner if the unit smells bad]*
>
> **[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]**

In addition, no respondent reported having any type of protocol or checklist for monitoring. Given the numerous other responsibilities of cleaner supervisors, it is possible that all areas are not being sufficiently audited. An example of this is provided below.

> ***Interviewer****: But do you have kind of guideline?*
>
> ***Participant****: No, I don't have it.*
>
> ***Interviewer****: for example, do you provide any guiding note for them to clean the baby's washing sink or the maternity room?*
>
> ***Participant****: Not at all*
>
> ***Interviewer****: You don't have it*
>
> ***Participant****: Yes, we only tell them verbally*
>
> **[Participant: Female, Age 50, Chief of Maternity Ward, Kampong Tralach Referral Hospital]**

In considering the role of cleaning staff supervisors and the greater issue of cleaning efficacy, every respondent stated that managing and ensuring hospital cleanliness was the responsibility of all health staff, from doctors to cleaners. This suggests that supervisors view cleanliness as an important issue that cannot be effectively managed by one designated person in a ward.

> ***Interviewer****: No worry, I want to ask who in your team or in the hospital that are in charge to keep the hospital cleaned.*
>
> ***Participant****: Usually it is the job of the cleaner that is the busiest person on this area*
>
> ***Interviewer****: Ok, first is the cleaner*
>
> ***Participant****: However, in my unit, I think everyone have to involve. If participation is there, then our place would be better and cleaner.*
>
> ***Interviewer****: Yes, staff in your unit and do you mean all?*
>
> ***Participant****: Yes, all staff*
>
> ***Interviewer****: Including doctor?*
>
> ***Participant****: Yes*
>
> **[Participant: Male, Age 28, Chief of Surgery Ward, Thbong Khmom Referral Hospital]**

Visual Assessment of Cleanliness

Every respondent described their supervision process as checking in with cleaners and conducting a brief visual assessment of their charge areas. No respondents reported any kind of environmental testing of cleanliness to certify a bacteria free environment; rather the opposite was

true. For example, one supervisor reports touching surfaces to check for dust. If the surface was not dusty, it was deemed satisfactorily clean.

Interviewer: *I mean that how do you evaluate the cleanness? For example, you come in to the room and you see it cleaned – how do you evaluate it?*

Participant: *It is not important if the floors are clean, but the materials are dirty – I would not say it is clean.*

Interviewer: *How do you evaluate it? Since you see your ward is not clean, for example: this place is not clean, the basin is not well clean. Do you evaluate it by your own eyes? Or how?*

Participant: *I use my hands to touch it*

Interviewer: *Do you use your hands to touch it?*

Participant: *Yes.*

Interviewer: *If you touch there is no dust, it means it is clean.*

Participant: *No dust – this is what we evaluate outside. It doesn't conclude that they are all clean. We need to use our hands to touch it.*

Interviewer: *Okay, it has dust or not.*

Participant: *Yes.*

[Participant: Female, Age 53, Chief of Maternity Ward, Kampong Thom Referral Hospital]

In addition, no respondents reported any type of standard checklist or protocol to ensure that each area under their charge was being cleaned consistently. Instead, every supervisor detailed their monitoring process as consisting solely of visual inspection, to varying degrees of scrutiny.

> ***Interviewer****: You don't know they do or not?*
>
> ***Participant****: Just to see the result if the place clean or not, but I have not closely monitor when they actually perform the job*
>
> **[Participant: Female, Age 46, Chief of Maternity Unit, Thbong Khmom Referral Hospital]**

One respondent even described cleaners only cleaning surfaces if they were visibly dirty.

> ***Interviewer****: Does not ask the cleaner?*
> ***Participant****: Just ask the cleaner after they have cleaned most of the parts and if there is no delivery [of a baby], then the cleaner no need to clean.*
> ***Interviewer****: Which mean if there's no stain after the delivery, the cleaner does not need to clean?*
> ***Participant****: yes*
>
> **[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]**

Another respondent reported being satisfied with an “80% clean” facility because that was the best they could do.

***Interviewer**: Is it enough clean?*
***Participant**: My hospital doesn’t clean 100%, at least 80% cleaned.*

***Interviewer**: is it only 80% cleaned?*

***Participant**: Yes*

***Interviewer**: I would like to know if you satisfy with this clean?*

***Participant**: Yes, I satisfy with it.*

[Participant: Female, Age 50, Chief of Maternity Ward, Kampong Tralach Referral Hospital]

In addition, when asked to define a “clean hospital”, most supervisors described a visibly clean environment rather than a pathogen free environment.

***Interviewer:** What would you refer to in term of cleaned hospital?*

***Participant:** The cleaned hospital, I think the first thing related to infrastructure and second thing related to the environment in/outside hospital are clean – they look clean everywhere.*

[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]

Studies in India have proven that visual assessment may not be a sufficient indicator of microbiological safety (Weber, 2019). Quality assessment of cleanliness is an integral part of an effective infection control program. “Visual cleanliness assessment may overestimate the level of environmental cleanliness…. Objects were frequently deemed to be visually acceptable yet may not have been cleaned.” (Mitchell, 2015) Evidence has demonstrated that environment is a key player in transmission of HCAIs. Therefore, environmental hygiene management must be a priority in every area of a healthcare facility and visual assessment of cleaning efficacy is not sufficient.

In contexts where consistent microbiological screening is not attainable, changes in management structure may have the potential to improve cleaning outcomes. A supervisory structure with a protocol that ensures key areas and surfaces are being inspected consistently and frequently, throughout the day, could provide an added level of support and accountability for cleaners. Increased supervision will can positively impact cleaning outcomes and patient health. A previous study has noted that improved cleaner supervision may have been a major contributor to a 30% decrease in microbiological contamination of high-touch surfaces (Dancer, 2016). It stands to reason that improved supervision has the potential to make sure that key areas are being effectively cleaned and that no areas are being missed or ignored.

Resources

Shortages: Human Resources

Across the key informant interviews, a shortage of human resources was reported as an issue. In some cases (six out of nine interviews), respondents reported that they did not have enough cleaners to maintain the appropriate levels of cleanliness in their wards. Examples include the following:

> ***Interviewer****: in case you have shortage, what is it?*
>
> ***Participant****: I have shortage labor resource. One cleaner is not enough.*
>
> ***Interviewer****: Do you have shortage of cleaner?*
>
> ***Participant****: Yes*
>
> **[Participant: Female, Age 50, Chief of Maternity Ward, Kampong Tralach Referral Hospital]**

> ***Interviewer:*** *Are you shortage staff?*
>
> ***Participant:*** *Yes, I am.*
>
> **[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]**

Supervisors reported having to conduct cleaning assessments while off duty. In one case, a supervisor reports having to help cleaners because they were unable to keep up with cleaning demands.

Interviewer: *How long have you spent to monitor it?*

Participant: *At least one or two hours during my off duty. Sometime, I do it by myself when it is not clean.*

Interviewer: *What did you do? Sweeping?*

Participant: *I mop the floors, and I wipe the mirror and so on.*

[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]

Other respondents reported overworked cleaners and attributed less than optimal cleaning outcomes to exhausted workers. Age was also a factor that was mentioned as a contributor to poor cleaning outcomes. Examples include:

Participant*: "Sometime, they said they are too exhausted and tired and no commitment to the work."*

[Participant: Female, Age 50, Chief of Maternity Unit, Kampong Thom Referral Hospital]

Interviewer*: What if no one clean? And who take care?*

Participant*: No, the cleaner is always on duty*

Interviewer*: Fully responsible*

Participant*: Yes*

Interviewer*: Is it difficult?*

Participant*: Sometime everything was not properly cleaned as she is old*

[Participant: Female, Age 46, Chief of Maternity Unit, Thbong Khmom Referral Hospital]

This presents a major issue in maintaining hospital cleanliness. Without sufficient staffing, it is unreasonable to expect cleaners to be able to keep up with the demands of hospital. This can directly lead to missed areas of cleaning or insufficient disinfection, which subsequently can result in environmental transmission of pathogens and high rates of HCAIs. These responses support existing literature that considers shortage of workers and the subsequent overworking of existing cleaners to a be a key contributor to poor cleaning outcomes (Salerno, 2012).

Working with and Training Cleaners

Lack of Training/Perceived Need for Additional Training

All respondents noted that their cleaners had received little, if any training upon beginning their role as a cleaner.

Respondents across hospitals acknowledged the need for greater training opportunities for cleaning staff. Respondents noted that infection prevention and control was a major opportunity for initial or continuous education and thought that additional training would improve cleaning outcomes. Three respondents also noted that alternate methods of education dissemination would be required for their illiterate staff and that picture reminders would be helpful tools to have throughout facilities. Examples include:

***Interviewer**: We've never train the cleaner on how to clean the room?*
***Participant**: No never*
***Interviewer**:…..We would create problem with the patient because everything is not clean and no infection control, you aware of this right? Infection control*
***Participant**: Yes I have learned on the sterilize material but not on how to wipe the floor*
***Interviewer**: So we should have that course*
***Participant**: I've never been to a course on wipe the floor but only to clean the material*

[Participant: Female, Age 46, Chief of Maternity Ward, Thbong Khmom Referral Hospital]

***Interviewer**: We've never train the cleaner on how to clean the room?*
***Participant**: Disagree. They said that there is no need to train them. However, I would think that they should have trained because they do this work.*

[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]

***Interviewer**: Since you start your job, have you ever train her on how to clean?*
***Participant**: No I have not*.

[Participant: Male, Age 45, Chief of Anesthetic Unit, Kampong Thom Referral Hospital]

Interviewer: *From your opinion, do you think cleaner staff should have received training?*
Participant: *Yes, of course.*

Interviewer: *Training on what?*
Participant: *infection control*

[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]

Interviewer: *Okay, how would you train people who don't know at all? What is the good way to train them?*

Participant: *The way of how to train those who don't have much knowledge. First, we need to have a short document/lesson and we make it in bullet points – for example: 7 bullet points and so on. We need to read for them when we project it.*

Interviewer: *If you have Video, what would you do with it?*

Participant: *It is even much better.*

Interviewer: *Such as wash your hand, if you don't wash your hand – what is on your hand? It is great idea. The way you teach them is based on their level of knowledge and age as well. You know how to teach those who have low education, first you make it short and read it for them, you also have projector so that they could see and capture it onto their mind. Video is even much better for them. What else would you need?*

Participant: *Handout should be shared with them. We need to demonstrate them prior to the group practice – it is from my experience, the teacher demonstrated it first and then asked students to practice it individually or group. It is quick learning.*

[Participant: Male, Age 49, Chief of Anesthetic Unit, Sampov Lun Referral Hospital]

***Interviewer**: Any other approach?*

***Participant**: Yes, to have a poster hang on the wall of hospital on how to clean and wipe. Picture would also work well.*

***Interviewer**: Ok, picture*

***Participant**: Yes, banner or poster*

***Interviewer**: OK poster*

***Participant**: Yes poster*

***Interviewer**: Some picture to hang on the wall, so that they would remember*

***Participant**: Yes*

[Participant: Male, Age 28, Chief of Surgery Ward, Thbong Khmom Referral Hospital]

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CHAPTER V: Focus Group Discussion Results
Cleaners Focus Group Discussion Results

Focus Group Discussion Key Themes

Among respondents, there did not appear to be any major differences of opinion based on factors such as age, gender or amount of time in role. The focus groups were designed to gain information from cleaners regarding four issues: cleaner duties, supplies and products, training and hospital cleanliness. Three major themes emerged from the data. They included: visual assessment of cleanliness, knowledge of infection control and a desire for additional training.

Visual Assessment of Cleanliness

A consistently repeated theme across participants in the focus groups was a definition of cleanliness derived directly from visual appearance. Only upon significant probing from the discussion facilitator and sometimes a line of direct questioning, did participants bring up cleaning as a measure of infection control. For many, the purpose of cleaning was to provide a pleasant atmosphere for patients.

Facilitator: *Okay, now your turn – how do you define the cleaned hospital? Please give an example – how you make hospital cleaned?*

Participant 1: *For me, I need to sweep and mop it until it looks cleaned*

Facilitator: *Okay. You wipe and mop it [until] it looks cleaned – what else do you have?*

[Participant: Male, Age 42, Cleaner- Courtyard, Kampong Tralach Referral Hospital]

Facilitator: *Okay, I would like to ask a question. What about person number 7? What do you mean to keep the hospital cleaned? Please give an example. What do you do to make the hospital cleaned?*

Participant 7: *The meaning of cleaning is people feel refresh when they come in.*

Facilitator: *How do you make it cleaned?*

Participant 7: *I need to wipe and make it organized.*

Facilitator: *To make it organized? Apart from the cleaning that you have seen it – what do you do? To make the hospital cleaned and provide the healthiness to people – what else do you do? What does it mean? The cleanness of tables, beds and so on – what does it mean?*

Participant 7: *When people come in, they feel cleaned, To make them good health. To prevent from infection.*

Facilitator: *Okay, apart from the good look of hospital, does it prevent from infection?*

Participant 7: *Yes.*

[Participant: Female, Age 45, Cleaner- Emergency Ward, Thbong Khmom Referral Hospital]

Facilitator*: Now what do you mean by clean, you refer to a situation where there is no trash, dust or you refer to other stuff. Chief of cleaner, what do you mean by having the hospital cleaned?*

Participant 3*: we mean that, to have the hospital cleaned – there is no trash such as plastic bag, no dust on the floor, beds where the patients stay. Health staff and patients would have good mood as they would [be] proud of the clean hospital.*

[Participant: Female, Age 33, Cleaner- Maternity Ward, Baray Santuk Referral Hospital]

In addition, multiple participants mentioned assessing their own cleaning tasks by cleaning what appeared to be dirty or smelled bad. Furthermore, self-auditing was limited to whether or not a surface looked clean.

Facilitator: *Okay, you don't have more comment. Let me go to another question of the third topic. As cleaner staff, how do you know that space is clean for example this table, the space at maternity room, they normally call delivery bed or handwashing sink – how do you know it is clean?*

Participant 3: *We know it is clean when there is no blood or other pieces of dust. Normally, the thing is not clean, there is blood stains and other pieces of dust – we can see it is not clean. When we see, it is not clean, we have to wipe it and make sure the blood stain is removed. For example, the stretcher has blood and mucus on it, we need to apply soap liquid few times before applying detergent to mop it. Once it is fragrant, we can see it cleaned.*

[Participant: Male, Age 40, Cleaner- Surgery Ward, Sampov Lun Referral Hospital]

Facilitator*: What do you mean the same? Please give an example.*

Participant: *I clean the bed where there is stain. I apply soap liquid to clean that bed. I, myself see if it is clean.*

[Participant: Unidentified Cleaner, Sampov Lun Referral Hospital]

Facilitator*: Okay, I would like to ask another question. As the cleaner staff, how do you know the handwashing sink or table are clean? How do you know it?*

Participant: *It looks clean, and no dirty. I use my hands to touch if there is no dust.*

[Participant: Male, Age 42, Cleaner- Courtyard, Thbong Khmom Referral Hospital]

Knowledge of Infection Control

General knowledge of infection control appeared to be a gap across many participants. When prompted, many respondents could not provide much information about how their cleaning impacted infection transmission.

> ***Facilitator****: What do you do to make the hospital cleaned? To prevent from infection?*
>
> ***Participant:*** *To prevent from infection, we have to… it is hard to say*
>
> **[Participant: Unidentified Cleaner, Thbong Khmom Referral Hospital]**

> ***Facilitator****: Okay, that's how you know about the transmission as a cleaner staff, what about getting infection through touching something – do you know it?*
>
> ***Participant 2****: not yet*
>
> **[Participant: Female, Age 38, Cleaner- Pediatric Ward, Kampong Thom Referral Hospital]**

Those participants that did have some knowledge of infection control, shared their knowledge in the context of cleaning supplies, primarily noting that *eau javel* and certain kinds of soaps were for killing bacteria and thereby preventing infection.

***Facilitator**: Okay, you apply soap liquid and detergent is to avoid bad smell?*

***Participant 2:** I mean to make it cleaned, it has to kill bacteria*

Not only the bad smell, it is also clean

We have to kill bacteria at the maternity room – it needs to be clean. We have to clean it as it will get infection to other.

[Participant: Unidentified Cleaner, Sampov Lun Referral Hospital]

Desire for Additional Training

All participants noted that they received little to no training when they started in their role as hospital cleaners. In addition, the majority of participants mentioned a desire for additional training, especially as related to infection control.

***Facilitator**: Okay why do people find it unclean – what is your weakness?*

***Participant 2**: we need more learning since we have limited knowledge*

***Facilitator:** lack of knowledge?*

***Participant 2:** lack of knowledge and training*

[Participant: Female, Age 38, Cleaner- Pediatric Ward, Kampong Thom Referral Hospital]

Facilitator: *Okay. Let me ask another question. From your opinion, why other cleaner staff do not receive training adequately. Why don't we receive adequate training?*

Participant 1: *Not at all*

Facilitator *Why don't you receive training at all?*

Participant 1: *I don't know. We have never been asked to get training – so we don't know how to answer you.*

Facilitator: *Have you never ever been attended any training?*

Participant 1: *The way we are working, it is from our own. We also see how the other people do, and then we follow them.*

[Participant: Female, Age 53, Cleaner- Surgery Ward, Thbong Khmom Referral Hospital]

Facilitator*: Your idea*

Participant 1: *my idea is that I would like to have more experience since we have limited education and we always followed doctors. Sometimes, we don't clean it well as it does not meet the standard so we want to have more experience on this.*

Facilitator: *you want to have more experience on this. So what kind of training do you need for your team to meet the standard?*

Participant 1: *I would like to have training on sanitation – how to prevent infection. We need more advice on this issue.*

[Participant: Female, Age 33, Cleaner- Emergency Ward, Baray Santuk Referrral Hospital]

According to respondents across both the interviews and the focus group discussions, supplies are not a key concern in promoting optimal hospital cleanliness. This includes water, cleaning products and cleaning supplies. Respondents from all six hospitals reported being satisfied with the amount of supplies that were available or alternatively were able to obtain supplies in a timely manner from nearby markets, when hospital inventory was low. Every supervisor and every respondent reported having a variety of cleaning products, including liquid and powdered detergent and most notably eau javel or bleach for disinfecting hospital surfaces. In the case of the six Cambodian hospitals surveyed, a shortage of supplies do not seem to be a contributing factor to the conversation about increasing levels of hospital cleanliness.

CHAPTER VI: Discussion

The role of cleaning staff in maintaining effective infection control practices is often undervalued and understudied. Despite the fact that they are frontline workers in the fight against environmental transmission of pathogens and healthcare associated infections, they are rarely mentioned in infection control structures and procedures. They are often left out of infection control trainings and this is especially true in developing contexts, where resources may be limited and infection control programs focus on healthcare workers such as doctors and nurses. In 2016, the World Health Organization released their updated Guidelines on Core Components of Infection Prevention and Control Programmes (WHO, 2016). This document outlined recommended infection control procedures at both the national and acute healthcare facility levels to improve patient outcomes and reduce rates of HCAIs. These guidelines recommend the that at minimum, facility level infection control procedures should include protocols addressing the following: standard precautions, hand hygiene, use of personal protective equipment, sterilization and medical devices decontamination, safe handling of linens and laundry, health care waste management, patient placement, respiratory hygiene and cough etiquette, environmental cleaning, principles of asepsis, prevention of injuries from sharp instruments, transmission-based precautions and aseptic technique and vice management for clinical procedures. (WHO, 2016) Despite the fact that in many contexts, particularly resource-limited contexts, five of these thirteen categories are highly likely to involve cleaning staff; cleaning staff are only briefly discussed as stakeholders in the infection control and prevention. The link between environmental hygiene and effective infection control and prevention cannot be ignored. Subsequently, the importance of cleaning staff in effective infection control and prevention

cannot be ignored. Several key areas in WHO guidelines have been revealed in this study to be gaps and potential areas of improvement in the surveyed hospitals. They include, maintaining a hygienic environment, infection control training and continuous education, adequate staffing and heightened auditing of cleaning processes to ensure efficacy.

WHO guidelines recognize that a hygienic environment, including materials and equipment, is a necessity in facilitating an environment that is conducive to breaking the transmission of pathogens. They state that "assurance that patient care activities are undertaken in a clean and hygienic environment" (WHO, 2016, p. 30) is vital. Without effective cleaning staff and management of cleaning staff, this goal is virtually impossible to achieve. Recognizing the vital role of cleaners in IPC is a key first step in closing gaps in cleaning processes.

WHO guidelines also note that IPC education and training is at the forefront of effective infection control programs. The recommendation is to include all new employees in infection control training and "to provide continuous educational opportunities for all staff, regardless of level and position" including administrative and housekeeping staff". (WHO, 2019, p. 12) "All health care workers involved in service delivery and patient care: clinical staff, laboratory and other health care workers such as cleaners…should understand IPC measures embedded within clinical procedures, the importance of precautions for biohazard security and the risks associated with the environment." (WHO, 2016, p. 35)

Data from this study supports IPC training as an area of opportunity in Cambodian hospitals. Cleaners reported having only brief introductions to their roles as cleaners, consisting mostly of verbal instruction on cleaning processes. A number of participants stated that they should already know how to clean, that the job was not a difficult one. In addition, the majority of cleaners, desired additional training of some sort, infection control being a high priority

among most. Cleaning supervisors made mention of training opportunities in infection control that existed but were either not extended to cleaners, or not made mandatory.

"All health care workers involved in service delivery and patient care: clinical staff, laboratory and other health care workers such as cleaners…should understand IPC measures embedded within clinical procedures, the importance of precautions for biohazard security and the risks associated with the environment." (WHO, 2016, p. 35) Data from this study reveal training and education as a gap in cleaning staff contribution to infection control.

The WHO guidelines also noted that "auditing of cleaning procedures is often neglected and should instead be prioritized with performance feedback given to cleaners as an important part of the frontline team" (WHO, 2016, p. 63). This is a key opportunity in the study hospitals, as both supervisors and cleaners reported an overall lack of consistent, effective auditing of cleaner endeavors. Supervisors and cleaners alike, reported a complete lack of an auditing protocol beyond visual assessment. Despite a lack of specific evidence in this area, it stands to reason that IPC programs which have benefited from greater structure and indicators in other areas, should also apply similar approaches to the cleaning portion of infection control management. Within the context of this study, both auditing of cleaning processes and supervision of cleaning staff appear to be lacking.

Supervisors reported extremely brief check-in times with cleaning staff and cursory auditing of cleaning processes, often only once a day. Without proper auditing, effective cleaning cannot be assured and changes cannot be made. Auditing does not necessarily need to happen at the supervisor level. Designing protocols and/or checklists for cleaning staff to follow could be a feasible, first step. Poor supervision has also been identified as a contributor to poor cleaning

outcomes. Supervising of cleaners is rarely a designated role, but rather is given as an addendum to another healthcare provider role. This often leaves little time to devote to effective supervision and can lead to cleaners working without high levels of accountability.

In addition, visual assessment cannot serve as a standalone method of auditing. In both the interviews and focus group discussions, reports of visual assessment of cleanliness were very common. Supervisors briefly toured the wards they were responsible for and only required follow-up cleaning for bad smells or visibly dirty surfaces. Neither supervisors nor cleaning staff reported a check-in between supervisors and cleaning staff that included information about what had or had not been cleaned or how. With both cleaners and their supervisors, a shortage of staff leads to high levels of "visual assessment" of cleanliness, which is an entirely subjective measure of facility cleanliness.

Finally, "aesthetic" approaches to cleaning are common, particularly in LMIC settings. Cleaners have reported cleaning only those surfaces which "looked dirty" or are first seen upon entrance to a room (Dancer, 2009). A study in India, tested surfaces that had been deemed "clean" by visual assessment and found that visibly clean surfaces were not microbiologically sterile. Pathogenic bacteria were reported on beds and mops and buckets used for cleaning. 31% of tested surfaces remained positive for pathogenic bacteria. Even the "cleanest" (by visual assessment) facilities maintained high levels of surface contamination (Weber, 2019). In another study, the addition of a single cleaner to a ward, combined with a two hour per week increase in supervision, resulted in 32.5% reduction in microbial contamination at high-touch locations like over-bed tables, beds, and sinks (Dancer, 2016). This presents a major opportunity for improvement in the study hospitals.

CHAPTER VII: Conclusion

The purpose of this project was to examine the experiences of hospital cleaners and their supervisors and explore the role that they play in maintaining optimal environmental hygiene and effective infection control. Through nine key informant interviews with the supervisors of hospital cleaners and five focus group discussions with cleaners themselves, a number of opportunities for improvement emerged. As it stands, there are gaps in effective infection control between the realities in the surveyed hospitals and infection control standards as recommended by the World Health Organization. Labor shortages, lack of effective supervision, consistent use of visual assessment as the only form of auditing for cleaning processes and a general lack of training for supervisors and cleaners on effective IPC procedures certainly contribute less-than environmental hygiene outcomes and are likely a contributor to HCAIs.

From this project, two major areas of improvement are clear. It is necessary to improve supervision of cleaners, including auditing of cleaning processes. Increased supervision can improve support and accountability for cleaners and catch areas that may not have been effectively cleaned before they become potential sites for environmental transmission of pathogens. The second area of opportunity is training. The WHO and the PAHO (WHO), 2018) specifically state that training is a key component of effective IPC programming. The data from this project reveals a major gap in training for both supervisors and cleaners. Initial and continuous training on infection control has the potential to provide necessary knowledge and increase investment in hospital-wide IPC programming. This can, in turn, improve environmental hygiene outcomes.

The role of cleaners in effective IPC must be recognized. Healthcare facilities can only benefit from additional investment in cleaners, with potential impacts including: better

environmental hygiene, staff satisfaction, patient satisfaction, and ultimately a reduction in healthcare associated infection.

Appendix A: Cleaner Supervisors Key Informant Interview Guide

Interview Guide – CLEANER SUPERVISOR

Main Questions: (60 MIN)

Topic 1: Supervisor Job Duties

SAY ALOUD: The first few questions are about your activities and duties in this healthcare facility or hospital.

1. *How long have you been working at this hospital?*
2. *What are some of your job duties on a normal day?*
3. *Of everything you do, how much time do you spend supervising cleaners?*
    a. *Are there other people who supervise the cleaners? If yes, who?*
4. *How long have you been responsible for cleaners?*
    a. *Who was the cleaner supervisor before you (if you know)?*
5. *Do you participate in hiring the cleaners?*
    a. *If yes, what do you generally look for when you hire cleaners? What type of person are you looking for?*
6. *How often do you have to hire new cleaners?*
    a. *How long does a typical cleaner stay employed in your hospital?*

Topic 2: Working with and Training Cleaners

SAY ALOUD: Now I would like to discuss your experiences working with and training cleaners

1. *What is the greatest challenge when working with cleaners?*
2. *On average, how often does a cleaner not come to work due to illness or some other reason?*
3. *How do you go about training cleaners?*
    a. *How often do you train them?*

4. *How did you learn "how to train" cleaners?*
5. *What guidelines do you use to train the cleaners? (if any)*
6. *How do you monitor the work of the cleaners? (if at all)*
7. *If you could make changes to how you work with and/or train cleaners, what would you do differently?*

Topic 3: Supplies and Products
**Supplies can be mops, brooms, buckets, cloths, etc. Products can be soap, chlorine, disinfectant, bleach, sprays.*

1. *Who is responsible for obtaining the cleaning supplies and products for the hospital?*
2. *In your opinion, are there enough supplies and products to keep the hospital clean every day?*
3. *When the cleaners need more supplies or products, what is the protocol to get them?*
    a. *How long does it take to get the supplies after a request is made?*
4. *What do you do when you run out of cleaning supplies or products?*

Topic 4: Hospital Cleanliness
SAY ALOUD: My final topic is about hospital cleanliness

1. *In general, what do you think about the cleanliness of this hospital? (Probe: Is it satisfactory? Is it not satisfactory?)*
    a. *If not satisfactory, what would need to change for this hospital's cleanliness to improve?*
2. *Who is/who are the most important person(s) in keeping the hospital clean?*

Closing:
SAY: Thank you for participating in this discussion. Do you have any other reflections to share about cleaners and hospital cleanliness?

Appendix B: Cleaners Focus Group Discussion Guide

Focus Group Guide - CLEANERS

Warm Up Question (5 MIN)*:*

SAY ALOUD: *Please introduce yourself by telling us your name and the hospital or region you represent.*

**If all from same hospital – please tell us how long you have worked as a cleaner in this hospital*

Main Questions: (60 MIN)

Topic 1: The Job of a Cleaner

SAY ALOUD: The first few questions are about the activities and duties of a cleaner in a healthcare facility or hospital.

1. *What do you believe is the job of a hospital cleaner? Or what are the basic duties of a cleaner?*
2. *What areas of the hospital are cleaners responsible for?*
3. *Who usually tells the cleaner what their job is when they first start?*
4. *Who shows the cleaner how to do their job when they first start?*
5. *Who is usually the cleaner's supervisor day to day?*
6. *Are there times when cleaners get asked to do things that seem to be "clinical" or "medical" in nature? (For example: are you asked to advise patients? Sterilize equipment? Give medicine?)*
    a. *If yes, what are some examples of these tasks?*

Topic 2: Supplies

SAY ALOUD: Now I would like to discuss the supplies and products you use in your jobs as cleaners

1. *What are some of the supplies and products that you use to clean the hospital?*
    a. *Supplies can be mops, brooms, buckets, cloths, etc.*
    b. *Products can be soap, chlorine, disinfectant, bleach, sprays.*

2. *What do you use each supply and product for? What is the purpose of each supply and product?*
3. *How well stocked are the cleaning supplies and products in your hospital?*
4. *Have you ever run out of supplies or products to clean? What do you do when you run out of supplies or products?*
5. *Who is responsible for giving you the supplies you need?*
6. *Where do cleaners normally get water to clean the hospital?*

Topic 3: Taking Care of the Hospital:

SAY ALOUD: Keeping a hospital clean is important. I would like to have your opinion about how cleaners accomplish cleanliness.

1. *What does it mean to keep the hospital "clean"? Give some examples of what you do to keep the hospital clean.*
2. *How do you know when a surface or sink is "clean"?*
3. *Are there times that some spaces or rooms don't need to be cleaned? When is that?*
4. *If a cleaner sees blood on the floor or on a surface, what would they probably do? (Probe: tell me exactly what they would do to address the blood)*
5. *Should cleaners wear gloves when they work? Why or why not*

Topic 4: Training for the job

SAY ALOUD: My final topic is about the training of cleaners

1. *When people start working as a cleaner in a hospital what kind of training do they normally receive?*

   a. *What kind of training **should** cleaners receive? What additional training is needed?*

2. *Who do you think is responsible for training the cleaners?*
3. *Why do you think that some cleaners do not receive enough training?*
4. *Do you think the hospital or clinicians value the work of the cleaners? Why or why not?*

Closing:
READ: Thank you for participating in this discussion. I have two final questions for you.

1. *Does hospital cleanliness affect patient care? If yes, how so? If no, why not?*
2. *How would changes in hospital cleanliness be achieved? Who is the most important person in leading change in this area?*

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