HEALTH WORKER AND PATIENT ATTITUDES TOWARDS WATER, SANITATION AND HYGIENE AT A RURAL UGANDAN HOSPITAL

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Table of Contents

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Acronyms

ANC	Antenatal Clinic
BD	Bugiri District
BDGH	Bugiri District General Hospital
CSO	Civil Society Organization
DHO	District Health Officer
EN	Enrolled Nurse
HCAI	Health Care Acquired Infection
HDP	Health Development Partner
HIV/AIDS	Human Immunodeficiency Virus
HSSIP	Health Sector Strategic and Investment Plan 2010/2011-2014/2015
IDA	International Development Association
IMF	International Monetary Fund
LRA	Lord's Resistance Army
MDG	Millennium Development Goal
MDR-TB	Multiple Drug Resistant Tuberculosis
MOH	Ministry of Health
NGO	Non-Governmental Organization
OPD	Out-Patient Department
OOP	Out-of-Pocket Expenditure
PEP	Preventative Exposure Prophylaxis
SNO	Senior Nursing Officer
SSA	Sub-Saharan Africa
SWAp	Sector Wide Approach
TB	Tuberculosis
TST	Tuberculosis Skin Test
THE	Total Health Expenditure
UNICEF	United Nations Children Fund
UNMHCP	Uganda National Minimum Health Care Package
USAID	United States Aid for International Development
VHTs	Voluntary Health Teams
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

Abstract

Background
In low-resource settings, hospitals and health centers face significant challenges in providing a hygienic environment that includes access to improved sanitation facilities and safe water. Currently, there is limited research that aims to quantify the specific barriers health facilities in low-income countries confront when attempting to improve water, sanitation and hygiene (WASH) facilities and behaviors. Yet, the need for improved hygiene and sanitation, as well as clean water, is especially important for health facilities given the inherent need to limit the spread of infectious diseases.

Objectives
The objectives of this research study were to: 1) evaluate current knowledge, attitudes and behaviors of health workers and patients related to WASH at Bugiri District Hospital, a rural public health facility located in Bugiri, Uganda; 2) understand if patient satisfaction is linked to perceived WASH conditions and practices at the hospital; and 3) highlight potential opportunities for improving WASH given the limited resources available.

Methods
Qualitative and quantitative data collection methods were used in the study. Forty-four health workers were interviewed on their attitudes, knowledge and behavior related to WASH, and fifty patients were surveyed on their level of satisfaction with the hospital's WASH conditions and how that relates to their level of satisfaction. Five health workers completed in-depth interviews, and eighteen health workers participated in focus group interviews.

Results
Patient survey results found that several WASH-related factors – the availability of clean drinking water ($p = .0347$), availability of clean and functional toilets ($p = .0018$), and availability of hand-washing facilities ($p = .0004$), were significantly associated with patient satisfaction. Health worker surveys, in-depth interviews and focus group discussions indicated that limited infrastructure and financial resources were the major barriers to improved WASH conditions and practices in the hospital. Seventy-two percent of health workers said that water was not normally available, and reported that on average health workers complete hand hygiene sixty-nine percent of the time when necessary. Almost fifty percent of health workers reported that hand hygiene was low or very low among their priorities. Seventy percent of health workers reported they are highly dissatisfied with the hospitals current sanitation system.

Conclusions
While WASH is an important part of the global development agenda, including WASH at both the household level and at schools, the findings of this study of a rural Ugandan hospital indicate that more efforts are needed to improve WASH conditions and practices in hospital settings. Focusing on WASH in hospitals will likely reduce hospital-acquired infections, improve behaviors among hospital staff and visitors and improve patient satisfaction.

Key Words: Water, hygiene, sanitation, health system, health workers, patient

Introduction

It is estimated that the lack of safe, potable water as well as unimproved sanitation accounted for 0.9 percent of global DALYs in 2010, a significant decrease from 2.1 percent in 1990 (Lim et al. 2012; IHME 2010). However, in Eastern Sub-Saharan Africa, unimproved water and sanitation in 2010 accounted for more than twice the global DALYs at 1.8 percent (IHME 2010).

In Uganda, it is estimated that 15.8 percent of all deaths are due to poor water, sanitation and hygiene (Pruss-Ustun et al. 2008). The economic impact of poor WASH conditions is significant – it is estimated that Uganda loses $US 177 million annually due to poor sanitation, equivalent to 1.1 percent of the national GDP. Approximately $US 8.1 million is lost in access time, $US 147 million due to premature death, $US 1.1 million to productivity losses, and $US 21 million to additional health care costs (WSP 2012).

While WASH has been shown to be critically important at the community and household level, very little research has documented WASH conditions in rural health facilities of low-income countries. These facilities face specific challenges when it comes to WASH given the importance of preventing the spread of infectious diseases in this context.

In the context of Uganda, rural public hospitals are providers of desperately needed health services including obstetric care, emergency health care, as well as services for HIV/AIDS, malaria, diarrhea and other diseases. It is critical to improve WASH infrastructure and hygiene practices at rural public hospitals in Uganda, as they are the primary medical destination for tens of thousands of its citizens. In Uganda, there is a significant urban/rural imbalance, specifically with regard to human resources for health, burden of disease, and overall available resources (AHWO 2009; Strasser 2003). A limited resource environment can translate into poor WASH conditions putting workers, patients, and visitors at a higher risk of contracting infectious diseases. Additionally, many hospitals and health facilities do not have the resources to properly dispose of medical waste that in many instances can be hazardous (ICRC 2011). Rural health centers may also have limited access to electricity or potable water, significantly undermining the

ability of the hospital to achieve improved hygiene and sanitation as well as conduct basic procedures that require a hygienic environment.

Lack of access to improved water and sanitation infrastructure in combination with poor hygiene behaviors foster nosocomial infections (i.e. infections contracted in the health facility). In developed countries, overall prevalence of health care associated infection (HCAI) is reported between 5.1 and 11.6 percent (WHO Fact Sheet 2010). However, there is limited data of HCAI prevalence in developing countries, as many developing countries do not have national HCAI surveillance systems in place. Limited data from developing countries worldwide report that hospital-wide HCAI prevalence rates are between 5.7 and 19.1 percent, significantly higher than HCAI rates in developed countries (WHO Fact Sheet 2010). Overall, the WHO reports that out of every 100 hospitalized patients worldwide, ten in developing countries as compared to seven in developed countries will get an HCAI (WHO Fact Sheet 2010).

Research suggests that these infections are due to inadequate hygienic conditions, poor infrastructure, lack of equipment, poor knowledge and procedure, overcrowding, and understaffing (WHO Fact Sheet 2010). Nosocomial infections pose a great risk to health workers and patients, who may be immunocompromised, and relatives or friends – known in Uganda as 'attendants' – who come to visit patients in the hospital. Little research of nosocomial infections has been undertaken in Uganda, however, results from the Lacor Hospital Case Study show that length of hospital stay was strongly associated with HCAI (Greco et al. 2011). Furthermore, Greco et al. posits that other Ugandan hospitals surveyed presented HCAI prevalence ranging between 17-20 percent, with the prevalence increasing to 50 percent in Intensive Care Units (Greco et al. 2011).

In a 2005 cross-sectional study, Kayanja et al. examined the prevalence of tuberculosis (TB) infection among 396 health workers in three hospitals (Mulago National Public Referral Hospital, private Nsambya Hospital, and private Mengo Hospital) located in Kampala, Uganda. Kayanja suggests that an absence of protective measures for health workers contributed to the high prevalence of health worker TB infection reported in the study. The study found that the prevalence of TB infection reached a staggering 57 percent, and determined that health worker age and department of employment were significantly associated with a Tuberculosis Skin Test (TST) ≥ 10

mm. Although both of these studies were administered in urban Ugandan hospitals, they highlight the risk of nosocomial infections and importance that WASH may play in preventing the spread of infectious diseases in healthcare settings.

Globally recognized Sphere standards document internationally agreed upon minimum standards for humanitarian and disaster response (The Sphere Project 2011). Sphere standards detail the minimum standards for health institutions in disaster or humanitarian related emergencies, and for the purpose of this study were used to assess the current situation at Bugiri District General Hospital (BDGH). Sphere standards state that health centers and hospitals should have a minimum of 5 liters of water per outpatient per day and 40-60 liters of water per inpatient per day, with additional quantities possibly needed for sterilizing/cleaning hospital equipment, laundry, flushing toilets, ect. Sphere standards also state that health centers and hospitals should have a minimum of one toilet per twenty beds/fifty outpatients in the short term, or one toilet per ten beds/twenty outpatients in the long term. Additionally, all water for hospitals and health centers should be treated with some sort of disinfectant, preferably chlorine. In cases of interrupted water supply, Sphere standards state that the health center or hospital should have available water storage to safeguard uninterrupted water supply at normal levels of usage (The Sphere Project 2011).

BDGH in Uganda faces significant challenges towards improving sanitation and hygiene due to limited financial resources, health worker resources, as well as limited accessibility to clean water. The District Hospital is located in Bugiri Town, Uganda along the main highway, a rural location approximately 150 kilometers and four hours driving time from Kampala, Uganda. The District Hospital is a 100-bed facility built in 1967 and has never been renovated; occupancy averages 150-250 inpatients per day and between 300-500 outpatients per day (District Development Plan 2009-2012). Performing daily tasks is difficult given the Hospital's extreme staff shortage – the hospital only employs three doctors, and has a significant nursing shortage.

Additionally, BDGH has unsustainable access to electricity and potable water. The hospital has a generator; however, it was never used during observed power outages due to the high cost of generator diesel. Thus, much like the rest of Bugiri Town, BDGH was subject to extended power cuts to the area. The BDGH potable water infrastructure is

only partially functioning, due to several different factors. The system relies on an electronic borehole pump that pumps water to a large overhead water storage tank, which is then piped underground directly to the hospital. The electronic borehole pump is not supported by an independent generator, and moreover does not operate at full capacity when functioning. Therefore, even when electricity is available, only a limited amount of water is pumped to the overhead water storage tank. The overhead water storage tank is only partially functioning due to extensive leaking, and the tanks current holding capacity cannot support the hospital's day-to-day operations. Based on observations during the study, some days BDGH received no water, while other days received only a few hours of flowing water from the hospital taps. The water tank has never been cleaned (in the over twenty years it has been used by the Hospital) and both the external and internal water piping system have not been renovated or updated since the hospital's original construction. Overall, BDGH faces significant resource and infrastructure challenges that prohibit improved WASH practices at the hospital and most likely promotes nosocomial infection.

Very little research exists on water, sanitation and hygiene knowledge, attitudes and practices among health workers in rural hospitals of low-income countries. The goal of this research is to better characterize hygiene related knowledge, attitudes and practices of hospital staff, as well as evaluate whether patient experiences related to WASH practices at BDGH are significant indicators of patient satisfaction. This research will help to assess what opportunities exist for improving WASH conditions under resource-limited conditions.

Background

Understanding the demographic, political and historical, and economic context of rural Uganda as well as health status of the population is important in determining overall supply and demand of health resources and barriers to implementation of any health or WASH intervention or program. Additionally, an evaluation of Uganda in context of WHO Health System Building Blocks, health system organization, recent health system

strengthening reforms, and SWAp reform will provided essential background information that informs any future recommendation related to WASH at BDGH.

Demographic

Uganda has a population of more than 34 million persons (World Bank 2012). Uganda's population has been consistently growing at a rate of 3.2 percent, one of the highest growth rates in the world (World Bank 2012). More than 86 percent of the nation's population lives in rural areas, which poses unique challenges regarding universal health care coverage within the country (World Bank 2012). Uganda's population is also highly impoverished – more than 64 percent of the population lives on less than $US 2 per day (World Bank 2012). About 68 percent of the population has access to an improved water source, 34 percent have access to improved sanitation facilities, but only 9 percent have access to electricity (World Bank 2012). Access to improved sanitation, an improved water source, as well as electricity are significantly different between the rural and urban populations, with the rural population having significantly lower access. Currently, Uganda is on track for Millennium Development Goal 7.C., to "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation" (United Nations 2013; Ministry of Finance, Planning and Economic Development 2010; UNDSEA 2011).

Political and Historical Context

Uganda has had a tumultuous political history. Since Uganda was granted independence in 1962, the nation has faced over two decades of civil unrest, and a series of different conflicts including civil war and violent uprisings, many of which continue today (UHSA 2011; Green et al. 2008). In the North of Uganda, a twenty-year rebel conflict ripe with human rights abuses continues to this day between the Lord's Resistance Army (LRA) and the Ugandan government. The conflict has displaced more than 1.6 million people, catalyzing poverty, income insecurity, and decreasing access to health services.

Structural adjustment policies promoted by the World Bank (World Bank 2012) and International Monetary Fund (IMF) were also significant historical and economic determinants within Uganda and the sub-Saharan Africa (SSA) region. Adjustment

policies forced countries to slash spending on social services, including health which drastically affected the region's ability to confront many health challenges, including the HIV/AIDS epidemic (Vogli et al. 2005; Mbonye et al. 2009). However, in Uganda, the structural adjustment policies implemented were for the most part successful in their goal to increase economic growth, and the country had the highest per capita growth rate out of all SSA countries implementing reforms (Easterly 2005).

The Ugandan Government has also undergone significant decentralization reform. Throughout the past decade the government has created more than thirty new districts, increasing from 33 districts in 1986 to 81 districts in 2008, and to 136 districts in 2012 (Odyek et al. 2012).

Economic Context

Uganda's economy has been steadily growing between six and eight percent throughout the past eight years, attracting foreign investment and allowing privatization of many state-owned enterprises. However, despite significant economic growth, per capita GDP totals only $US 487 compared to SSA at $1,424 (World Bank 2012). Additionally, the country faces extreme poverty as well as extreme wealth, with a GINI income inequality index of .443 (World Bank 2012).

Uganda has more than $US 1.1 trillion in external debt, representing approximately 7.1 percent of the nations GNI (World Bank 2012). Uganda also has significant challenges in raising tax revenue. In 2010, tax revenue only accounted for 12 percent of the nation's GDP (World Bank 2012). Additionally, inflation rates have more than tripled since 2007, from 6.1 percent in 2007 to 18.7 percent in 2010 (World Bank 2012). Overall, high amounts of external debt and lack of internal revenue coupled with high inflation constrain national governments such as Uganda from implementing and financing the needed social and health service programs to combat the many challenges within their country.

Health Status of the Population

Uganda faces many significant challenges related to population level health. The nation faces increasing prevalence of chronic diseases, yet still faces high prevalence of infectious diseases and several neglected tropical diseases. Both maternal mortality and

under-five mortality remain high at 310 deaths per 100,000 live births and 90 deaths per 1000 live births, respectively (World Bank 2012). Currently, Uganda is not on track to meet Millennium Development Goal (MDG) Four to decrease under-five mortality by two-thirds by 2015 or MDG Five to reduce maternal mortality by three-fourths by 2015. Skilled birth attendants attend only 42 percent of births, similar to SSA where only 46 percent of births are attended by skilled medical staff (World Bank 2012). The total fertility rate remains high at 6.1 children per woman.

TB, HIV/AIDS, Malaria as well as other tropical diseases remain a significant health burden (World Bank 2012). Although TB incidence has decreased in Uganda over the past decade, in 2010 more than 209 per 100,000 people were diagnosed with TB (World Bank 2012). In 2008, Uganda reported more than 36 thousand cases of malaria (World Bank 2012; UHSA 2011). Moreover, HIV/AIDS prevalence has been slowly increasing since 2007, from 6.3 percent to 6.5 percent in 2009 (World Bank 2012). Alarmingly, Uganda has experienced a dramatic feminization of the epidemic.

Additionally, Uganda still struggles to control and/or eliminate several neglected tropical diseases including schistosomiasis, onchocerciasis, trachoma, lymphatic filariasis, and soil-transmitted helminthiasis (Neglected Tropical Disease Control Program 2012; MOHb 2007).

Health System Building Blocks

The World Health Organization (WHO) has identified six health system building blocks as being crucial towards health systems strengthening. They are: health service delivery, health workforce, health information systems, access to essential medicines, health systems financing, as well as leadership and governance (WHO 2012). Understanding the current capacity and strength of each building block will facilitate understanding of the BDGH case study.

Financing

Over the past decade, Uganda has attempted to finance and combat the many health challenges facing the country. However, Uganda has yet to meet the Abuja Target and commit 15 percent of the government budget to health. Health spending as a proportion of the government's budget has fluctuated throughout the past four years,

from 9.8 percent in 2007 to 10.6 percent in 2008, 13.6 percent in 2009, and 12.1 percent in 2010 (World Bank 2012; WHO 2011). Public financing of health only accounts for 22.6 percent of total health expenditure (THE), donor spending on health accounts for 32 percent of THE, while out-of-pocket (OOP) spending accounts for an astonishing 54 percent of THE (UHSA 2011). OOP spending remains a significant cost to citizens high despite the abolishment of user fees at all public health facilities in 2001, and overall financing remains highly unequal (WHO 2005; Zikusooka 2009; AGH 2011).

Governance

In Uganda, health system governance is inclusive of the multiple stakeholders involved in the health system including non-governmental organizations (NGO), health development partners (HDPs), civil society organizations (CSOs), as well as other Ugandan government agencies such as Defense, Local Government, Internal Affairs, and Gender, Labor and Social Development. Many policies and regulations are developed through a participatory multi-stakeholder process, which allows for multiple perspectives and strategies. However, despite the innovative and inclusive governance process for health, corruption and 'misallocation' of funds continues to be a problem (UHSA 2011).

Service Delivery and Human Resources for Health

Uganda faces a huge health workface shortage, with only 70,000 health care workers. Uganda does not meet the WHO recommendation of 2.3 health workers per 1000 population at 1.8 health workers per 1000 population (UHSA 2011; USAID 2011). Only 53 percent of health employee positions are filled, according to recent estimates. However, Bugiri District (BD) faces especially challenging circumstances, with only 46 percent of health workforce positions filled. In the Districts' Human Resources for Health Recruitment Plan 2011/2012, the Ministry of Health (MOH) outlines a recruitment plan to fill 53 more health worker positions, increasing health worker filled positions to only 55 percent in BD.

District's Human Resources for Health Recruitment Plan 2011/2012			
	% Current staffing	Planned Recruitment	% Staffing after recruitment
Bugiri District	46	53	55
Uganda	53	5,054	65

(Districts' Human Resources for Health Recruitment Plan 2011/2012)

Uganda's health workforce is also inequitably distributed, with less than thirty percent of all doctors and 60 percent of all nurses and midwives located in rural areas, where more than 80 percent of the population lives (MOHa 2007). Moreover, absenteeism has been documented at more than 35 percent (U.S. MUIHT 2011).

Information Systems

Uganda's health system currently relies on an inefficient paper system. Plans for a computerized system are being developed, and once implemented, the system will streamline information sharing and increase monitoring and evaluation capacity of the MOH. However, there is no immediate plan to implement the computerized system given the limited funding.

Medical Products, Vaccines and Technologies

Uganda continues to face severe shortages of medicines, vaccines and health system related technologies. Between 2006-2009, Health Center Level IIs experienced stock-outs close to 80 percent, compared to the national average at 70 percent (Orem et al. 2010). Stock-outs happen when health facilities temporarily have no access to a specific medicine, or many types of medicines at an exact point in time or over a series of days, weeks or months. Stock-outs are exacerbated by lack of communication on distribution and procurement between HDPs and the public sector. Stock-outs negatively affect the overall functionality of the health system, heightening dysfunction and decreasing overall capacity (UHSA 2011).

Health System Organization

The Uganda Health System is largely decentralized, with the majority of services delivered as well as managed on the district level (U.S. MUIHT 2011). The private sector plays an important role in health service infrastructure and delivery, and is responsible for approximately 50 percent of all health service outputs (U.S. MUIHT 2011). Uganda's public health care system is tiered and comprises National Referral Hospitals, Regional Referral Hospitals, General Hospitals, Health Center IVs (district level hospitals), Health Center IIIs, Health Center IIs, and Health Center I/VHTs. Uganda faces a severe shortage of health system infrastructure, with each National Hospital responsible for up to 30

million citizens – 20 million more than planned. However, at the General Hospital level, such as BDGH, it is estimated that each General Hospital is responsible for two hundred and sixty thousand citizens – fewer than the allocated five hundred thousand citizens. This may be partly attributed to increased decentralization policies at the national level, since each District has an official District General Hospital. Yet, Health Center IV's, III's, and II's are under severe stress, managing thousands of citizens above their standard ratio. Below, the current status of each Ugandan health facility catchment is defined.

Type of Facility	**Indicator**		
	Health Facility Population Ratio Standard	**Current Health Facility Population Ratio**	**Services Provided**
National Referral Hospital	1: 10,000,000	1: 30,000,000	Comprehensive specialist services, teaching and research.
Regional Referral Hospital	1: 3,000,000	1: 2,307,692	Some specialist services offered at this level: psychiatry, ear, nose and throat, ophthalmology, dentistry, intensive care, radiology, pathology, higher level surgical and medical services.
District General Hospital	1: 500,000	1: 263,157	General services are provided, including in-service training, consultation and research to community-based health care programs.
Health Centre IV	1: 100,000	1: 187,500	Preventive, promotive, outpatient, curative, maternity, inpatient services emergency surgery and blood transfusion and laboratory services.
Health Centre III	1: 20,000	1: 84,507	Preventive, promotive, outpatient, curative, maternity, inpatient services and laboratory services.
Health Centre II	1: 5,000	1:14,940	Preventive, promotive and outpatient curative health services, outreach care.
Health Centre I/ VHT	1: 1,000 or 1 per 25 HH's		Community-based preventive and promotive health services.

(HSSIP 2010) (AHWO 2009)

Uganda SWAp Reform

In 2001, Uganda responded to the health system failures of the 90's by implementing radical reforms in the health sector. The Sector Wide Approach (SWAp) was included as part of the strategy to improve coordination, efficiency, and equity throughout the health sector, and was officially launched in 2000 (Makerere 2006; Jeppsson 2002). The SWAp strategy was implemented through the Health Sector Strategic and Investment Plan (HSSIP 2010), from 2000/2001 – 2004/2005 (Makerere

2006). The HSSIP mission was to decrease morbidity and mortality related to disease, decrease disparities within rates of disease, contribute to poverty eradication, as well as development of Uganda's citizens (Makerere 2006). The HSSIP focus was to provide the Uganda National Minimum Health Care Package (UNMHCP) the most efficiently and most equitably as possible. Since 2000, the health sector reforms implemented have evolved into a much broader reform program, which includes budget allocations as well as medicine logistics. Notably, one of the most significant reforms within SWAp was the decentralization of health service delivery and abolition of user fees at public health facilities. Overall the reforms have been successful, however, decentralization has caused different problems in and of itself related to feasibility of health service delivery and communication between different health service delivery units (Makerere 2006; Jeppsson 2002).

Uganda Health System Strengthening Project (UHSSP)

In 2010, Uganda received $US 130 million in funding from the International Development Association (IDA) (part of the World Bank) for a five year health systems strengthening project (World Bank UHSSP, Uganda UHSSP). UHSSP is a "government initiative set out to assist the country achieve the Uganda National Minimum Health Care Package (UNMHCP) with a focus on maternal health, newborn care and family planning" (Uganda UHSSP). A primary goal of UHSSP is to improve infrastructure of existing health facilities, however, BDGH has received no increase in funding for hospital rehabilitation (Uganda UHSSP).

Overall, the Ugandan health system still faces extreme challenges and shortfalls despite the many reforms and millions in international donor funding. This case study of BDGH health workers and patients provides a needed understanding of current, relevant attitudes, behaviors, challenges, and barriers related to WASH at the District Hospital level, in context of the larger Ugandan health system.

Purpose and Objectives

The purpose of this paper is to add to current research on WASH as related to the Ugandan health system, specifically patient satisfaction and health worker behaviors,

knowledge, and attitudes. The study objectives are as follows:

1. To assess BDGH health worker knowledge, attitudes and practices towards WASH.
2. To evaluate patient satisfaction, and determine if hygiene, sanitation and water conditions at BDGH were significant indicators of patient satisfaction.
3. Recommend feasible interventions to Bugiri District Government in order to improve WASH at BDGH.

Methodology

Qualitative and quantitative data collection methods were used, including surveys, in-depth interviews and focus group interviews. Both health workers and patients were asked to complete surveys, while health workers were asked to participate in a focus group as well as in-depth interviews. Patients were only able to participate in the study if they had been formally discharged by the on-duty doctor at BDGH, and were in possession of a signed discharged slip. Observational data on health worker hygiene, water and sanitation behavior, as well as characteristics of WASH infrastructure at BDGH, were also collected.

Bivariate and multivariate analyses were conducted using STATA to determine if water, sanitation and hygiene conditions at BDGH were significant indicators of patient satisfaction. Descriptive statistics of all quantitative data was conducted using STATA. Coding of qualitative data was also used to analyze in-depth interview and focus group transcripts.

Surveys

Two surveys were administered as part of the research study: the Health Worker Survey and the Patient Survey (See Annex 7.3 and 7.4). The Health Worker Survey aimed to gather information on health worker knowledge and attitudes towards hygiene, sanitation and clean water as well as current behaviors related to those themes. The Patient Survey aimed to gather information on patient satisfaction, specifically patient expectations of staying in a health facility as well as their perceptions about their stay at BDGH. All survey questions were based on published surveys that have undergone prior

testing (WHO 2002; WHO 2009; UNICEF 2011; World Bank 2006; USAID 2010). Surveys for patients and health workers were translated into the local Ugandan language, Lusoga, and participants had the option of taking the survey in the local Ugandan language or English.

Consent

All participants gave oral informed consent before any data collection took place. Consent forms were separate for health workers and patients, and participants had the option of reading the English consent form or the same form translated into Lusoga. With informed consent from participants, video recordings were used during heath worker in-depth interviews and focus group discussions. Participants were recruited through verbal announcements, posters in BDGH, and written announcements by hospital administration.

Inclusion and Exclusion Criteria

To participate in the study, patients and health workers had to fully comply with the study inclusion and exclusion criteria. The inclusion and exclusion participation criteria were as follows:

1. Participant must be over the age of 18.
2. Participant must either be a health worker or a discharged patient at BDGH.
3. If a patient, the patient must have stayed or been at BDGH for a minimum of three hours to participate in the study, and be discharged from BDGH.
4. Patients and health workers must consent to be a study participant.

To confirm that patient participants were discharged from BDGH, patients were requested to show their discharge form, and show signatures by the doctors in each of the three wards where patients were recruited (Female ward, male ward, maternity ward).

Study compensation

All study participants, both patients and health workers, received small compensation in the form of a small hygiene kit, thanking them for their time. The hygiene kit contained a bar of soap, antibacterial soap, nail file, small washcloth, small

Kleenex, and toothbrush.

Study approval

The study and all research documents were fully approved by the George Washington University Institutional Review Board (IRB) as well as the Uganda National Council for Science and Technology (UNCST) IRB Committee (February 2013 and March 2013, respectively). The Uganda Office of the President provided approval to study Ugandan Districts.

Results and findings

Health Worker Survey

Results

Demographic

The health worker survey was filled out by forty-four study participants, from a variety of health service professions and backgrounds (Table 1.1). All health workers were given one week to fill out the survey, although most returned their surveys before the seven-day deadline. A cohort of student nurses were training at BDGH during administration of the survey, thus, it was ensured that only employed health workers at BDGH received and filled out the survey (student nurses were not eligible to take the survey because they were not employed health workers at BDGH). Twenty-nine percent of health worker participants were male (n = 13), while over seventy percent were female (n = 31). This statistic is highly representative of all staff, as it was observed that the majority of all hospital staff were female. Twenty-seven nurses filled out surveys, one doctor, one anesthetic officer, three nursing assistants, one R/M, two administrators, one medical records assistant, one dental attendant, one dentist, one orthopedic officer, one X-Ray attendant, one pharmacy technician, one health volunteer, one laboratory technician, and one health worker who identified as 'other'. Almost seven percent were ages 18-25 (n = 3), thirty-one percent were ages 26-35 (n = 14), twenty percent were ages 36-45 (n = 9), thirty-six percent were ages 46-55 (n = 16), and four percent were ages 56-65 (n = 2).

Water

Health workers were asked a variety of questions relating to water availability, water treatment, and personal attitudes towards those same themes. Health workers reported that the top four sources of water used at BDGH are piped water to the hospital (97.72%, n = 43), rainwater (38.63%, n = 17), borehole (34.09%, n = 15), and public tap (31.81%, n = 14) (Table 1.2). Overall, sixteen different sources of water were documented as being used, a testimony to the insecure water attainment system at the hospital. Thus, BDGH relies on many different protected as well as unprotected sources of water. The main source of water at BDGH is piped into the hospital from a borehole, however, the borehole relies on electricity to pump water, and functions below fifty percent capacity. The hospital also has a small water tank that collects rainwater, however, it does not fulfill the daily water needs of the hospital and is dependent on rainfall. Health workers reported that water (all reported sources) is used towards toilet cleaning (90.90%, n = 40), handwashing (90.90%, n = 40), bathing (86.36%, n = 38), cooking (84.09%, n = 37), toilets (84.09%, n = 37), drinking (75.00%, n = 33), and staff reported other uses as general hospital cleaning, clothes washing, mopping, and cleaning surgical instruments. Drinking was listed as the least used, representative of the current policy at BDGH that requires treated drinking water to only be provided to patients swallowing drugs at the hospital (specifically the antenatal clinic (ANC)) and patients attending the HIV/AIDS clinic (where waterguard tablets and treated water is provided to patients through external funding).

Twenty-five percent of health workers reported that water was normally available, and twenty-one percent reported that the main source of water was functional 5-7 days per week. Twenty-two percent of health workers reported that the main water source (piped water from a borehole) provided enough needs for the entire hospital, and eighty-six percent stated that there was no available alternative main water source for the hospital. Sixty-six percent reported that water was unavailable at the hospital (from all sources) for a day or longer during the past two weeks. Seventy-seven percent of health workers stated that the hospital had a water shortage during the dry season. Twenty-seven percent report that it takes 31-60 minutes to obtain water, while another twenty-seven percent report that it takes 61-180 minutes to obtain water. Health worker responses to

the previous question may be related to the fact that when functional, piped water from the main borehole source is retrieved at BDGH more quickly than when no piped water is available, and the hospital relies on buying jerry cans filled with water.

Health workers were also asked a series of questions related to treatment of drinking water. Seventy-nine percent of health workers totally agree that it is necessary to treat their family's drinking water, forty-three percent partially agree that their friends take action to treat their drinking water, and forty-seven percent partially agree that their neighbors take action to treat drinking water. Importantly, health workers seem to understand the importance of treating drinking water, but are much less confident in the attitudes of their friends, family, and community. Interestingly, thirty-four percent totally disagree that the majority of their community takes action to treat drinking water while thirty-six percent partially agree that the majority of their community takes action to treat drinking water. This may be reflective of the fact that some health workers live in Bugiri Town seven days a week, while others only live on the hospital compound a few days a week and travel to their home community on their days off. Thus, it is unknown if health workers are referring directly to residents of Bugiri Town or residents of another Ugandan town. Eighty-one percent are totally confident that they can treat drinking water, and sixty-eight percent report they treat their drinking water at home. While seventy-nine percent of health workers agreed that it is necessary to treat their family's drinking water, only sixty-eight percent reported that they actually treat their own drinking water.

Thirty-one percent of health workers stated that water is treated at the hospital, and one hundred percent reported that water was not treated because the hospital did not have enough filters or chemicals. If water is treated at the hospital, one hundred percent of health workers stated that chlorination is used, while eighty-three percent reported that boiling is used. Health workers and patients were not provided drinking water at the hospital, and waterguard chlorination tablets were only provided to patients in the separately funded HIV/AIDS ART clinic.

Thirty-eight percent of health workers reported that water is stored at the hospital, and only fifty-one percent reported that storage containers were used only for storing water. Water storage containers were observed in each hospital ward; at time of

observation, it was confirmed that containers were only used for storing water. However, given limited resources at BDGH and health worker's response, it is possible that the storage containers were used in different capacities. Health workers were also asked about drinking water while at BDGH. Sixty-nine percent of health workers reported that some or most patients bring drinking water from home, while fifty-six percent reported that some or most health workers bring drinking water from home. Some health workers commented that they returned to their living quarters on the compound during their shift to obtain personal drinking water (which they have treated themselves).

Hygiene

Health workers were asked several questions relating to the importance of hygiene and personal opinions of hygiene performance within BDGH. Health workers reported that it was most important to their wash hands before eating, as well as after eating, after defecation, when one has dirty hands, after cleaning the toilet, after changing a child's diaper, and before cooking (Table 1.3). Some health workers additionally stated that it was important to wash hands after handling a patient, as well as before and after operations. Forty percent stated that most people wash their hands within ten paces of the toilet facility, thirty-four percent elsewhere in the hospital, and thirty-four percent in no specific place. Observation confirmed that there was one handwashing station per ward for health workers, but no handwashing facilities for patients. Overall, it seemed that access to handwashing stations was limited for health workers. Moreover, although each ward has access to a handwashing station, they must have clean water and soap consistently available. Seventy-nine percent reported that soap is normally available, and observation confirmed that soap was available within all wards at time of data collection. Observation showed that solid bars of soap were available within each ward.

Health workers were also asked questions regarding nosocomial infection, and what they believed was the burden of HCAI at BDGH. Health workers estimated that on average that thirty-five percent of patients receive a nosocomial infection, with fifty-three percent stating that the impact on a patient's clinical outcome is low and twenty-seven percent stating that the impact is high. Overall, it seems that health workers do not believe that HCAI is a serious infection, and may even attribute the 'new' infection to

something the patient acquired outside or inside the hospital due to the patient's 1) relationship with family and friend 'attendants' who come and visit the patient within the hospital, 2) non-hygienic personal behaviors (ie. not bathing on a regular basis, or not washing their hands before eating), 3) already decreased immune system due to initial medical issue, or 4) patient travel outside the hospital (while an admitted patient) to retrieve water, food, or other items. It is unknown whether health workers attributed the cause of HCAI to the hospital and health workers themselves or to behaviors of patients and their attendants. If health workers believed the risk of HCAI is due to patient or attendant behaviors, it may explain why health workers believe that HCAI is not a serious infection.

Most health workers (67%) believed that hand hygiene is effective in preventing nosocomial infection. Twenty-seven percent believed that the effectiveness of hand hygiene in preventing a healthcare associated infection is low, thirty-two percent believed it is high, and thirty-four percent believed it is very high. Thirteen percent reported that hand hygiene is very low among their priorities, thirty-six percent reported that it is low, twenty-nine percent report that it is high, and twenty percent reported that it is very high. Almost fifty percent of health workers believed that hand hygiene was low or very low among their priorities. On average, only sixty-nine percent of health workers reported that they perform handwashing when necessary, while ninety-three percent reported that it is common practice to inform patients about the importance of hand hygiene and personal bodily hygiene.

To improve hand hygiene at the hospital, health workers reported that the most effective action (listed most effective to least effective) would be to provide health worker education, provide clear and simple instructions, put up posters on hand hygiene, watch senior nurses and doctors perform hand hygiene correctly, receive feedback on their performance of handwashing, and finally having patients remind health staff to perform good hand hygiene.

Sanitation

Overall, health workers were highly dissatisfied with the place of defecation at BDGH. Almost 71 percent said they were very unsatisfied, 14 percent somewhat

unsatisfied, and only 11 percent stated they were somewhat satisfied. Mean satisfaction was 1.56, with 1 being very unsatisfied, and 5 being highly satisfied (Table 1.4). Health workers reported two different types of defecation facilities used at BDGH, including a flush/pour toilet and pit latrines. Almost 90 percent of health workers said that patients used the hospital toilet facilities (latrines), while only 72 percent said that health workers used the hospital toilet facilities (flush toilet in the administration wing of BDGH). This discrepancy might be associated with the fact that the majority of health workers lived in compounds located on hospital grounds, and they may choose to use their own personal place of defecation instead of the hospitals (considering the extremely low rate of satisfaction by health workers of BDGH's toilet facilities). Patients only had access to latrines, as toilet facilities within the wards have been shut down due to inadequate maintenance and misuse of facilities (health workers reported that patients would defecate or urinate on the floor). Health workers were only provided access to two working flush toilets within the administrative wing of the hospital, one for females and one for males. Because there was a significant difference between the number of males and females at the hospital, this meant that the ratio of females to the single toilet was much larger than the ratio of males to the toilet. Over 65 percent of health workers stated that they were not able to use the toilet facilities at nighttime; however, this statistic was not explicit between flush toilet facilities and latrines. Health workers seemed to be split on whether or not the toilet facilities could be used during the rainy season, and again, this question referred to both flush toilet facilities as well as latrines. When asked to describe characteristics of a hygienic latrine, 70 percent said that the excreta should not be seen, 86 percent said there should be no bad odor, 80 percent said there should be no access for flies or insects, and 41 percent said it should be water sealed. Moreover, health workers described the reason for maintaining a hygienic latrine, with 97 percent stating for the prevention the spread of germs or diseases, 84 percent stating to keep everyone healthy, 36 percent for the safety of female members, and 34 percent to maintain social prestige.

Health workers were also asked some basic questions regarding sanitation knowledge. When asked how diseases spread from one human to the next, 88 percent said through open feces, 75 percent said through air, 90 percent said through

contaminated water, and 88 percent said through unclean hands. When asked directly whether diseases spread from open feces, 93 percent responded yes. Overall, health workers seemed to have a comprehensive understanding of how diseases spread, especially fecal-oral transmission. Also, about 88 percent of health workers believe that adult's and children's feces have the same risk. Ninety percent of health workers stated that diarrhea is caused or spread by feces in the environment, 95 percent stated dysentery is spread by open defecation, 84 percent typhoid, 4 percent jaundice, 90 percent worm infestation, and 34 percent skin disease. Ninety percent of health workers stated that the latrines were not clean enough, and 95 percent stated that having hygienic latrines was very important. Overall, health workers seemed to be highly dissatisfied with the places of defecation available at BDGH, and seemed to have a basic understanding of the characteristics and importance of hygienic toilet facilities including latrines.

Maintenance

Overall, health workers at BDGH reported that the maintenance of water and sanitation facilities was not adequate. Almost sixty percent believed that the water and sanitation facilities were not maintained sufficiently, thirty percent believed both facilities were partially maintained, while almost twelve percent reported that they were successfully maintained (Table 1.5).

Patient Satisfaction Survey

Results

Demographic

Patient satisfaction was measured through the use of a survey that asked general demographic questions, and questions that asked patients to rate indicators by importance as well as specific parts of their hospital stay experience (Table 2.1). Out of 47 respondents, 25 percent were male (n=12) and 75 percent were female (n=35). There was a broad age range of respondents, with thirty-four percent of respondents (n=16) ages 18-25, seventeen percent ages 26-35 (n=8), twenty-one percent ages 36-45 (n=10), nine percent ages 46-55 (n=4), 11 percent ages 56-65 (n=5), and eight percent 65 or older (n=4). Over seventy-six percent of patients (n=36) had been to BDGH previously, an

important statistic showing that many patients return for treatment. Six percent of patients stayed at the Hospital for three hours (n=3), eight percent stayed more than three hours and less than five hours (n=4), four percent stayed more than five hours but less than ten hours (n=2), four percent stayed more than ten hours but less than one day (n=2), thirteen percent stayed more than one day but less than three days (n=6), twenty-three percent stayed more than three days but less than a week (n=11), twenty-six percent stayed more than a week but less than two weeks (n=12), and fifteen percent stayed more than two weeks (n=7).

Patient Perceptions

Patients rated the factors that were most important to their experience staying at a public health facility in Uganda (not specifically BDGH) (Table 2.2, Table 2.3). Patients had the opportunity to rate the indicators as extremely important (1), very important (2), moderately important (3), slightly important (4), and not important (5). In order of most important to least important, patients rated contact with the outside world (mean=1.23), respectful treatment (mean=1.27), convenient travel and short waiting times (mean=1.29), good quality surroundings (mean=1.3), clarity of communication (mean=1.36), availability of clean drinking water (mean=1.36), availability of hand-washing facilities (mean=1.38), availability of clean and functional toilet facilities (mean=1.46), confidentiality of personal information (mean=1.53), involvement in decision making (mean=1.8), and lastly choice of health care providers (mean=1.82). Overall, each indicator mean was above two, reflecting that on average patients believed all indicators to be very important or more important.

Rating of Indicators

The second phase of the survey asked patients to retrospectively rate their experience at BDGH. Patients had the opportunity to rate their experience related to each of the indicators as very good (1), good (2), moderate (3), bad (4), or very bad (5) (Table 2.4, Table 2.5). Patients rated contact with the outside world the best (mean=1.48), and next ability of friends and family to visit (mean=1.70), respectful treatment (mean=1.74), confidentiality of personal information (mean=1.74), ability to talk privately with the health care provider (mean=1.82), privacy (mean=1.87), having enough time to ask

questions (mean=2.04), clarity of communication by health care provider (mean=2.06), choice of health care providers (mean=2.15), information on other tests or treatments (mean=2.17), involvement in decision making (mean=2.34), cleanliness (mean=2.38), having enough space (mean=3.14), availability of clean drinking water (mean=4.36), availability of clean and functional toilet facilities (mean=4.36), and finally availability of hand-washing stations for patients (mean=4.42).

Patients overwhelmingly reported that health provider skill was adequate for their treatment (93 percent), however only 34 percent reported that hospital equipment was adequate for their treatment, and only 40 percent reported that the drugs provided were adequate for their treatment (Table 2.6). Overall, patient satisfaction was quite low, with almost 30 percent not at all satisfied, 21 percent not very satisfied, 21 percent moderately satisfied, 10 percent somewhat satisfied, and 17 percent very satisfied (Table 2.7, 2.8).

Patients rated privacy at 1.87, quite high despite the fact that patients had no private bathing facilities, and the public ward had no private areas. Some patients paid small sums to use 'private rooms,' however, these rooms had no functional bathing facilities. Cleanliness was another variable that reflects an interesting patient perspective. Patients rated cleanliness quite high at 2.38, possibly a reaction to seeing 'cleaners' come to BDGH each morning to mop the floors with water. Observational data showed almost no trash visible on the hospital's floors over more than two weeks of observation, which may also impact patient's perspective on cleanliness.

Patients rated having enough space at 3.14, which is reflective of the 'cramped' situation within the outpatient department as well as the wards. Monday through Friday, the hospital's outpatient department was packed with women, children, and men. During all days of the week, the wards faced significant challenges as they usually had more admitted patients than available beds. Each ward had twenty-four beds, however, observational data and qualitative data showed that most of the time, the wards contained between twenty-five and fifty admitted patients (sometimes, although unusually, even more). When wards had more than twenty-four admitted patients, they placed foam pads (if available) on the floor in-between patient beds where patients sleep and rest. In this case, patients had no more than six inches of floor space on either side of their bed.

Framed beds are labeled numerically 1, 2, 3, however, with the addition of foam mattresses in-between beds, the foam mattresses contain the names 1x, 2x, 3x, etc.

Bivariate Regression

Bivariate regression in STATA showed that six variables were associated with patient satisfaction at $p < .05$ level, including availability of clean drinking water ($p= .0347$), availability of clean and functional toilets ($p= .0018$), availability of hand-washing facilities ($p= .0004$), having enough space ($p= .0281$), opinion of whether hospital equipment was adequate for treatment ($p= .0364$), and opinion of whether drugs provided were adequate for treatment ($p= .0003$). Cleanliness was another significant factor for patient satisfaction at $p < .10$ ($p= .0740$) (Table 2.9).

Multivariate Regression

A multivariate regression equation was developed to better understand the relationship between the significant independent variables and the dependent variable, satisfaction (Table 2.10). Bivariate STATA analysis was used to determine if the variables for sex, age, ever been to BDGH before, as well as length of time spent at BDGH were confounding or mediating variables to each independent variable used in the multivariate regression. Six independent variables were significant at $p < .05$ in bivariate regressions, and one independent variable was significant at $p < .10$. Only the six independent variables significant at $p < .05$ were used in the final multivariate regression equation. However, it should be noted that the multivariate regression may have lacked sufficient power given the small sample size of 46 observations.

The six most significant variables used in the final regression equation were opinion of whether the drugs provided were adequate, rating of handwashing availability, rating of toilet facilities, rating of having enough space, rating of availability of clean water, and opinion of whether hospital equipment was adequate.

The demographic variables age and sex were not mediators since they were exogenous, but were tested through multivariate regression to see if they were potential confounding variables. Through multivariate regression, it was found that the variables age and sex were not confounding variables, based on the fact that the unstandardized regression coefficient did not change by more than ten percent in either direction (Boston

University 2013). Therefore, neither age or sex variables were used within the final multivariate regression.

The variables 'ever been to BDGH before', as well as 'length of time spent at BDGH', were found to be non-mediating variables for each of the independent variables used within the final multivariate regression. Therefore, neither variable was used within the final multivariate regression. Below is the final regression equation developed to analyze patient satisfaction at BDGH. The variable X_1 represents patient opinion of the drugs provided, X_2 represents patient rating of handwashing facilities, X_3 represents patient rating of toilet facilities, X_4 represents patient rating of having enough space during their stay at BDGH, X_5 represents patient opinion of hospital equipment, and X_6 represents patient rating of safe drinking water availability. The variable $\hat{Y}$ represents the dependent variable, patient satisfaction.

$$\hat{Y} = 0.43 + (1.17)X_1 + (.50)X_2 + (-0.06)X_3 + (0.02)X_4 + (-.54)X_5 + (-.02)X_6$$

The final multivariate regression included 46 observations, and was significant at $F(6, 39) = 3.28$, and $p > F = .01$. R-squared was .335, meaning that approximately 33 percent of the variance was explained by the model.

In-Depth Interviews and Focus Group Discussions

In-depth interviews were completed with five health workers at BDGH. Two were completed with hospital administrators, one with a senior nursing officer (SNO), one with a doctor, and one with an enrolled nurse (EN). Three focus groups were conducted, one with theatre (surgical) nurses, one with ENs, and one with SNOs. All interviews and focus groups addressed three separate domains, including hygiene, sanitation, and water.

All health workers emphasized that hygiene, sanitation, and water were all extremely important and cannot work in isolation from one another. Health workers explained that the independent components of WASH are all interconnected, work hand in hand, and all support one another. Health workers stated that without one or any of the main pillars of WASH, all health workers, patients, attendants (family and friends of patients), or any other hospital visitors were at risk.

Hygiene Attitudes, Knowledge and Behaviors

Health workers in general agreed that lack of hygiene, specifically, put all persons within BDGH at risk of becoming sick. Focus groups and in-depth interviews revealed that health workers have a strong understanding of good hygiene practices and behaviors, but are substantially limited by hospital infrastructure and resources. Health workers touched on a variety of subjects related to hygiene at BDGH, including availability of handwashing at the hospital, procedures in the case of needle-stick injuries, proper handwashing procedure, proper health worker hygiene, available protectives, disease risk related to unimproved hygiene practices, sterilization of hospital equipment, as well as general hospital cleaning.

With regard to handwashing stations for patients and health workers, health workers reflected upon past and current availability of handwashing facilities. Health workers described that seven years prior, hospital administrators had purchased metal handwashing stations and placed them at every latrine as well as within each ward and department (child ward, maternity ward, male ward, female ward, out-patient department, as well as other departments). However, within four years the handwashing stations had become so rusty they were unusable, and health workers also realized they were a breeding ground for mosquitos. Moreover, health workers stated that patients stole soap that was available at the handwashing stations, so in essence, much of the time patient handwashing stations were without bars of soap. Hence, in 2009, hospital administrators pulled out the rusted metal handwashing stations. Hospital administrators decided to instead buy plastic ten-liter 'jerry can' hand washing bins, however, at 50,000 Ugandan schillings each ($US 19.25), administrators were only able to buy one per ward (four plastic handwashing stations). Currently, only health workers have access to handwashing stations, which are placed within each ward. Positively, heath workers stated that soap bars were usually available within the wards, and if water was available, they were able to wash their hands when needed. However, patients had no access to handwashing stations anywhere in the hospital, nor outside near the latrines. Hospital administrators emphasized that if they had enough funds, they would buy and place plastic handwashing stations at each and every latrine and department.

All health workers stated that the proper protocol for handwashing was with soap and water, and that they should wash their hands at all of the proper times. Health workers provided specific examples of when to wash their hands with soap, such as before eating, after eating, after every procedure in the wards, after operations in theatre (surgery), before touching patients, after examining patients, and after using the toilet. Some health workers emphasized further that all handwashing should be very 'thorough', and that health workers should wash their hands with soap and water before and after a procedure even if they wear latex gloves. Latex gloves are worn by all health workers at the hospital, and were normally stocked and available when needed. Some health workers emphasized the difference between disposable and surgical gloves. Surgical gloves were worn during procedures and operations, and disposable gloves may be used when only examining a patient. Hospital administrators stated that they expected health workers to wash their hands one-hundred percent of the time when required; however, one hospital administrator stated that health workers sometimes forget, and estimated that only 90 percent of health workers washed their hands when needed. Health workers described that the Uganda MOH would sometimes come and do trainings on handwashing, and that those trainings were quite successful and seemed to improve health worker handwashing behavior at the hospital.

Health workers described that general cleaning of BDGH was done every day between six and seven in the morning, and was completed by men who were contracted by the hospital administration. Health workers described 'general hospital cleaning' as the daily cleaning routine performed by health workers and paid hospital cleaners. The contracted men scrub, mop, remove trash and use Jeek liquid soap to clean the hospital's interior and exterior, including latrines and hospital floors. However, health workers said that even when they clean, the drainage system is dysfunctional and blocked, so the dirty water floods back up onto the floor. Moreover, when there is a severe shortage of water, the cleaners are significantly hampered in their ability to do general cleaning at the hospital. Some health workers claimed that the cleaners don't usually scrub the hospital, and that they just sprinkle water on the floors; one health worker described it as a partial cleaning. Overall, health workers said they feel comfortable to tell cleaners how to properly clean the hospital, however, health workers also admitted that general cleaning

of the hospital should represent teamwork, with both the cleaners and health workers doing their own part. One health worker stated that hospital cleaners were not well paid, and although they try to do their best, they are generally unmotivated.

Additionally, health workers described their daily role in general hospital cleaning. Each health worker who works on the morning shift and begins at eight AM is required to complete what are called the 5 'S'. The 5 'S' stand for 'sorting' what the health workers will use for the day, 'setting' everything in its order, 'sustaining' to make sure that the environment stays organized and fit, 'standardizing' to make sure that everything is up to standard, and finally 'shining' to ensure overall cleanliness. Health workers stated that in order to successfully complete the 5 'S', they needed water to be readily available at the hospital. Health workers also participated in what is called 'dump dusting', where they clean the wards, their offices, as well as patients beds.

Health workers seemed very aware of the ability for patients to infect health workers, and the ability for health workers to infect patients. Health workers talked about the importance of using 'protectives', such as gloves, masks, gumboots, and aprons. Additionally, health workers stated that they should have proper personal hygiene, and cut their nails short, have their hair back, wear covered shoes, have a clean uniform, and wear a gown if needed. It is hospital procedure to wear latex gloves during a shift, however, health workers stated that consumption varies by department and ward. One health worker said that in the HIV/AIDS, ANC, maternity ward, out-patient department (OPD), and theatre, glove consumption can be very high. Health workers said that in 2012 there was a shortage of gloves, but that so far in 2013 the gloves have remained in stock and readily available. Health workers said that if for some reason gloves were not available, they asked the hospital administrator to buy more or sometimes had to ask the patients or attendants to buy gloves to perform a procedure or operation. One health worker emphasized that use of gloves and other protective measures was very important in the maternity ward, where women who have given birth can easily catch an infection such as sepsis.

Health workers also emphasized the high risk of needle-stick injuries, as well as specific diseases that put health workers at risk at BDGH. In the event of a needle-stick injury, health workers are required by protocol to implement Preventative Exposure

Prophylaxis (PEP). Health workers stated that needle stick injuries sometimes occurred when they were working with stubborn patients, who may not want the injection or might be afraid. In cases of needle-stick injury, PEP requires that health workers run the affected area under running water, and that both the health worker and patient are tested for HIV/AIDS. If the health worker is HIV/AIDS negative, and the patient is HIV/AIDS positive, the health worker begins a prophylaxis HIV/AIDS treatment for three full weeks. Health workers also emphasized that they were at risk for Hepatitis B, Hepatitis C, as well as TB, pneumonia, and also malaria. TB seemed to be a very important concern of health workers, as they explained that there was no separate unit for TB patients and that infected patients were mixed in with all other patients within the wards. Some health workers even described the rate of TB infection as alarming, saying that everyone, including the health workers, were at risk of TB infection especially when coughing is not controlled by the patient. Hospital administrators stated that other General Hospitals in Uganda have official TB units, but BDGH does not. Health workers attempted to separate infected TB patients by putting them in the last row, but many times they cannot because there are too many patients admitted. So far, health workers state that MDR-TB is very rare, but has been increasing steadily throughout Uganda.

Health workers and patients were also at high risk for malaria, since many patients arrived at the hospital to be treated for malaria as well as the fact that many of the hospital's windows are broken and admitted patients are not provided mosquito nets. Patients are expected to carry their own mosquito nets; however, during observation, no admitted patients were using mosquito nets at BDGH. Hospital administrators said they recommended that staff put on gumboots and other protectives at night to protect against malaria, but that health workers were still at high risk.

Health workers also emphasized the importance of sterilization for hospital instruments, especially surgical instruments. Health workers described three different ways they sterilize instruments, including sterilizers (electricity required), autoclaves (electricity required), and lastly boiling water (kerosene). Health workers consider autoclaves to be the most hygienic and recommended, since the autoclave uses steam to sanitize the instruments under pressure. The sterilizer boils the instruments in water, and is considered a good alternative to the autoclave. Finally, if electricity was not available,

health workers resorted to boiling the instruments in water over a kerosene stove. Sometimes, health workers had to request that patients or attendants buy kerosene to sterilize instruments before a procedure if the hospital had no money to buy kerosene. Theatre nurses were especially adamant that all instruments were sterilized before any operation or procedure.

Separation of wastes was also a topic of discussion among health workers. Health workers described that medical waste could not be incinerated at BDGH, because the hospital did not have a functioning incinerator. Instead, a company was contracted to pick up the medical waste each week and BDGH, and then transport the waste to the nearby city of Iganga for incineration. The hospital waste is kept near the mortuary, and health workers stated that the mortuary is highly prone to flooding during the rainy season. This poses a significant problem, given that the medical waste sits at BDGH for up to a week, and during floods the waste spreads and contaminates the surrounding hospital area. Health workers were knowledgeable about separation of medical wastes and the use of sharps containers for used syringes.

Nurses in theatre faced significant challenges to hygiene, and reported that many ceiling boards were missing, showers were not functioning for health workers after operations, much of the time health workers did not have enough linen to cover a patient during an operation, and sometimes there was not enough liquid cleaner to clean the room after an operation. At times, patients or attendants were requested to buy liquid soap for an operation or surgery if the hospital was out of stock, so theatre nurses could clean the operating room.

Patient hygiene was also a substantial challenge to health workers, as many patients were very poor and don't have the money to buy items the hospital cannot supply. Health workers stated that patients must collect and/or buy their own water to bathe, and that female patients had to come with their own menstrual pads. If patients were disabled or unable to leave their bed or mattress, then their attendants bathe them with a small towel or rag. If patients did not have attendants helping them during their stay at the hospital, they themselves had to collect and/or buy their own water to bathe, including soap, or anything else they need – or go without. It is a stark situation that puts both health workers and patients at risk – health workers were understaffed and BDGH

was underfunded, while patients were often too poor to provide all necessary provisions to maintain personal hygiene.

Sanitation Attitudes, Knowledge and Behaviors

Sanitation was a significant challenge at BDGH, and is considered a huge risk to everyone at the hospital. Health workers explained that sanitation was a challenge within the hospital interior and exterior. While discussing sanitation, there was a sense of helplessness because any improvements, renovations or overhauls required significant funding that was not available. Latrines were accessible to patients, and the few toilet facilities within the hospital were available to health workers and hospital visitors. During time of observation, two pour-flush toilets in BDGH (one female and one male) were reported to be functioning and most often used by health workers within BDGH. However, overall, health workers reported a range of two to five pour-flush toilets at BDGH that were available and functioning, explaining that many times these pour-flush toilets were 'partially functioning', getting get blocked and becoming unavailable for a period of time. Health workers explained that they must have water available to flush the toilets, and sometimes there was no water available. The two pour-flush toilets most often used were located within the administrative wing of the hospital, but health workers noted that the administration's flush toilets were far from the wards. Hospital administrators explained that the hospital's sanitation infrastructure is aging, and needs a complete renovation. They described sewage all over the hospital grounds from leaking pipes, cross contamination between sewage and leaking water pipes, half-broken down latrines that the hospital can't afford to fix, and patient toilet facilities that have been completely shut down within the hospital.

Health workers stated that the whole hospital smells of feces, and that fecal matter saturated the compound and was carried into the wards and health workers' homes. Moreover, they explained that when fecal matter was dumped on the ground, the chance of getting a fecal-oral infection was very high. They explain that patients much of the time paid no regard to where they defecated, and sometimes urinated or defecated within the wards or hallways of the hospital. Moreover, all four wards had to share only two latrines for patients – health workers stated this was not enough, considering that most

wards had between 35-75 admitted patients per day. Yet, hospital administrators stated that constructing a new latrine was very costly, at 15 million Ugandan schillings ($US 5,775). Previously, there were patient flush-toilet facilities within each ward, but those were shut down due to misuse, blockage, and contamination by patients.

Health workers stated that the latrines did not cater to the disabled, and patients were then forced to bring their own bed pans to the hospital. Hospital bed pans were broken and leaking. This was another significant cost to the patient, despite the fact that there were no user fees required at Ugandan health facilities.

The smell of feces on the hospital grounds was compounded by the fact that when latrines were filled every two months, and sewage was removed and subsequently buried near the hospital. Health workers acknowledged that this process of emptying the latrines and burying the sludge nearby BDGH, on official hospital grounds, had been going on for years if not decades, possibly even from when the hospital was originally constructed. Moreover, the hospital faced a significant challenge with animal waste, as local farmers allowed their cattle, goats, and other animals to graze on hospital grounds despite the fact that it was government property and not allowed (but was not enforced). Health workers stated that sometimes animals even came into the hospital, and that animal feces were tracked into the hospital on a daily basis.

Overall, health workers described a disastrous sanitation situation at BDGH, but felt helpless in their efforts to enforce any change or fund any necessary renovation.

Water Attitudes, Knowledge and Behaviors

Overall, health workers at the hospital considered water the most significant challenge. Health workers said that BDGH is supposed to have running water twenty-four hours per day, as should any hospital, but that they only had access to piped water in the morning when the tank is opened for one to two hours, at most. Health workers described that the pump was dependent on electricity, and that sometimes during extended power outages the hospital received no water at all. Water was pumped from a location far from the hospital, then piped to a 10,000-gallon overhead water storage tank, and then finally piped to the hospital. However, the water tank was leaking, and could not hold enough water for the needs of the entire hospital. Moreover, the majority of the taps

within the hospital were blocked or non-functional, with some health workers estimating that only one in ten water taps were functional. Importantly, there were no functional water taps for patients within the entire hospital.

When the Hospital had no running water, hospital administrators resorted to using a small rain-water harvesting tank. Because of the small size, the tank was of limited capacity, especially during the dry season. The Hospital Administration often bought a minimum of one hundred jerry cans of water per day for the Hospital's entire operations. The water was from unknown water sources, sold by peddlers outside the Hospital. A jerry can of water was sold for 500 to 1000 shillings, equivalent to US 20 cents – US 40 cents. Therefore, when water was not available, the Hospital Administration had to spend a minimum of US $20 – US $40 per day on water from unknown sources. Health workers reported the observation of peddlers on bicycles riding into the Hospital carrying jerry cans of water to the wards. Buying water was a significant financial burden to the Hospital, as it was an unanticipated expense in an already strained and limited budget. Alarmingly, if the Hospital ran out of purchased water, any operations or medical procedures performed on patients were put on hold until the patient or their attendants could retrieve (most often buy) water and bring it to the Hospital.

All health workers considered the hospital's piped water contaminated, and not non-potable. Health workers described that water could be contaminated at any stage: before it is pumped, within the tank, within the pipes or even once it is stored within the wards. Overall, they did not 'trust' the cleanliness of the water, and agreed that the lack of access to sustainable, clean sources of water puts everyone at risk at BDGH. Health workers said that chlorine was rarely used as a water treatment method because it was too costly for the hospital, and the hospital also did not have enough kettles to boil water. Sometimes health workers boiled small amounts of water for oral-rehydration treatment, but this required other available resources such as kerosene and kettles.

Hospital administrators stated that it was official hospital policy to advise all health workers, patients, attendants or any other visitors to the hospital to boil water before they drank it. Patients were not provided drinking water even if admitted to the hospital for days or weeks at a time, and had to drink the piped water without treatment or go buy untreated plastic bags of water, jerry cans of water or bottled water. However,

health workers stated that sometimes even bottled water was contaminated and can make you sick (e.g., if vendors purposely fill bottles with contaminated water). Health workers bought bottled water if they could afford it, but many health workers said they weren't paid enough to consistently buy bottled water.

Health workers described the process for obtaining water on a daily basis as well. Night shift nurses were responsible for storing any water that came out of the pipes in the morning, and usually were able to store between three and four jerry cans of water. However, by the time night shift workers returned to their posts, all the water had been used and they were forced to wait until morning for additional water. Theatre nurses stated that much of the time they ran out of water by midnight – with no available alternative except asking patients or their attendants to fetch water for an emergency procedure or operation. Theatre nurses described that sometimes they were unable to wash their hands after a procedure, or were not able to bathe after a difficult surgical procedure.

Health worker quarters were also dependent on the same water system as the main hospital, for drinking water as well as personal use such as bathing. Health workers reported that some houses on the compound did not have running water, so they had to ask their neighbors to fetch them water from their tap. All health workers collected water from the same few houses, and said it was very tiresome and time consuming carrying water from house to house, and sometimes made them late to work.

There was a severe shortage of water at BDGH, placing health workers, patients and attendants at great risk of nosocomial infection. Similar to the theme of sanitation, health workers said they felt helpless in the situation, unable to make any tangible changes that would improve the situation.

Challenges

Health workers reported a multitude of challenges with regard to WASH including a small budget, lack of hospital resources, health worker shortage, aging and non-functional hospital infrastructure, as well as a non-sensitized local community. Hospital administrators stated that hospital funds were received on a quarterly basis, with a budget of 34 million Ugandan schillings ($US 13,090) over a period of three months.

However, hospital administrators said that they sometimes received calls from the MOH telling them they should not expect the full amount of funds for the three-month period.

Health workers also stated the need for the community, both patients and attendants, to be sensitized and educated on health as well as on how to use toilet facilities. As previously stated, health workers reported that patients and attendants sometimes defecated and urinated within the hospital, and came from communities that have never used latrines or toilets. Moreover, one patient had between six or seven attendants, and it was difficult for health workers to engage in health education for each individual person. Health workers described the community as stubborn, and stuck in their ways. Health workers specifically referenced the stubbornness in regard to illegal animal grazing on hospital property.

The health worker shortage was also a huge challenge to health workers at the hospital. Health workers said they were each sometimes alone and responsible for 35 patients, while also supervising and training student nurses. Much of the time, health workers described that they faced impossible situations that no health worker should ever have to deal with. Health workers reported feeling very stressed, and many times unmotivated to come to work. They also described being overworked, with one health worker describing that they sometimes work up to eleven hours without drinking water or eating lunch. Health workers and hospital administrators overall understood their role with regard to WASH at BDGH, but didn't have the resources to successfully address any of the main problems facing the hospital.

Health workers identified several main recommendations to improve WASH at BDGH, including significantly increasing latrine coverage in BD (especially in rural locations of BD, as noted by health workers), purchasing a new generator for the piped water system, continued advocacy to local government, construction of a fence around BDGH, continuous handwashing training for health workers, rehabilitation of hospital infrastructure, including the water tank and health worker compound, sensitization of the local community, construction of an additional borehole for health workers and patients, increased rainwater harvesting, and construction of latrines for each hospital ward. Figure 3.1 depicts health worker recommendations for WASH at BDGH and categorizes the recommendations by low-resources, medium resources, and high resources required.

Discussion

The purpose of this case study was to understand and evaluate health worker attitudes, knowledge and behaviors at BDGH as well as evaluate if hygiene, sanitation, and water were significant indicators of patient satisfaction. The original study hypothesis was that attitudes about hygiene, water, and sanitation by health workers at BDGH are significant indicators of behaviors, and secondly that patient satisfaction of BDGH and health workers would be affected by perceived hygiene, sanitation, and water practices at the hospital.

The case study found that patient's rating of experiences relating to water, hygiene, and sanitation were significant indicators of overall patient satisfaction at $p > .05$. Additionally, results found that patient's rating of experiences relating to having enough space during their stay, adequacy of hospital equipment, and adequacy of hospital drugs were also significant indicators of overall patient satisfaction at $p > .05$.

Low ratings for availability of toilets, availability of hand-washing stations, as well as availability of safe drinking water were anticipated patient ratings based on the current infrastructure and conditions of the hospital. These indicators were rated the lowest out of all the indicators patients were able to rate. There are no areas for patients to wash their hands both inside or outside (either with just water, or even with soap and water), the majority of patients are not provided drinking water (only ART clinic patients receive Water Guard), and there are no functional toilet facilities within the hospital for patients (patients must use poorly maintained latrines outdoors). However, patient ratings for cleanliness of the hospital were higher than anticipated. It is possible that patients viewed cleanliness as a 'lack of visible trash on the floors' rather than a hygienic environment free of bacteria, germs, viruses, or other non-visible organisms.

Qualitative and quantitative data found that health workers had a strong understanding of hygiene, sanitation and water, as well as its importance, but that health worker attitudes were not strong indicators of health worker behavior, due to the significant resource challenges health workers faced on a daily basis. Overall, health worker data revealed significant pitfalls with regard to sustainable access to water, as well as improved hygiene and sanitation infrastructure at BDGH.

Challenges related to water, sanitation, and hygiene infrastructure at BDGH are of great concern. Obtaining water when the main piped source is not available is extremely time consuming, costly, and possibly unsafe to both hospital staff and patients. Moreover, there is high demand for the already scarce water resources. The main piped water source supplies both the hospital as well as the nearby health worker quarters on the hospital compound. More than one hundred health workers and their families rely on the main piped water source for personal use – further limiting the water supply for the hospital.

Unimproved sanitation and hygiene infrastructure at BDGH pose significant risk to health workers, patients, and attendants. Patients have no access to clean drinking water, or any handwashing facilities at BDGH. Additionally, health workers have no access to safe drinking water sources, and severely limited access to handwashing facilities. The hospital lacks sufficient and improved sanitation infrastructure for both health workers and patients; moreover, current latrine feces removal and disposal practices have saturated surrounding hospital grounds with feces, possibly contaminating piped and groundwater sources, as well as spreading disease.

Limited hospital resources related to hygiene, water and sanitation pose a great financial burden to health workers, as well as patients and their attendants. Patients must provide their own soap for personal hygiene, bedpans, drinking water, or any other necessary resources the hospital lacks – or go without (including medicines). Health workers at times are forced to purchase protectives, water or other items due to limited hospital financial resources. Each and all of these costs to patients, attendants and health workers act as 'invisible' fees (user fee for patients), despite the fact that Uganda abolished formal user fees at all government health centers and hospitals in 2001.

Access to sustainable clean water sources, sufficient toilet facilities for the target population and hospital staff, as well as sufficient handwashing stations are pillars of WASH; interventions that aim to improve WASH cannot succeed without access to these basic resources. Currently, BDGH does not even meet the minimum standards set by Sphere in the area of water, sanitation, as well as hygiene.

Qualitative and quantitative data were used to develop a logic model to identify the various factors that would improve WASH at BDGH as well as the relationships between those variables. Improved WASH at BDGH could be achieved by sustainable access to water, supportive hospital staff, educated local community, as well as cleaner hospital grounds and toilet facilities. Sustainable access to water, however, is dependent upon financial resources and rehabilitated hospital infrastructure, which is a precursor to cleaner hospital grounds and toilet facilities. Rehabilitated hospital infrastructure is dependent upon financial resources, but is a necessary first step to increased availability of handwashing facilities for patients and health workers, sustainable access to water, and cleaner hospital grounds and toilet facilities. An educated local community improves WASH at BDGH, but is also a precursor to cleaner hospital grounds and toilet facilities. Health education promotes a more educated local community, but also creates a more supportive hospital staff. Importantly, supportive hospital staff and educated local community affect one another, as an educated community affects how supportive hospital staff is, and supportive hospital staff positively affects the educated local community. Financial resources and supportive hospital staff also affect one another, with increased financial resources making staff more supportive, and supportive hospital staff more likely to advocate for more financial resources. Overall, these variables were all interrelated, and all could affect WASH conditions at BDGH (Figure 3.2).

This study adds to current research on the subject of WASH in rural hospitals of low-income countries in sub-Saharan Africa, specifically health worker attitudes, knowledge and behaviors as well as patient satisfaction as related to WASH. The study highlights the importance of investing in WASH resources within the health system, and specifically at the District level. The achievement of improved WASH was especially important at District Level Hospitals, to prevent and decrease rates of nosocomial infection.

Study Strengths and Limitations

There were several limitations and strengths to this research case study. The case study of BDGH is a single representation of health worker hygiene and sanitation attitudes and behaviors at a low-resource, rural public Ugandan hospital. There is limited

external validity as the data collected may only be applicable to other rural, public Ugandan hospitals within BD, or surrounding Ugandan districts. Sub-Saharan Africa is a melting pot of ethnicities, cultures, languages and customs, and therefore, the data collected at BDGH may not be entirely generalizable to other rural public hospitals in countries or districts other than BD, Uganda. However, given the limited published research on health worker hygiene and sanitation attitudes and behaviors at low-resource, rural public health hospitals, this case study serves as a stepping stone for future research that could improve hygiene and sanitation in public hospitals located in developing countries as well as develop comprehensive, feasible interventions to improve hygiene and sanitation practices in rural public health facilities with low-resources.

Additionally, the case study may be subject to recall bias given that patients were asked retrospective survey questions, and health workers were asked to recall specific events regarding their own hygiene and sanitation practices. Moreover, the study is subject to the self-reporting and social desirability bias, since all behavior by health workers was self-reported. Any social desirability bias will bias towards the null. The study was not subject to a significant amount of selection bias as all participants were recruited from BDGH.

Conclusion

In conclusion, the study of BDGH provides a preliminary understanding of health worker attitudes and behaviors towards WASH as well as the relationship between WASH practices at BDGH and patient satisfaction. Further research is needed to develop a more comprehensive understanding of health worker attitudes and behaviors towards WASH, as well as patient satisfaction's relationship to WASH, and should include a bigger sample size of health workers and patients. More funding for WASH and WASH related infrastructure is needed to improve WASH at District Hospitals in Uganda as well as improve patient outcomes.

Based upon qualitative and quantitative results obtained from the case study, several recommendations have been made to improve WASH at BDGH, while keeping in mind the limited resources available.

1. Increase health education within the local community, and if possible, increase health education to patients and attendants at BDGH.
2. Increase consistent handwashing trainings for health workers as well as student nurses training at the hospital that are facilitated through clear and simple instructions.
3. Increase and improve advocacy to BD Local Government as well as Ministry of Health. This will most facilitated mainly by hospital administrators and the District Health Officer (DHO), through:
    a. Implementation of an advocacy campaign to local and national government officials.
    b. Invitation of local government officials to visit BDGH and present all challenges related to improved WASH. Identify improvement strategies that BDGH can implement with low-resources, but emphasize that other strategies rely on increased financial resources.

The first recommendation requires low-resources, and will improve WASH at BDGH by improving patient and attendant treatment of hospital infrastructure. The second recommendation was based on health worker survey responses that suggest that health worker education is the most effective strategy to improve hygiene and handwashing behavior at BDGH. Moreover, health workers said that the second most effective strategy to improve hygiene and handwashing behavior is through clear and simple instructions. The third recommendation is advocacy, aimed to increase knowledge of the hospital's current challenges and identified strategies to improve WASH at BDGH.

Although many of the strategies to improve WASH at BDGH require significant resources, some strategies require low levels of funding and are achievable within a short time frame. Overall, health workers faced significant challenges to WASH at BDGH, and full achievement of improved WASH will require substantial financial resources as well as support from the MOH and BD Local Government.

Annex

Table 1.1: Health Worker Demographic Characteristics

Table 1.1: Health worker demographic characteristics	
Sex	% (44)
Male	29.55 (13)
Female	70.45 (31)
Occupation	% (44)
Nurse	61.36 (27)
Doctor	2.27 (1)
Anesthetic Officer	2.27 (1)
Nursing Assistant	6.81 (3)
R/M	2.27 (1)
Administration	4.54 (2)
Medical Records Assistant	2.27 (1)
Dental Attendant	2.27 (1)
Dentist	2.27 (1)
Orthopedic Officer	2.27 (1)
X-ray attendant	2.27 (1)
Pharmacy Technician	2.27 (1)
Health volunteer	2.27 (1)
Laboratory technician	2.27 (1)
Other	2.27 (1)
Age	% (44)
18 - 25	6.82 (3)
26 - 35	31.82 (14)
36 - 45	20.45 (9)
46 - 55	36.36 (16)
56-65	4.55 (2)

Table 1.2: Health Worker Attitudes and Behaviors Towards Water

Table 1.2: Health worker attitudes and behaviors towards water	
All water sources health workers use at BDGH	% (44)
Piped into hospital	97.72 (n = 43)
Piped into yard	6.81 (n = 3)
Public tap	31.81 (n = 14)
Open well at hospital	0 (n = 0)
Open well in yard	9.09 (n = 4)
Open public well	15.90 (n = 7)
Protected well at hospital	0 (n = 0)
Protected well in yard	2.27 (n = 1)
Protected public well	15.90 (n = 7)
Borehole	34.09 (n = 15)
Unprotected spring	13.63 (n = 6)
Protected spring	20.45 (n = 9)
River	2.27 (n = 1)
Lake	2.27 (n = 1)
Dam	4.54 (n = 2)
Rainwater	38.63 (n = 17)
Surface water	0 (n = 0)
Bottled water	25.00 (n = 11)
Other	2.27 (n = 1)
Hospital uses of main water source	% (44)
Drinking	75.00 (n = 33)
Cooking	84.09 (n = 37)
Bathing	86.36 (n = 38)
Handwashing	90.90 (n = 40)
Toilet	84.09 (n = 37)
Toilet cleaning	90.90 (n = 40)
Other: cleaning the unit	2.27 (n = 1)
Other: cloth washing	2.27 (n = 1)
Other: general cleaning	2.27 (n = 1)
Other: hospital cleaning	2.27 (n = 1)
Other: mopping	2.27 (n = 1)
Other: washing surgical instruments	2.27 (n = 1)
Other	2.27 (n = 1)
Water is normally available from main water source	% (43)
Yes	25.58 (n = 11)
No	72.09 (n = 31)
Don't know	2.32 (n = 1)
Functionality of main water source	% (42)
5-7 days per week	21.42 (n = 9)
2-4 days per week	54.76 (n = 23)
Fewer than two days per week	23.80 (n = 10)
Main water source provides enough water for Hospital needs including water for drinking, handwashing and food preparation	% (44)
Yes	22.72 (n = 10)
No	77.27 (n = 34)
Availability of acceptable alternative water source	% (44)
Yes	9.09 (n = 4)
No	86.36 (n = 38)

Don't know	4.54 (n = 2)
Hospital has a water shortage during the dry season.	% (44)
Yes	77.27 (n = 34)
No	22.72 (n = 10)
Water was unavailable from main source for one day or longer in last two weeks	% (42)
Yes	66.66 (n = 28)
No	33.33 (n = 14)
Amount of time on average it takes health workers to get water	% (43)
30 minutes or less	16.27 (n = 7)
31 - 60 minutes	27.90 (n = 12)
61 - 180 minutes	27.90 (n = 12)
More than three hours	16.27 (n = 7)
I don't know	11.62 (n = 5)
Health worker believes it is necessary to treat their family's drinking water	% (43)
Totally disagree	0 (n = 0)
Partially disagree	2.32 (n = 1)
No opinion	2.32 (n = 1)
Partially agree	16.27 (n = 7)
Totally agree	79.06 (n = 34)
Health worker believes their friends take action to treat water	% (44)
Totally disagree	13.63 (n = 6)
Partially disagree	4.54 (n = 2)
No opinion	4.54 (n = 2)
Partially agree	43.18 (n = 19)
Totally agree	34.09 (n = 15)
Health worker believes their neighbors take action to treat water	% (44)
Totally disagree	15.90 (n = 7)
Partially disagree	6.81 (n = 3)
No opinion	6.81 (n = 3)
Partially agree	47.72 (n = 21)
Totally agree	22.72 (n = 10)
Health worker believes that the majority of people in their village treat water	% (44)
Totally disagree	34.09 (n = 15)
Partially disagree	13.63 (n = 6)
No opinion	11.36 (n = 5)
Partially agree	36.36 (n = 16)
Totally agree	4.54 (n = 2)
Health worker is confident they can correctly treat water to make it safe to drink	% (44)
Totally disagree	2.27 (n = 1)
Partially disagree	4.54 (n = 2)
No opinion	2.27 (n = 1)
Partially agree	9.09 (n = 4)
Totally agree	81.81 (n = 36)
Health worker currently treats water at home	% (44)
Yes	68.18 (n = 30)
No	29.54 (n = 13)
Don't know	2.27 (n = 1)

Health worker currently treats water at hospital	% (41)
Yes	31.70 (n = 13)
No	56.09 (n = 23)
Don't know	12.19 (n = 5)
If water is not always treated at BDGH, reason why	% (24)
Water source is considered safe	29.16 (n = 7)
Hospital doesn't have enough filters/chemicals	100.00 (n = 24)
Nobody knows how to treat water	12.50 (n = 3)
It may/may not seem necessary	12.50 (n = 3)
Staff have no time	16.66 (n = 4)
Most bring bottled water	9.25 (n = 5)
Don't know	9.25 (n = 5)
What treatment method is usually used at BDGH	% (18)
Chlorination	100.00 (n = 18)
Filtration	16.66 (n = 3)
Boiling	83.33 (n = 15)
Let it stand and settle	16.66 (n = 3)
Strained	5.55 (n = 1)
Other: Waterguard tablets	16.66 (n = 3)
Don't know	22.22 (n = 4)
Water is stored at BDGH	% (39)
Yes	38.46 (n = 15)
No	53.84 (n = 21)
Don't know	7.69 (n = 3)
Water storage containers are only used for storing water	% (27)
Yes	51.85 (n = 14)
No	33.33 (n = 9)
Don't know	14.81 (n = 4)
Patients bring water from home	% (39)
Most patients	28.20 (n = 11)
Some patients	41.02 (n = 16)
No patients	17.94 (n = 7)
Don't know	12.82 (n = 5)
Health workers bring water from home	% (44)
Most health workers	25.00 (n = 11)
Some health workers	31.81 (n = 14)
No health workers	36.36 (n = 16)
Don't know	6.81 (n = 3)

Table 1.3: Health Worker Attitudes and Behaviors Towards Hygiene

Table 1.3: Health Worker Attitudes and Behaviors Towards Hygiene	
All occasions when the health worker believes it is important to wash their hands	% (44)
Before eating	97.72 (n = 43)
After eating	95.45 (n = 42)
Before praying	6.81 (n = 3)
Before breastfeeding	90.09 (n = 40)
Before cooking	88.63 (n = 39)
After defecation	95.45 (n = 42)
After changing a child's diaper	90.09 (n = 40)
Dirty hands	93.18 (n = 41)
After cleaning the toilet	93.18 (n = 41)
Other: After changing pads	2.27 (n = 1)
Other: After dump dusting	2.27 (n = 1)
Other: After handling a patient	11.36 (n = 5)
Other: Before and after operations	13.63 (n = 6)
Where people most often wash their hands at BDGH	% (44)
Within 10 paces toilet facility	40.90 (n = 18)
Within 10 pages of cooking place	22.72 (n = 10)
Elsewhere in hospital	34.09 (n = 15)
Outside hospital	9.09 (n = 4)
No specific place	34.09 (n = 15)
Soap is available most of the time at BDGH for washing hands	% (43)
Yes	79.06 (n = 34)
No	20.93 (n = 9)
Facilities and programmes at BDGH that promote safe and private menstrual hygiene for older girls	% (44)
Educational sessions	36.36 (n = 16)
Private washing facilities	11.36 (n = 5)
Private disposal	29.54 (n = 13)
Any kind of distribution program	6.81 (n = 3)
None	36.36 (n = 16)
Don't know	18.18 (n = 8)
Health worker opinion of average rate of health care associated infections for hospitalized patients	% (38)
Mean	35% (n = 21)
Don't know	44.73 (n = 17)
Impact of a health care associated infection on a patient's clinical outcome	% (43)
Very low	11.62 (n = 5)
Low	53.48 (n = 23)
High	27.90 (n = 12)
Very high	6.97 (n = 3)
Effectiveness hand hygiene preventing health care associated infections	% (43)
Very low	4.65 (n = 2)
Low	27.90 (n = 12)
High	32.55 (n = 14)
Very high	34.88 (n = 15)
Among all patient safety issues, importance of hand hygiene among all priorities at BDGH	% (44)
Very low	13.63 (n = 6)
Low	36.36 (n = 16)

High	29.54 (n = 13)
Very high	20.45 (n = 9)
On average, what percentage of situations requiring hand hygiene do health care workers at BDGH actually perform hand hygiene, either by hand-rubbing or handwashing (between 0-100%)	% (41)
Mean	69.32 % (n = 31)
Don't know	24.39 (n = 10)
Common to inform patients about the importance of optimal hand hygiene during health care delivery	% (44)
Yes	93.18 (n = 41)
No	6.81 (n = 3)
Effective action to increase hand hygiene compliance permanently in facility: hand hygiene posters are displayed at point of care	% (44)
Not effective	9.09 (n = 4)
Somewhat effective	13.63 (n = 6)
Effective	36.36 (n = 16)
Very effective	40.90 (n = 18)
Mean = 3.09	
Effective action to increase hand hygiene compliance permanently in facility: health care workers receive education on hand hygiene	% (44)
Not effective	2.27 (n = 1)
Somewhat effective	9.09 (n = 4)
Effective	40.90 (n = 18)
Very effective	47.72 (n = 21)
Mean = 3.36	
Effective action to increase hand hygiene compliance permanently in facility: clear and simple instructions for hand hygiene are made visible	% (44)
Not effective	2.27(n = 1)
Somewhat effective	13.63 (n = 6)
Effective	47.72 (n = 21)
Very effective	36.36 (n = 16)
Mean = 3.2	
Effective action to increase hand hygiene compliance permanently in facility: health workers regularly receive results of hand hygiene performance	% (44)
Not effective	20.45 (n = 9)
Somewhat effective	13.63 (n = 6)
Effective	47.72 (n = 21)
Very effective	18.18 (n = 8)
Mean = 2.63	
Effective action to increase hand hygiene compliance permanently in facility: senior nurses and doctors perform hand hygiene perfectly	% (43)
Not effective	4.65 (n = 2)
Somewhat effective	16.27 (n = 7)
Effective	44.18 (n = 19)
Very effective	34.88 (n = 15)
Mean = 3.09	
Effective action to increase hand hygiene compliance permanently in facility: patients are invited to remind health workers to perform hand hygiene	% (44)
Not effective	52.27 (n = 23)
Somewhat effective	20.45 (n = 9)
Effective	15.90 (n = 7)
Very effective	11.36 (n = 5)

Mean = 1.86

Table 1.4: Health Worker Attitudes and Behaviors Towards Sanitation

Table 1.4: Health Worker Attitudes and Behaviors Towards Sanitation	
Toilet facility people usually use at BDGH	% (44)
Flush/pour toilet to piped sewer system	34.09 (n = 15)
Flush/pour toilet to septic tank	36.36 (n = 16)
Flush/pour toilet to pit latrines	4.54 (n = 2)
Flush/pour toilet to somewhere else	9.09 (n = 4)
Ventilated pit latrine	29.54 (n = 13)
Pit latrine with slab	47.72 (n = 21)
Pit latrine with no slab	15.90 (n = 7)
Don't know	2.27 (n = 1)
Which people use toilets at BDGH	% (44)
Male adults	65.90 (n = 29)
Female adults	65.90 (n = 29)
Male children	56.81 (n = 25)
Female children	56.81 (n = 25)
Health workers	72.72 (n = 32)
Patients	90.90 (n = 40)
Hospital visitors	65.90 (n = 29)
Don't know	2.27 (n = 1)
Health worker satisfaction with place of defecation	% (44)
Very unsatisfied	70.45 (n = 31)
Somewhat unsatisfied	13.63 (n = 6)
No opinion	4.54 (n = 2)
Somewhat satisfied	11.36 (n = 5)
Mean = 1.56	
Toilet facility can be used at all hours of the day and night	% (43)
Yes	32.55 (n = 14)
No	65.11 (n = 28)
Don't know	2.32 (n = 1)
Latrines can be used during rainy season	% (43)
Yes	44.18 (n = 19)
No	44.18 (n = 19)
Don't know	11.36 (n = 5)
Features of a hygienic latrine, conditions that make a latrine hygienic	% (44)
Excreta should not be seen	70.45 (n = 31)
No bad odor	86.36 (n = 38)
No access for flies or insects	79.54 (n = 35)
Water sealed	40.90 (n = 18)
Other: well ventilated	2.27 (n = 1)
Don't know	4.54 (n = 2)
Importance of having a hygienic latrine	% (44)
Not to spread germs/diseases	97.72 (n = 43)
To keep all safe and healthy	84.09 (n = 37)
Security of female members	36.36 (n = 16)
Maintain social prestige	34.09 (n = 15)
Other: Attract visitors and patients	2.27 (n = 1)
Don't know	2.27 (n = 1)
How diseases spread to one another	% (44)
Open feces	88.63 (n = 39)

Through air	75.00 (n = 33)
Through contaminated water	90.90 (n = 40)
Through unclean hands	88.63 (n = 39)
Other: body contact	2.27 (n = 1)
Other: Poor latrines	2.27 (n = 1)
Other: Poorly ventilated place	2.27 (n = 1)
Other: Sexual intercourse	2.27 (n = 1)
Other: Unprotected sex	2.27 (n = 1)
Don't know	2.27 (n = 1)
Diseases spread from open feces	% (43)
Yes	93.02 (n = 40)
No	6.97 (n = 3)
Adult's and children's feces are different when it comes to spreading disease	% (43)
Yes, adult more potent	9.30 (n = 4)
Yes, child more potent	2.32 (n = 1)
No, they are about the same	88.37 (n = 38)
Diseases that are caused by defecating in the open or use of an unhygienic latrine	% (44)
Diarrhea	90.90 (n = 40)
Dysentery	95.45 (n = 42)
Typhoid	84.09 (n = 37)
Jaundice	4.54 (n = 2)
Worm infestation	90.90 (n = 40)
Skin disease	34.09 (n = 15)
Other: cholera	4.54 (n = 2)
Hospital latrine is hygienic	% (40)
Yes	20.00 (n = 8)
No	80.00 (n = 32)
Hospital latrine is clean enough	% (42)
Yes	7.14 (n = 3)
No	90.47 (n = 38)
Don't know	2.38 (n = 1)
Having a hygienic latrine is important at BDGH	% (43)
Very important	95.34 (n = 41)
Important	4.65 (n = 2)

Table 1.5: Health Worker Attitudes Towards Maintenance of Hospital Facilities

Table 1.5: Health Worker Attitudes Towards Maintenance of Hospital Facilities	
Water facilities are maintained successfully at BDGH	% (43)
Yes	11.62 (n = 5)
No	58.13 (n = 25)
Partially	30.23 (n = 13)
Sanitation facilities are maintained successfully at BDGH	% (43)
Yes	11.62 (n = 5)
No	58.13 (n = 25)
Partially	30.23 (n = 13)

Table 2.1: Patient Demographic Characteristics

Table 2.1 Patient Demographic Characteristics	
Sex	% (50)
Male	25.53 (12)
Female	74.47 (35)
Age	% (50)
18-25	34.04 (16)
26-35	17.02 (8)
36-45	21.28 (10)
46-55	8.51 (4)
56-65	10.64 (5)
65 and older	8.51 (4)
Ever been to Bugiri General Hospital before	% (50)
Yes	76.60 (36)
No	23.40 (11)
Length of Visit	% (50)
3 hours	6.38 (3)
5 hours or less	8.51 (4)
10 hours or less	4.26 (2)
1 day	4.26 (2)
Less than three days	12.77 (6)
Less than a week	23.40 (11)
Less than two weeks	25.53 (12)
More than two weeks	14.89 (7)

Table 2.2: Patient Importance Characteristics

Table 2.2 Patient Importance Characteristics	
Indicators	**Mean (SD)**
Respectful treatment	1.28 (.54) n = 47
Confidentiality of personal information	1.53 (.86) n = 47
Involvement in decision making	1.81 (1.08) n = 47
Convenient travel and short waiting times	1.30 (.66) n = 47
Choice of health care providers	1.83 (.96) n = 47
Good quality surroundings	1.30 (.55) n = 46
Clean drinking water available	1.36 (.73) n = 47
Clean and functional toilet facilities available	1.47 (.95) n = 47
Hand-washing facilities available	1.38 (.99) n = 47
Contact with the outside world	1.23 (.63) n = 47
Clarity of communication	1.36 (.60) n = 47
Rating 1 Extremely Important **Rating 2 Very Important** **Rating 3 Moderately Important** **Rating 4 Slightly Important** **Rating 5 Not Important**	

Table 2.3: Scores given by patients to factors they consider important (lower scores are more important)

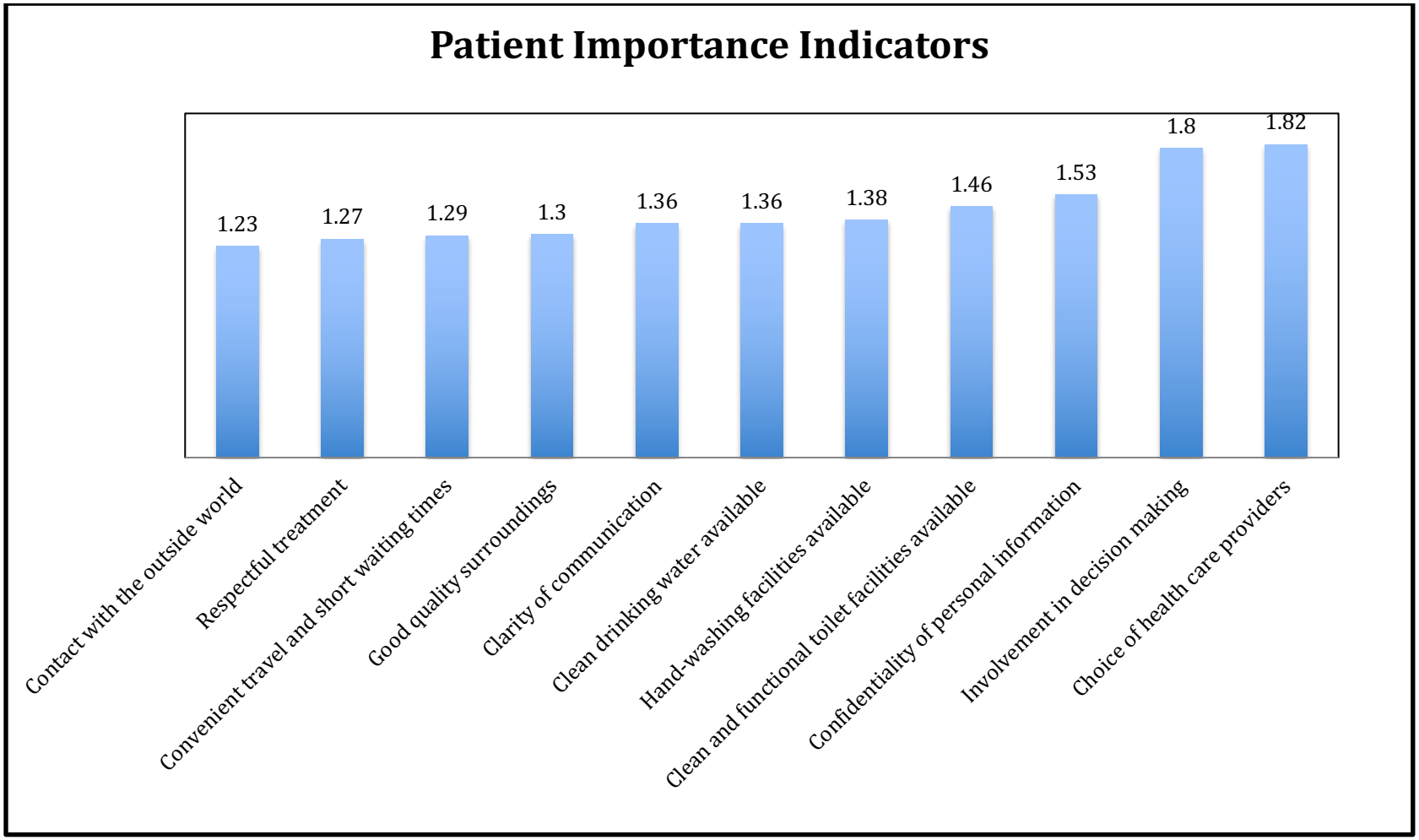


Table 2.4: Rating of BDGH Experience by Patients

Table 2.4 Rating of BDGH Experience by Patients	
Indicators	**Mean (SD)**
Respectful treatment	1.74 (1.09) n = 47
Confidentiality of personal information	1.74 (1.09) n = 47
Involvement in decision making	2.34 (1.32) n = 47
Privacy	1.87 (1.03) n = 47
Clarity of communication	2.07 (1.10) n = 43
Enough time to ask questions	2.04 (1.03) n = 46
Information on other tests or treatments	2.17 (1.29) n = 46
Ability to talk privately with health care providers	1.83 (.96) n = 47
Choice of health care providers	2.15 (1.09) n = 46
Cleanliness	2.38 (1.62) n=47
Clean drinking water available	4.36 (1.20) n = 47
Clean and functional toilet facilities available	4.37 (1.25) n = 46
Hand-washing facilities available	4.42 (1.21) n = 47
Enough space	3.15 (1.52) n=47
Family and friends visit	1.70 (.98) n=47
Contact with the outside world	1.49 (1.04) n=47
Rating 1 Very good **Rating 2 Good** **Rating 3 Moderate** **Rating 4 Bad** **Rating 5 Very bad**	

Table 2.5: Ratings given by patients to factors based on their experience at BDGH (lower ratings indicate better experiences).

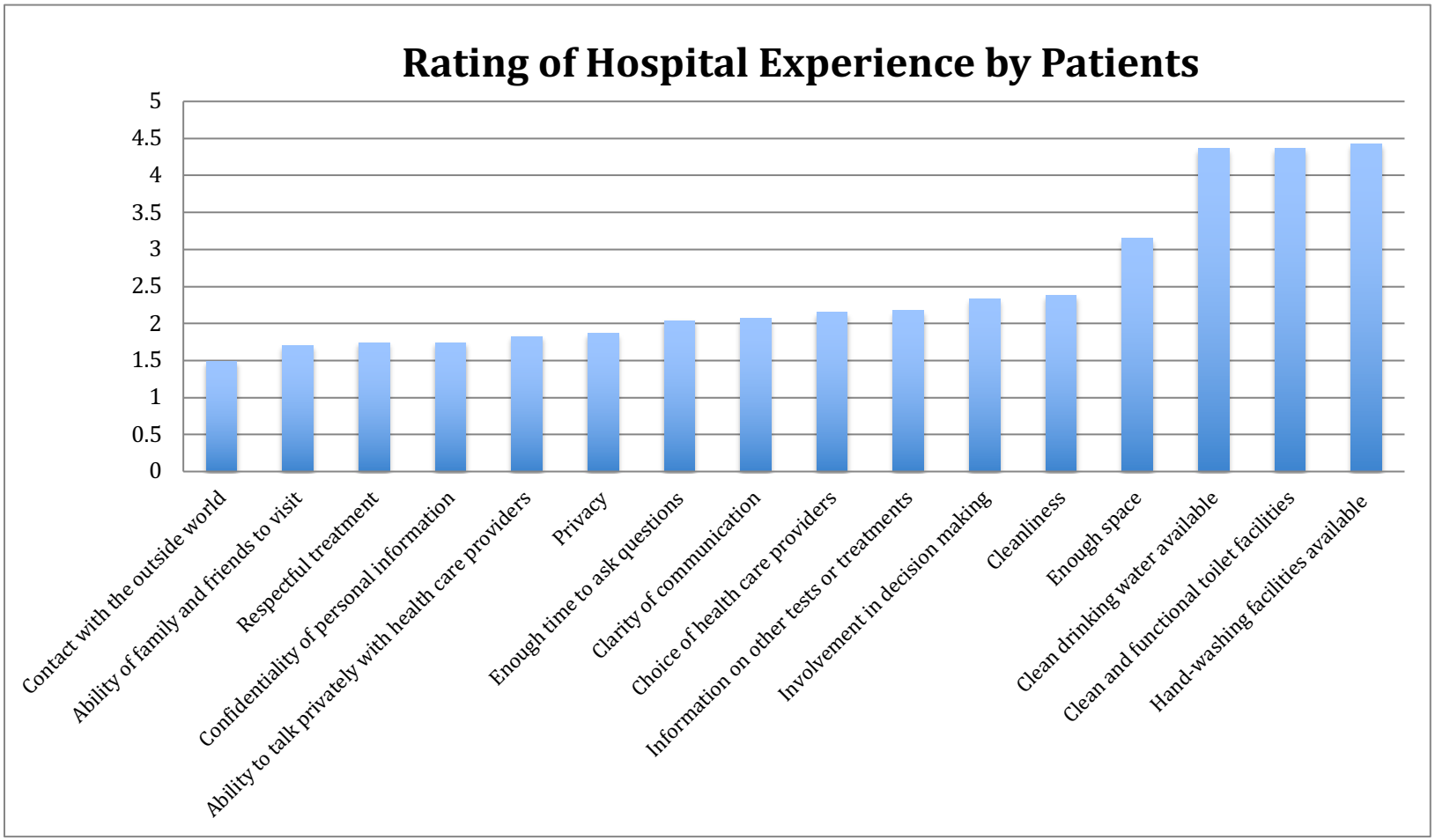


Table 2.6: Patient Ratings of BDGH Equipment, Health Worker Skill, and Drugs

Table 2.6: Patient Ratings of Hospital Equipment, Health Worker Skill, and Drugs	
	Mean (SD)
Adequacy of health care provider skill Rating 1 Yes Rating 2 No	1.06 (.25) n = 47 93.62 % (n = 44) 6.38 % (n = 3)
Adequacy of hospital equipment Rating 1 Yes Rating 2 No	1.66 (.48) n = 47 34.04 % (n = 16) 65.96 % (n = 31)
Adequacy of hospital's drug supplies Rating 1 Yes Rating 2 No	1.59 (.50) n = 47 40.43 % (n = 19) 59.57 % (n = 28)

Table 2.7: Overall Satisfaction By Patients of their Stay at BDGH

Table 2.7 Patient Satisfaction	
	Mean (SD)
Overall Patient Satisfaction	3.361702 (1.45102) n = 47
Rating 1 Very Satisfied	17.02 % n = 8
Rating 2 Somewhat Satisfied	10.64 % n = 5
Rating 3 Moderately Satisfied	21.28 % n = 10
Rating 4 Not Very Satisfied	21.28 % n = 10
Rating 5 Not at All Satisfied	29.79 % n = 14

Table 2.8: Overall Satisfaction By Patients of their Stay at BDGH

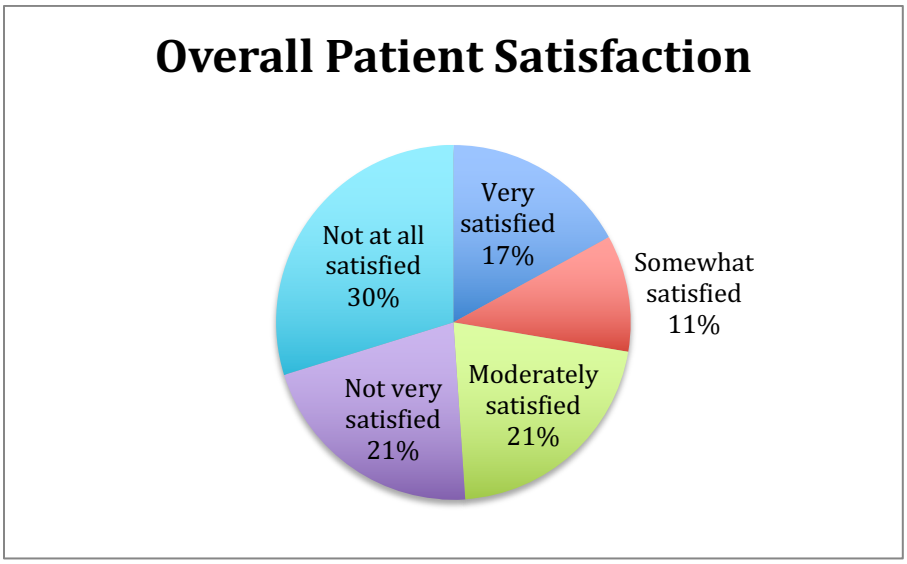


Table 2.9: Bivariate Regression Analysis

Regression coefficients predicting satisfaction

Variable	F-value	P-value	R-squared	Adjusted R-squared	n
Respectful Treatment	0.16	0.6911	0.0035	-0.0186	47
Confidentiality of personal information	0.34	0.5613	0.0076	-0.0145	47
Involvement in decision making	0.49	0.4854	0.0109	-0.0111	47
Privacy	1.21	0.2773	0.0262	0.0045	47
Clarity of communication	0.98	0.3277	0.0234	-0.0004	43
Enough time to ask questions	2.43	0.1266	0.0522	0.0307	46
Information on other tests or treatments	0.65	0.4252	0.0145	-0.0079	46
Ability to talk privately with health care providers	0.09	0.7638	0.0020	-0.0201	47
Choice of health care providers	0.37	0.5474	0.0083	-0.0143	46
Cleanliness	3.35	0.0740*	0.0692	0.0485	47
Clean drinking water	4.74	0.0347**	0.0954	0.0753	47
Clean and functional toilet facilities	10.98	0.0018**	0.1997	0.1815	46
Hand-washing facilities	14.36	0.0004**	0.2419	0.2251	47
Enough space	5.15	0.0281**	0.1027	0.0828	47
Family and friends visit	0.27	0.6036	0.0060	-0.0160	47
Contact with the outside world	0.07	0.7966	0.0015	-0.0207	47
Opinion of provider skill	0.14	0.7111	0.0031	-0.0191	47
Opinion if equipment is adequate	4.65	0.0364**	0.0937	0.0736	47
Opinion if drugs are adequate	15.78	0.0003**	0.2597	0.2432	47

****Significant at p < .05**
***Significant at p < .10**

Table 2.10: Multivariate Regression Analysis of Overall Patient Satisfaction (Dependent Variable) and Independent Variables: Patient Opinion of Hospital Drugs, Patient Ratings of Handwashing Facilities, Patient Ratings of Toilet Facilities, Patient Ratings of Having Enough Space, Patient Ratings of Hospital Equipment, and Patient Ratings of Available Drinking Water (Patient Survey Variables).

Source	SS	df	MS
Model	31.56	6	5.26
Residual	62.54	39	1.60
Total	94.10	45	2.09

Number of observations	46
F(6, 39)	3.28
Prob>F	0.01
R-squared	0.33
Adjusted R-squared	0.23
Root MSE	1.26

Satisfaction	Coefficient	Standard Error	t	P > t	[95% Confidence Interval]	
Opinion of drugs	1.17	0.49	2.36	0.02	0.16	2.18
Handwashing rating	0.50	0.36	1.39	0.174	-0.23	1.23
Rating of toilet facilities	-0.06	0.37	-0.17	0.87	-0.81	0.68
Rating of space	.02	0.16	.16	0.87	-0.30	0.35
Rating of hospital equipment	-.54	.58	-.92	.36	-1.73	.65
Rating of availability of drinking water	-.02	.21	-.11	.91	-.46	.41
_cons	0.43	0.82	0.51	0.61	-1.24	2.09

Table 3.1: Health worker recommendations to improve WASH at BDGH and the level of resources required for each.

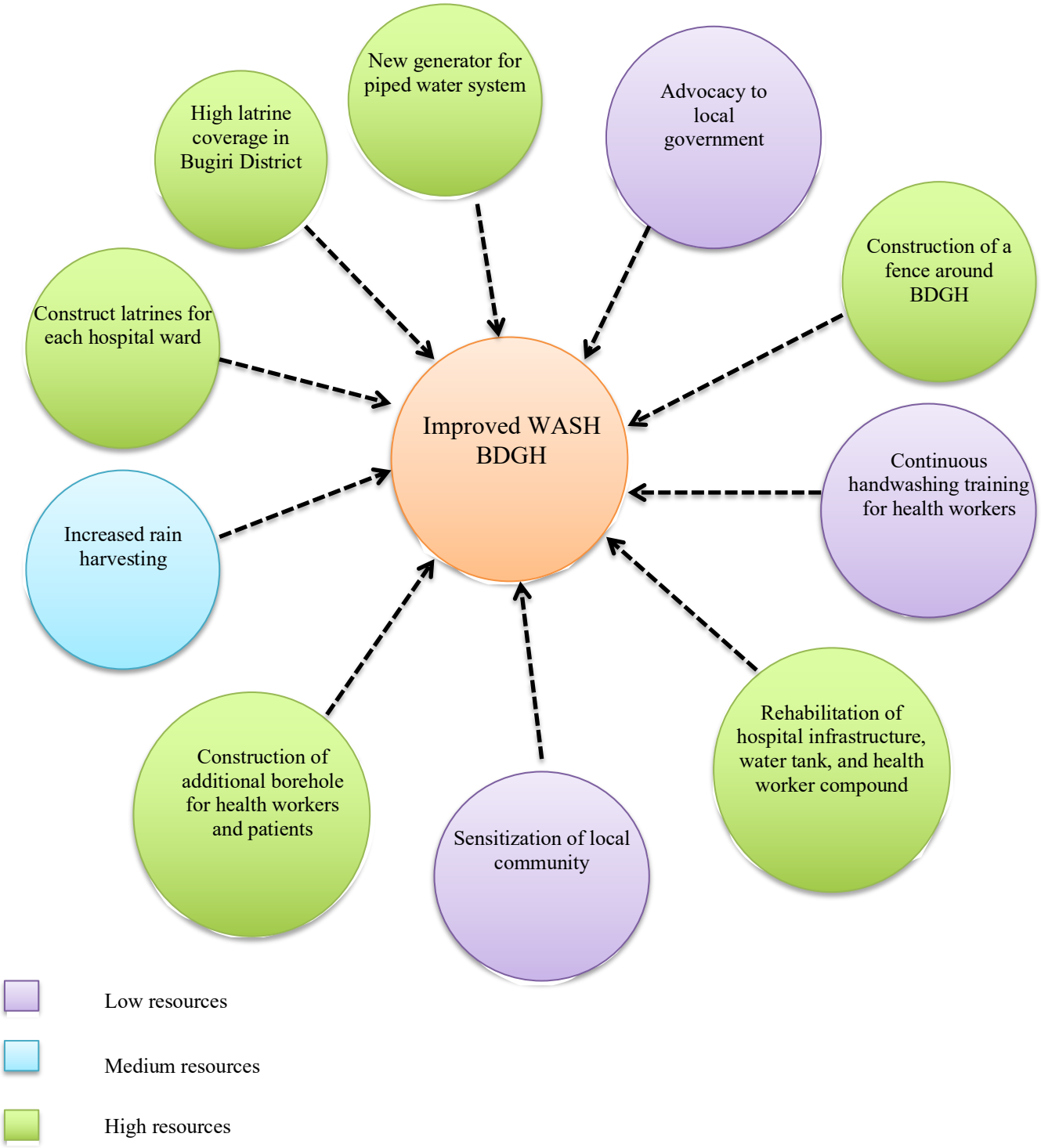


Figure 3.2: Improved WASH at BDGH Logic Model

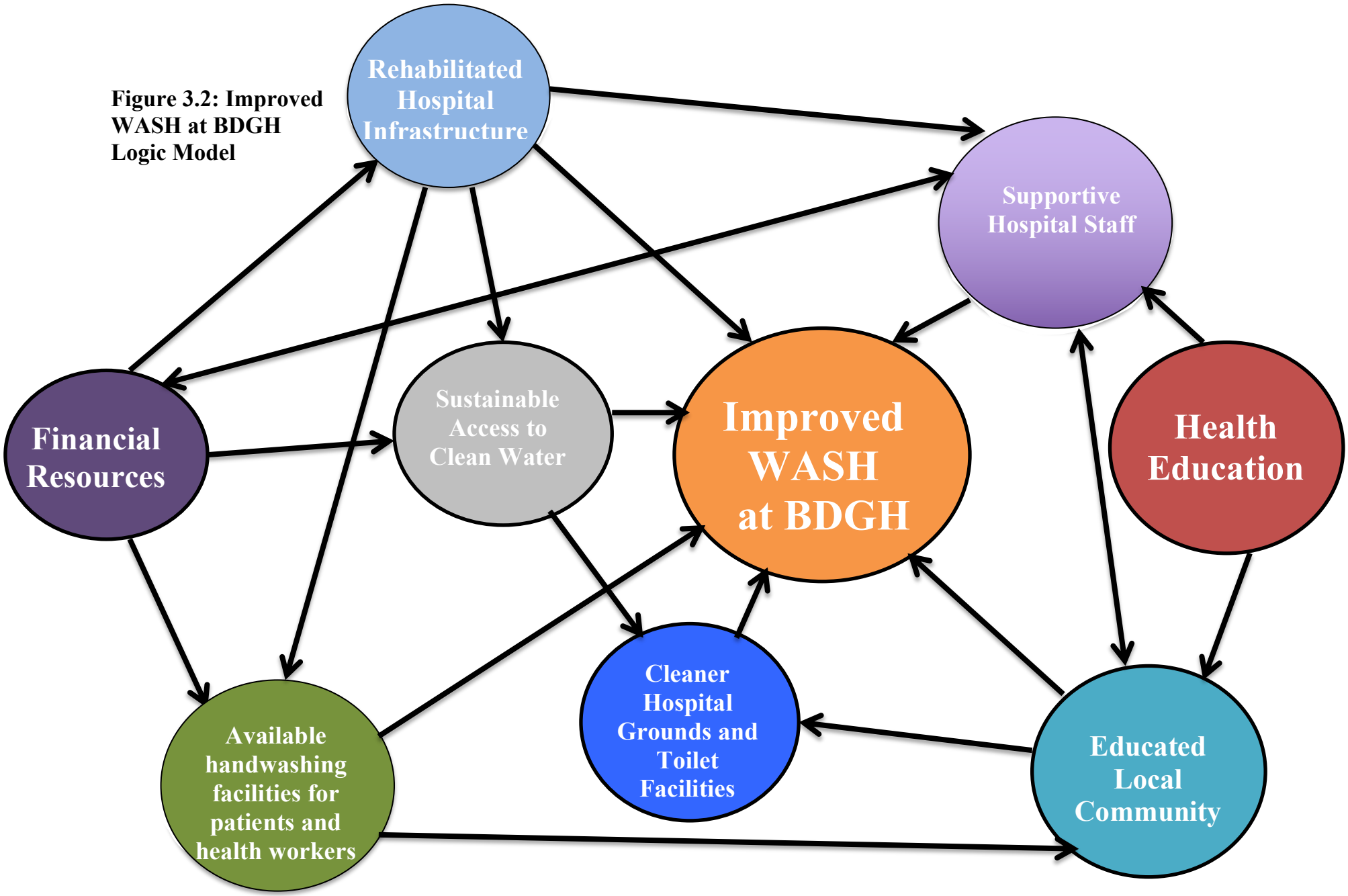


Figure 4.1: George Washington University IRB Approval Form and Modification Request Form

THE GEORGE WASHINGTON UNIVERSITY

WASHINGTON, DC

Date:	February 21, 2013
To:	Jay Graham, PhD, MPH, MBA
From:	The George Washington University Committee on Human Research, Institutional Review Board (IRB), FWA00005945
Re:	Correspondence dated 01/17/2013
Subject:	**IRB#011333** -- *Health Worker Attitudes and Behaviors Towards Hygiene, Sanitation and Water in Rural Health Facilities Located in Low-Resource Settings: A Case Study of Bugiri District Hospital in Uganda*
Sponsor:	None
Risk Level:	**Minimal** **Status:** Active **Expiration date: 2/19/2014**

This is to certify that the Institutional Review Board has **fully approved** the above referenced protocol via expedited review procedure under categories # **6 & 7** of 45 CFR 46.110.
The IRB has also determined that this study meets the criteria for a waiver of the subjects' signature as documentation of consent under 45 CFR 46.117 (c).

The expiration date of this project is **2/19/2014.** HHS regulations at 45 CFR 46.109(e) require that **continuing review** of research be conducted by the IRB at intervals appropriate to the degree of risk and **not less than once per year.** The regulations make **no provision for any grace period extending the conduct of the research beyond the expiration date of IRB approval. When your protocol expires all research activities must stop.** Please mark your calendar now to insure that the IRB receives a renewal request 30 days before the anniversary date of the project, if this study is expected to extend beyond one year.

This protocol has been approved for **a maximum number of 60 subjects** to be enrolled under the auspices of George Washington University. If you wish to increase enrollment beyond this number, you must submit a modification request to the IRB and obtain approval before exceeding this number.

Please note that the IRB must be notified if the project is altered in any way (change in location, personnel, number of subjects, age of subjects, or any change in research protocol). If you have any questions, please do not hesitate to contact the Office of Human Research either by email at ohrirb@gwu.edu or via phone at 202-994-2715.

MPB/dba

Page 1 of 1

GEORGE WASHINGTON UNIVERSITY & MEDICAL CENTER
OFFICE OF HUMAN RESEARCH • INSTITUTIONAL REVIEW BOARD
ohrirb@gwu.edu • PHONE: 202.994.2715

MODIFICATION REQUEST FORM

IRB#	#011333	STUDY EXPIRATION DATE:	2/19/2014
CLASSIFY THIS STUDY:	- choose one - Case Study (Survey, Interview, Focus Group)		

PROTOCOL TITLE AND SPONSOR:
TITLE: *Health Worker Attitudes and Behaviors Towards Hygiene, Sanitation and Water in Rural Health Facilities Located in Low-Resource Settings: A Case Study of Bugiri District Hospital in Uganda*
SPONSOR: None

PRINCIPAL INVESTIGATOR INFORMATION				
LAST NAME:	Graham	FIRST NAME:	Jay	Degree: PhD, MPH, MBA
CITI TRAINING COMPLETED:	- choose one - YES			
DEPARTMENT:	Department of Global Health			SCHOOL: MPH
ADDRESS:	2100 M. Street, Office Unit 203 Washington D.C. 20037			
PHONE:	202.994.2392	EMAIL: jgraham@gwu.edu		
~~PRINCIPAL CONTACT (IF OTHER THAN THE PI)~~ ☒ Student ☐ Coordinator ☐ Other:				
LAST NAME:	Benke	FIRST NAME:	Amalia	
PHONE (DAY):	971-221-3251	EMAIL: abenke@gwu.edu		

MODIFICATION CLASSIFICATION:

IRB approved protocol/research consent form:	IRB approved enrollment/recruitment documents:
☐ *Change design/methodology*	☐ *Administrative/Clerical changes*
☐ *Change in eligibility criteria*	☐ *Editorial/clarification*
☒ *Change in number of subjects*	☐ *New safety information for enrolled subjects*
☐ *Change in number of groups*	☐ *Other, describe:*
☐ *Changes to the research consent form*	
☐ *Other, describe:*	

1.	Summary of modification(s) requested: (required): **I would like to change the maximum number of subjects eligible to participate in the study to 150 participants, from 60.**
2.	Justification for the modification (s): **I ARRIVED IN UGANDA AND WAS SURPRISED TO FIND THAT MANY MORE HEALTH WORKERS WANTED TO PARTICIPATE IN THE STUDY THAN I HAD PREVIOUSLY ANTICIPATED. I HAD PREVIOUSLY ONLY THOUGHT AROUND 10 HEALTH WORKERS WOULD LIKE TO PARTICIPATE BY TAKING/PARTICIPATING IN THE SURVEY/FOCUS GROUP/INTERVIEW, HOWEVER, NOW APPROXIMATELY 100 WANT TO TAKE THE SURVEY. I STILL ANTICIPATE TO COLLECT DATA FROM UP TO 50 PATIENTS.**
3.	Is the requested modification major or minor? **Select one Minor**
4.	List all attached documents. Include versions and dates: **Type a list of ALL attached documents**

Signature of PI:	Date:
See email GF 4/15/13	

'13 APR 11 AM 11:50

Form Version 03/24/2010

1 of 3

THIS BOX FOR OHR USE ONLY!

OHR TRANS# 19546

Should all subjects be re-consented: _____ YES / _____ NO/ ✓ NA

Date Reviewed by **Full Committee** or **IRB Chair/Designee:** 04/16/13

Final IRB Approval:

Chair/IRB Designee: Melissa P. Ball Signature: MPBall Date: 04/16/13

MODIFICATION REQUEST CHECKLIST

PLEASE NOTE: All modifications to the approved protocol must be submitted to the IRB for approval before implementation. Changes in practice should not begin until after IRB approval has been received, except when necessary to eliminate apparent immediate hazards to the subject.

Examples of Major Modifications include, but are not limited to:

- Modifying consent document(s)
- Changing population from which subjects will be drawn\
- Change in survey instrument/questionnaire
- Change in risk/benefit ratio
- Change in Principal Investigator

** The type of review is determined by the change in the risk/benefit ratio, cumulative or individual, or change to the study design**

	Required documents for studies qualifying for a Minor Modification	**# of copies**
☒	Modification Request Form	1 copy
☒	Highlighted or red-lined versions of any previously approved forms/documents that will be impacted by this request, which demonstrate the changes	1 copy
☒	Revised (clean copy) documents that include the requested changes	1 copy
☒	Updated/Current Synopsis Form **OR** Protocol Summary with changes incorporated	1 copy

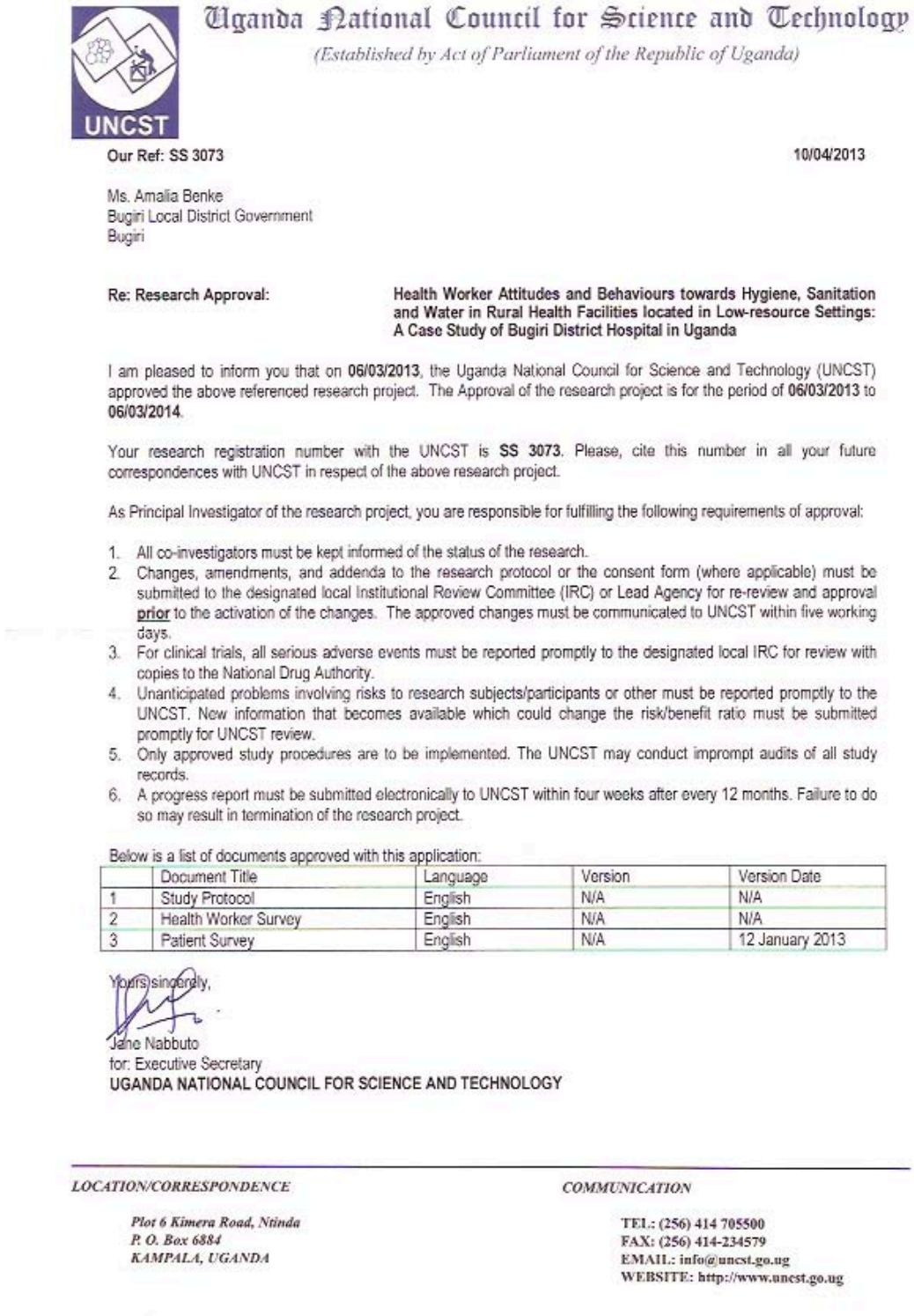
No submission deadline. The IRB Chair or designee can approve the modification on behalf of the IRB

	Required documents for studies qualifying for a Major Modification (For modifications that need to be reviewed by the full IRB, 15 copies of the study materials will be requested when the study has been prepared for IRB review.)	**# of copies**
☐	Modification Request Form	1 copy
☐	Highlighted or red-lined versions of any previously approved forms/documents that will be impacted by this request, which demonstrate the changes	1 copy
☐	Revised (clean copy) documents that include the requested changes	1 copy
☐	Updated/Current Synopsis Form **OR** Protocol Summary with changes incorporated	1 copy

Deadline: The Friday prior to the 2nd and 4th Tuesday of every month – please see submission schedule on OHR website

Form Version 03/24/2010

Figure 4.2: Uganda National Council for Science and Technology IRB Approval



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

UNCST

Our Ref: SS 3073 **10/04/2013**

Ms. Amalia Benke
Bugiri Local District Government
Bugiri

Re: Research Approval: **Health Worker Attitudes and Behaviours towards Hygiene, Sanitation and Water in Rural Health Facilities located in Low-resource Settings: A Case Study of Bugiri District Hospital in Uganda**

I am pleased to inform you that on **06/03/2013**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **06/03/2013** to **06/03/2014**.

Your research registration number with the UNCST is **SS 3073**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated local Institutional Review Committee (IRC) or Lead Agency for re-review and approval **prior** to the activation of the changes. The approved changes must be communicated to UNCST within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local IRC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST review.
5. Only approved study procedures are to be implemented. The UNCST may conduct imprompt audits of all study records.
6. A progress report must be submitted electronically to UNCST within four weeks after every 12 months. Failure to do so may result in termination of the research project.

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1	Study Protocol	English	N/A	N/A
2	Health Worker Survey	English	N/A	N/A
3	Patient Survey	English	N/A	12 January 2013

Yours sincerely,

Jane Nabbuto
for: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P. O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

Figure 5.1: Health Worker Informed Consent Form

HEALTH WORKER VERBAL INFORMED CONSENT FORM: Bugiri District Hospital Case Study

You are invited to participate in a research study under the direction of Dr. Graham of the Department of Environmental and Occupational Public Health, George Washington University (GWU). My name is Amalia Benke and I am a Master's in Public Health student attending George Washington University School of Public Health. I am currently completing my Master's Thesis, and I have decided to understand more about health worker hygiene and sanitation attitudes and behaviors at Bugiri District Hospital.

You are being asked if you want to take part in this study because you are a health worker at Bugiri District Hospital. Please read this form and ask us any questions that will help you decide if you want to be in the study. Taking part is completely voluntary and even if you decide you want to, you can quit at any time. You must be at least 18 years old to take part in this study, and be a health worker at Bugiri District Hospital. By taking part in this research you will receive a small thank you gift, and the benefit to society will be a better understanding of ways to improve hygiene and sanitation in Bugiri District Hospital.

As a health worker, you are invited to participate in the study through a number of ways. You may fill out the health worker survey, or participate in an interview or focus group discussion. Additionally, your behavior while at the Hospital may be observed during general observations of the Hospital and health workers at the Hospital. Only behaviors related to hygiene, sanitation, or use of water will be observed and recorded for this study. There are no right or wrong answers to any of the questions during the interview, survey, or focus group, and if you feel uncomfortable answering a question you may choose not to answer. Filling out the survey should take about thirty minutes to complete. Participation in a focus group discussion as well as an in-depth interview should each last about one hour. If you feel uncomfortable or emotional stress/discomfort answering the survey, interview or focus group questions you are free to skip any questions and can stop at any point. Your employment status at Bugiri District Hospital will not be affected if you decide to participate or not participate.

I will not put your name on any interviews, surveys, or focus group discussions so the information you provide will be confidential. Once again please let me know if there are any questions you feel uncomfortable answering or if you need a break at any point in the interview. Information from this interview, survey and/or focus group discussion will be completely confidential. The information you provide me will be used for my Master's Thesis as well as development of a Report to the Hospital and District Government on how to improve hygiene and sanitation practices at Bugiri District Hospital. The records of this study will be kept private. In any published articles or presentations, we will not include any information that will make it possible to identify you as a subject.

With your consent, I would like to record as well as take notes during the interview or

focus group discussion, however, if you are uncomfortable with audio or video recording I would still like to take notes during the session. Once the session is transcribed, the recording will be destroyed. While we cannot guarantee the privacy of the focus group discussion, we request that all present respect the group by not telling anyone outside the group what is said.

This study is completely confidential and neither your name, my name, nor names that come up during the interview, focus group discussion or survey will be associated with your responses. Every effort will be made to keep your information confidential, however, this cannot be guaranteed. The information you provide confidentially will be kept secure in a password-protected database with only myself and the research team having access. If results of this research study are reported in journals or at scientific meetings, the people who participated in this study will not be named or identified.

After you give your consent as a study participant, the research team will provide you with a copy. Please keep it in case you want to read it again or call someone about the study. If you have questions about the research study or your right as a study participant please call the Uganda National Council for Science and Technology (UNCST) at + 256 (0)414 – 250499 or contact them at P.O. Box 6884, Kampala, Uganda. Your signature is not required. Your willingness to participate in this research study is implied if you proceed with completing the survey.

Figure 5.2: Patient Informed Consent Form

PATIENT VERBAL INFORMED CONSENT FORM: Bugiri District Hospital Case Study

You are invited to participate in a research study under the direction of Dr. Graham of the Department of Environmental and Occupational Public Health, George Washington University (GWU). My name is Amalia Benke and I am a Master's in Public Health student attending George Washington University School of Public Health. I am currently completing my Master's Thesis, and I have decided to understand more about patient satisfaction at Bugiri District Hospital.

You are being asked if you want to take part in this study because you were a patient at Bugiri District Hospital. Please read this form and ask us any questions that will help you decide if you want to be in the study. Taking part is completely voluntary and even if you decide you want to participate, you can quit at any time. You must be at least 18 years old to take part in this study, and have been discharged from the Hospital. By taking part in this research you will receive a small thank you gift, and the benefit to society will be a better understanding of ways to improve hygiene and sanitation in Bugiri District Hospital.

You are invited to participate in the study by filling out a survey. There are no right or wrong answers to any of the questions on the survey, and if you feel uncomfortable answering a question you may choose not to answer. If you feel uncomfortable or emotional stress/discomfort at any point during the survey, you are free to skip any questions and can stop at any point. Filling out the survey should take about thirty minutes to complete. Your name will not be on the survey, so the information you provide will be confidential. Once again please let me know if there are any questions you feel uncomfortable answering or if you need a break at any point during the survey.

Information from this survey will be completely confidential. The information you provide me will be used for my Master's Thesis as well as development of a Report to the Hospital and District Government on how to improve hygiene and sanitation practices at Bugiri District Hospital. The records of this study will be kept private. In any published articles or presentations, we will not include any information that will make it possible to identify you as a subject.

This study is completely confidential and your name will not be associated with your survey responses. Every effort will be made to keep your information confidential, however, this cannot be guaranteed. The information you provide confidentially will be kept secure in a password-protected database with only myself and the research team having access. If results of this research study are reported in journals or at scientific meetings, the people who participated in this study will not be named or identified.

After you give your consent as a study participant, the research team will provide you with a copy. Please keep it in case you want to read it again or call someone about the

study. If you have questions about the research study or your right as a study participant please call the Uganda National Council for Science and Technology (UNCST) at + 256 (0)414 – 250499 or contact them at P.O. Box 6884, Kampala, Uganda. Your signature is not required. Your willingness to participate in this research study is implied if you proceed with completing the survey.

Figure 6.1: Letter of Invitation from Government Officials

Telephone
District Chairman 0752386738
Vice Chairman 0772685127
District Speaker 0779054521
Chief Administrative Officer Mob. 0772497699
Chief Administrative Officer 0434251003
CAO General Line 0434251102
Fax 0434251102
Website: www.bugiri.go.ug
E-mail: bugiridistrict@elitemail.org
bugiridistrict@yahoo.co.uk

THE REPUBLIC OF UGANDA

BUGIRI DISTRICT LOCAL GOVERNMENT
Office of the Chief Administrative Officer
P.O Box 37,
Bugiri,
Uganda

In any correspondence on this subject please quote
Ref: **CR/164/1**

MINISTRY OF LOCAL GOVERNMENT RECEIVED 18 OCT 2012 KAMPALA MINISTRY Hqr. P.O.BOX 7037

Monday October 15th 2012

Ms. Amalia Jane Benke
George Washington University
School of Public Health Administration
2100 M St NW, Suite 203
Washington, D.C. 20052, **USA**

INVITATION FOR ASTUDY TOUR TO BUGIRI DISTRICT LOCAL GOVERNEMNT

Dear Ms. Benke,

Greetings from Bugiri District Local Government.

I was delighted to learn of your intended visit to Uganda and Bugiri District in particular in January or February 2013. We remember fondly your visit in March 2012 and welcome your return.

We understand that you will be conducting case study research at Bugiri District Hospital and that your research will be shared with the Bugiri District Government and the administration of the Bugiri District Hospital to inform and facilitate improved hygiene and sanitation practices at the District Hospital.

This is therefore to formally extend an invitation to visit Bugiri District Local Government. We understand that you are working closely with the Resident District Commissioner, Mrs. Margaret Mwanamoiza, and that her office will provide support (transportation, lodging, meals etc.) for your visit to Bugiri. Please let us know the exact dates of your visit so that we may assist in coordinating your research and other activities.

Best Regards,

for: CHIEF ADMINISTRATIVE OFFICER BUGIRI DISTRICT

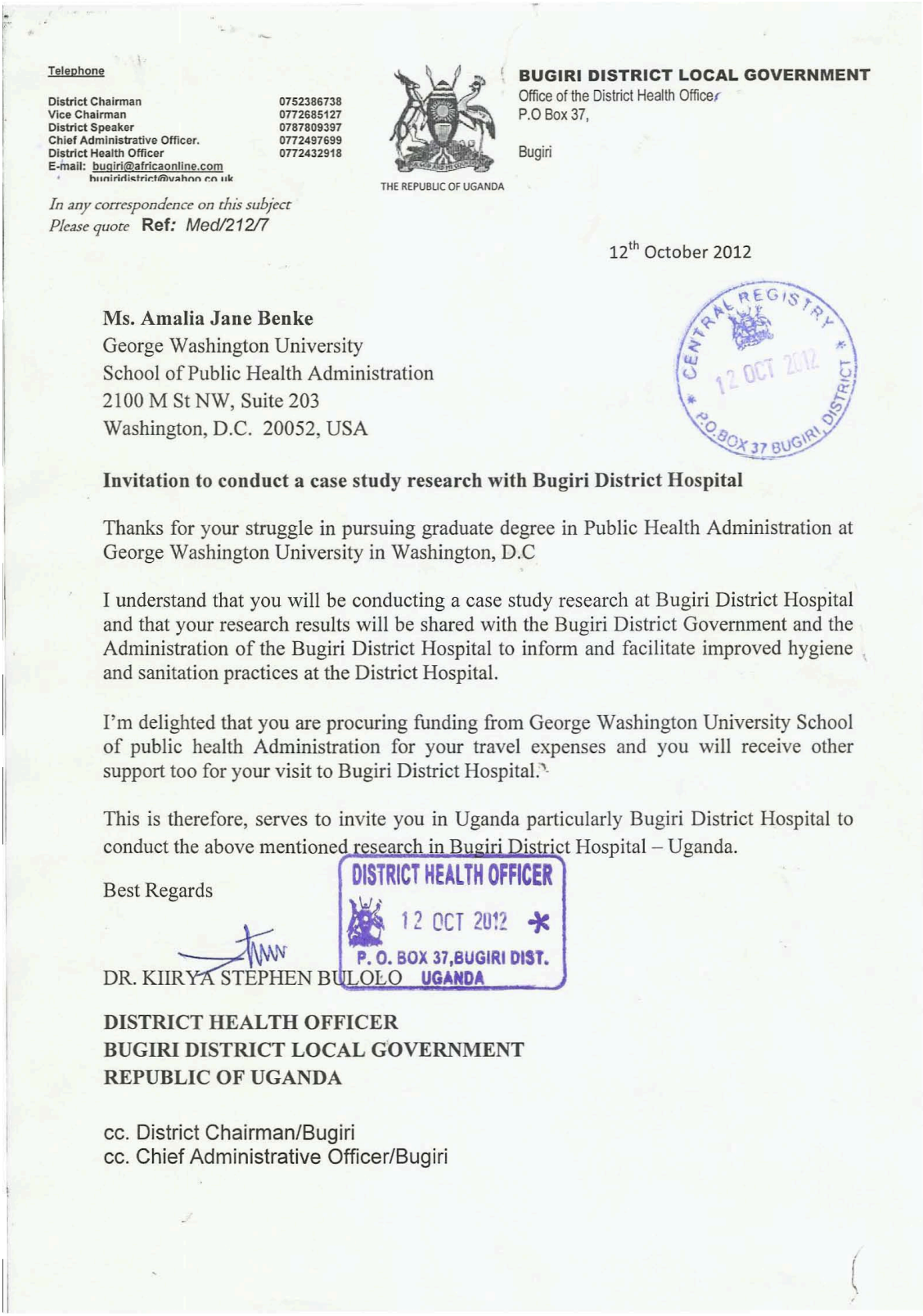
18 OCT 2012

Kayise Chrizestom
CHIEF ADMINISTRATIVE OFFICER

c.c. The Permanent Secretary Ministry of Foreign Affairs
c.c. The Permanent Secretary Ministry of Local Government
c.c. The Permanent Secretary Ministry of Health
c.c. The District Chairperson/Bugiri
c.c. ISEAC & ECO International Uganda
c.c. The District Health Officer
c.c. The Medical Superintendent Bugiri Hospital

MINISTRY OF FOREIGN AFFAIRS 18 OCT 2012 RECEIVED

Figure 6.2: Letter of Invitation District Health Officer



Telephone

District Chairman 0752386738
Vice Chairman 0772685127
District Speaker 0787809397
Chief Administrative Officer. 0772497699
District Health Officer 0772432918
E-mail: bugiri@africaonline.com
bugiridistrict@yahoo.co.uk

THE REPUBLIC OF UGANDA

BUGIRI DISTRICT LOCAL GOVERNMENT
Office of the District Health Officer
P.O Box 37,

Bugiri

In any correspondence on this subject
Please quote **Ref:** *Med/212/7*

12th October 2012

CENTRAL REGISTRY 12 OCT 2012 P.O.BOX 37 BUGIRI DISTRICT

Ms. Amalia Jane Benke
George Washington University
School of Public Health Administration
2100 M St NW, Suite 203
Washington, D.C. 20052, USA

Invitation to conduct a case study research with Bugiri District Hospital

Thanks for your struggle in pursuing graduate degree in Public Health Administration at George Washington University in Washington, D.C

I understand that you will be conducting a case study research at Bugiri District Hospital and that your research results will be shared with the Bugiri District Government and the Administration of the Bugiri District Hospital to inform and facilitate improved hygiene and sanitation practices at the District Hospital.

I'm delighted that you are procuring funding from George Washington University School of public health Administration for your travel expenses and you will receive other support too for your visit to Bugiri District Hospital.

This is therefore, serves to invite you in Uganda particularly Bugiri District Hospital to conduct the above mentioned research in Bugiri District Hospital – Uganda.

Best Regards

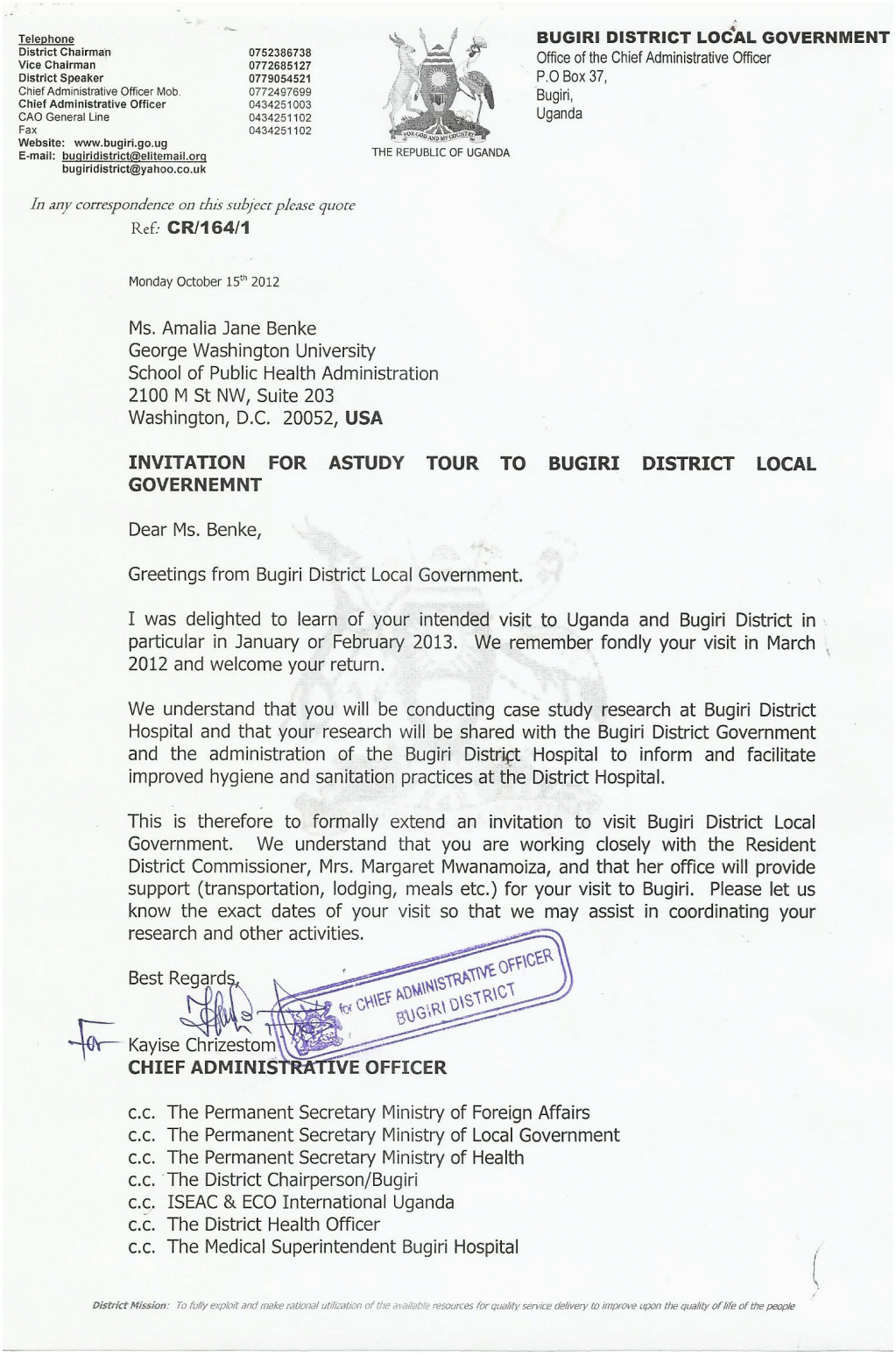
DISTRICT HEALTH OFFICER 12 OCT 2012 P. O. BOX 37,BUGIRI DIST. UGANDA

DR. KIIRYA STEPHEN BULOLO

DISTRICT HEALTH OFFICER
BUGIRI DISTRICT LOCAL GOVERNMENT
REPUBLIC OF UGANDA

cc. District Chairman/Bugiri
cc. Chief Administrative Officer/Bugiri

Figure 6.3: Letter of Invitation CAO



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THE REPUBLIC OF UGANDA

BUGIRI DISTRICT LOCAL GOVERNMENT
Office of the Chief Administrative Officer
P.O Box 37,
Bugiri,
Uganda

In any correspondence on this subject please quote
Ref: **CR/164/1**

Monday October 15th 2012

Ms. Amalia Jane Benke
George Washington University
School of Public Health Administration
2100 M St NW, Suite 203
Washington, D.C. 20052, **USA**

INVITATION FOR ASTUDY TOUR TO BUGIRI DISTRICT LOCAL GOVERNEMNT

Dear Ms. Benke,

Greetings from Bugiri District Local Government.

I was delighted to learn of your intended visit to Uganda and Bugiri District in particular in January or February 2013. We remember fondly your visit in March 2012 and welcome your return.

We understand that you will be conducting case study research at Bugiri District Hospital and that your research will be shared with the Bugiri District Government and the administration of the Bugiri District Hospital to inform and facilitate improved hygiene and sanitation practices at the District Hospital.

This is therefore to formally extend an invitation to visit Bugiri District Local Government. We understand that you are working closely with the Resident District Commissioner, Mrs. Margaret Mwanamoiza, and that her office will provide support (transportation, lodging, meals etc.) for your visit to Bugiri. Please let us know the exact dates of your visit so that we may assist in coordinating your research and other activities.

Best Regards,

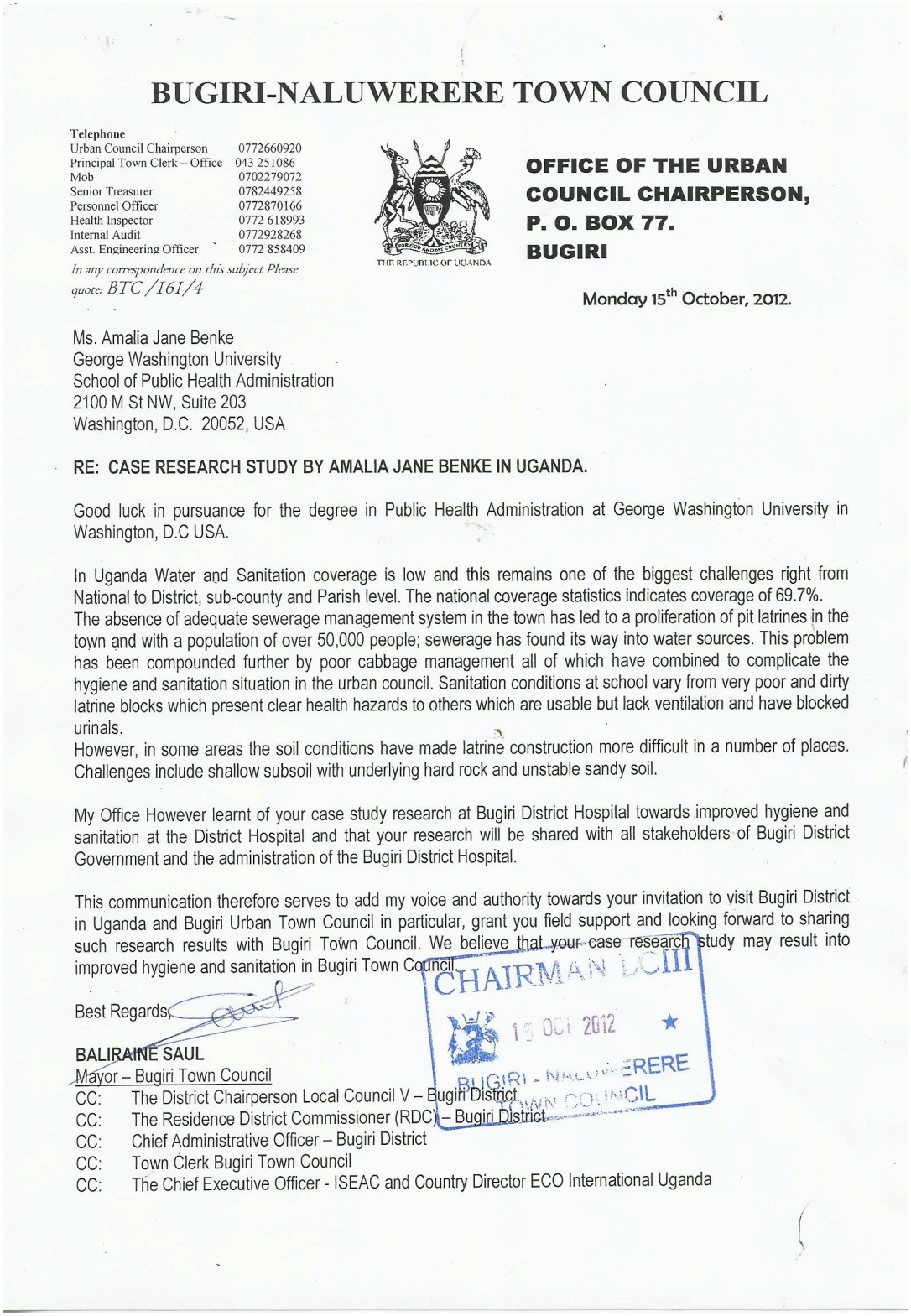
for CHIEF ADMINISTRATIVE OFFICER
BUGIRI DISTRICT

for Kayise Chrizestom
CHIEF ADMINISTRATIVE OFFICER

c.c. The Permanent Secretary Ministry of Foreign Affairs
c.c. The Permanent Secretary Ministry of Local Government
c.c. The Permanent Secretary Ministry of Health
c.c. The District Chairperson/Bugiri
c.c. ISEAC & ECO International Uganda
c.c. The District Health Officer
c.c. The Medical Superintendent Bugiri Hospital

District Mission: *To fully exploit and make rational utilization of the available resources for quality service delivery to improve upon the quality of life of the people*

Figure 6.4: Letter of Invitation Mayor Bugiri Town Council



BUGIRI-NALUWERERE TOWN COUNCIL

Telephone
Urban Council Chairperson 0772660920
Principal Town Clerk – Office 043 251086
Mob 0702279072
Senior Treasurer 0782449258
Personnel Officer 0772870166
Health Inspector 0772 618993
Internal Audit 0772928268
Asst. Engineering Officer 0772 858409

In any correspondence on this subject Please quote: BTC /I6I/4

THE REPUBLIC OF UGANDA

OFFICE OF THE URBAN COUNCIL CHAIRPERSON,
P. O. BOX 77.
BUGIRI

Monday 15th October, 2012.

Ms. Amalia Jane Benke
George Washington University
School of Public Health Administration
2100 M St NW, Suite 203
Washington, D.C. 20052, USA

RE: CASE RESEARCH STUDY BY AMALIA JANE BENKE IN UGANDA.

Good luck in pursuance for the degree in Public Health Administration at George Washington University in Washington, D.C USA.

In Uganda Water and Sanitation coverage is low and this remains one of the biggest challenges right from National to District, sub-county and Parish level. The national coverage statistics indicates coverage of 69.7%.
The absence of adequate sewerage management system in the town has led to a proliferation of pit latrines in the town and with a population of over 50,000 people; sewerage has found its way into water sources. This problem has been compounded further by poor cabbage management all of which have combined to complicate the hygiene and sanitation situation in the urban council. Sanitation conditions at school vary from very poor and dirty latrine blocks which present clear health hazards to others which are usable but lack ventilation and have blocked urinals.
However, in some areas the soil conditions have made latrine construction more difficult in a number of places. Challenges include shallow subsoil with underlying hard rock and unstable sandy soil.

My Office However learnt of your case study research at Bugiri District Hospital towards improved hygiene and sanitation at the District Hospital and that your research will be shared with all stakeholders of Bugiri District Government and the administration of the Bugiri District Hospital.

This communication therefore serves to add my voice and authority towards your invitation to visit Bugiri District in Uganda and Bugiri Urban Town Council in particular, grant you field support and looking forward to sharing such research results with Bugiri Town Council. We believe that your case research study may result into improved hygiene and sanitation in Bugiri Town Council.

CHAIRMAN LCIII
15 OCT 2012
BUGIRI - NALUWERERE TOWN COUNCIL

Best Regards,

BALIRAINE SAUL
Mayor – Bugiri Town Council
CC: The District Chairperson Local Council V – Bugiri District
CC: The Residence District Commissioner (RDC) – Bugiri District
CC: Chief Administrative Officer – Bugiri District
CC: Town Clerk Bugiri Town Council
CC: The Chief Executive Officer - ISEAC and Country Director ECO International Uganda

Figure 7.1: Health Worker Focus Group Guide

Interview Guide: Focus Group

Domain: Background

1. What do you all believe to be most important: hygiene, sanitation, or clean water?
2. What are some examples of good sanitation, hygiene and safe water sources? LISTING and PILE SORTING Exercise.

Domain: Hygiene attitudes

1. What are some barriers towards improving hygiene at the hospital?
2. Can you describe some ways to improve hygiene at the Hospital?
3. How are menstrual hygiene products used, disposed of, and cleaned in the Hospital?

Domain: Sanitation attitudes

1. What are some barriers towards improving sanitation at the Hospital?
2. Can you describe some ways to improve sanitation at the Hospital?

Domain: Water attitudes

1. What are the different ways you use water at the Hospital?
2. What are some barriers to getting clean water at the Hospital?
3. What are some barriers to keeping water clean at the Hospital?

Figure 7.2: Health Worker In-Depth Interview Guide

Interview Guide: In-Depth Interview

Domain: Background

1. What do you believe to be most important: hygiene, sanitation, or clean water?
2. Do you perceive yourself at a health risk in any way by working in a hospital?
3. How you feel the Hospital facilities help you decrease the risk of disease due to bad sanitation and hygiene?

Domain: Hygiene attitudes

1. From your perspective, what are some barriers towards improving hygiene at the Hospital?
2. Is anyone at risk in the hospital when good hygiene practices are not adhered to?

Domain: Sanitation attitudes

1. What are some barriers towards improving sanitation at the Hospital?
2. Is anyone at risk in the hospital when good sanitation practices are not adhered to?
3. Who is responsible for maintaining the latrines at the Hospital?
4. Do you believe there are enough latrines for patients and health workers at the Hospital?

Domain: Water attitudes

1. What are some barriers to getting clean water at the Hospital?
2. What are some barriers to keeping water clean at the Hospital?
3. How do you determine if water is clean?
4. What do you do if only ‘unclean’ water is available at the Hospital?
5. Who is responsible for maintaining safe drinking water at the Hospital?

Figure 7.3: Health Worker Survey

HEALTH WORKER SURVEY

First, we would like to ask you some general questions about you. Please answer as honestly as possible. All of your answers are completely confidential and no one at the Hospital or the community will know your answers.

1. What is your sex?

   - ☐ Male
   - ☐ Female

2. What is your specific occupation at Bugiri District Hospital?

   - ☐ Nurse
   - ☐ Doctor
   - ☐ Health Assistant
   - ☐ Other
   - ☐ I don't know

3. How old are you?

   - ☐ 18-25
   - ☐ 26-35
   - ☐ 36-45
   - ☐ 46-55
   - ☐ 56-65
   - ☐ 65 and older
   - ☐ I don't know

Now we'd like to know what you think about different water sources. Please answer as honestly as possible. All of your answers are completely confidential and no one at the Hospital or the community will know your answers. Remember there are no right or wrong answers.

1. Mention all of the sources of water you and other members of the Hospital use (check all that apply).

- ☐ Piped into Hospital
- ☐ Piped into yard/plot
- ☐ Public tap
- ☐ Open well in Hospital
- ☐ Open well in yard/plot
- ☐ Open public well
- ☐ Protected well in Hospital
- ☐ Protected well in yard/plot
- ☐ Protected public well
- ☐ Tubewell/borehole
- ☐ Spring
- ☐ Protected spring

- ☐ River/stream
- ☐ Pond/lake
- ☐ Dam
- ☐ Rainwater harvesting
- ☐ Surface water
- ☐ Bottled water
- ☐ Other_____
- ☐ I don't know

2. What is the main source of drinking water for members of Bugiri Hospital?

- ☐ Piped into Hospital
- ☐ Piped into yard/plot
- ☐ Public tap
- ☐ Open well in Hospital
- ☐ Open well in yard/plot
- ☐ Open public well
- ☐ Protected well in Hospital
- ☐ Protected well in yard/plot
- ☐ Protected public well
- ☐ Tubewell/borehole
- ☐ Spring
- ☐ Protected spring
- ☐ River/stream
- ☐ Pond/lake
- ☐ Dam
- ☐ Rainwater harvesting
- ☐ Surface water
- ☐ Bottled water
- ☐ Other_____
- ☐ I don't know

3. What is the Hospital's main source of water used for? (check all that apply)

- ☐ Drinking
- ☐ Cooking
- ☐ Bathing
- ☐ Handwashing
- ☐ Toilet Use
- ☐ Toilet Cleaning
- ☐ Other _____
- ☐ I don't know

4. Is water normally available from this source?

- ☐ Yes
- ☐ No
- ☐ I don't know

5. How often is the water source functional?

- ☐ 5-7 days per week
- ☐ 2-4 days per week
- ☐ Fewer than 2 days per week
- ☐ I don't know

6. When the water source is functional, does it provide enough water for the needs of the Hospital, including water for drinking, handwashing and food preparation?

- ☐ Yes
- ☐ No
- ☐ Water source is not functional

☐ I don't know

7. Is there an acceptable alternative Hospital water supply available when the main supply is non-functional?

☐ Yes
☐ No
☐ I don't know

8. Does the Hospital have a water shortage during the dry season?

☐ Yes
☐ No
☐ I don't know

9. In the last two weeks, was water unavailable from this main source for a day or longer?

☐ Yes
☐ No
☐ I don't know

10. How much time does it take on average to go to the drinking water source, get water, and come back?

☐ 30 minutes or less
☐ 31 to 60 minutes
☐ 61 to 180 minutes
☐ More than 3 hours
☐ I don't know

11. It is necessary to treat my family's drinking water at home.

☐ Totally disagree
☐ Partially disagree
☐ No opinion
☐ Partially agree
☐ Totally agree

12. Most of my friends take some action at home to treat their water to make it safer to drink.

☐ Totally disagree
☐ Partially disagree
☐ No opinion
☐ Partially agree
☐ Totally agree

13. My neighbors take some action at home to treat their water to make it safer to drink.

☐ Totally disagree
☐ Partially disagree
☐ No opinion

☐ Partially agree
☐ Totally agree

14. The majority of people in my village take some action at home to treat their water to make it safer to drink.

☐ Totally disagree
☐ Partially disagree
☐ No opinion
☐ Partially agree
☐ Totally agree

15. I feel confident that I can correctly treat water to make it safer for drinking.

☐ Totally disagree
☐ Partially disagree
☐ No opinion
☐ Partially agree
☐ Totally agree

16. Do you currently treat your drinking water at home?

☐ Yes
☐ No
☐ I don't know

17. Do you currently treat drinking water at the Hospital?

☐ Yes → SKIP to QUESTION 19
☐ No
☐ I don't know

18. If water is not always treated at the Hospital, why not? (Check all that apply)

☐ Because the water source is considered safe
☐ Because the Hospital does not have filters or sufficient purification chemicals
☐ Because nobody at the Hospital knows how to treat water
☐ Because the Hospital staff does not know if it is necessary or not
☐ Because Hospital staff do not have time to do it
☐ Because most patients drink bottled water purchased and/or brought from home
☐ Any other reason (specify) _____
☐ I don't know

19. What treatment method do you usually use at the Hospital?

☐ Chlorination
☐ Filtration
☐ Solar Disinfection
☐ Boiling
☐ Let it stand and settle

☐ Strained through a cloth
☐ Aluminum salt coagulant
☐ Iron salt coagulant
☐ Polymers (natural or synthetic)
☐ Combined System
☐ Chemical removal system (arsenic, fluoride, other)
☐ Other _____
☐ I don't know

20. Do you store drinking water at the Hospital?

☐ Yes
☐ No → IF NO SKIP TO QUESTION 22
☐ I don't know

21. If you do store water at the Hospital, are the containers used only for storing drinking water?

☐ Yes
☐ No
☐ I don't know

22. Do patients bring their own drinking water from home?

☐ Most patients bring water from home
☐ Some patients bring water from home
☐ No patients bring water from home
☐ I don't know

23. Do health workers bring their own drinking water from home?

☐ Most health workers bring water from home
☐ Some health workers bring water from home
☐ No health workers bring water from home
☐ I don't know

Now, we'd like to know what you think about personal hygiene. All of your answers are completely confidential and no one at the Hospital or the community will know your answers. Remember there are no right or wrong answers.

1. Please mention all of the occasions when is it important to wash your hands (check all that apply).

☐ Before eating
☐ After eating
☐ Before praying
☐ Before breastfeeding or feeding a child

☐ Before cooking or preparing food
☐ After defecation/urination
☐ After cleaning a child that has defecated/changing a child's nappy
☐ When my hands are dirty
☐ After cleaning the toilet or potty
☐ Other (please list) _____
☐ I don't know

2. Where do people at the Hospital most often wash their hands?

☐ Inside/within 10 paces of the toilet facility
☐ Inside/within 10 paces of the kitchen/cooking place
☐ Elsewhere in Hospital or yard
☐ Outside the Hospital
☐ No specific place
☐ I don't know

3. Is there soap available most of the time in the Hospital for washing hands?

☐ Yes
☐ No
☐ I don't know

4. Is there any ash or sand or mud in the Hospital for washing hands?

☐ Yes
☐ No
☐ I don't know

5. What facilities and programmes are there in the Hospital for promoting safe and private menstrual hygiene for older girls? (Check all that apply)

☐ Menstrual hygiene education sessions for girls
☐ Private washing facilities for cloth napkins (such as a tap and basin inside a lockable toilet stall)
☐ Private disposal/incineration facilities for disposable napkins
☐ Any kind of napkin distribution programme
☐ Other (specify)
☐ None
☐ Don't know

6. In your opinion, what is the average percentage of hospitalized patients who will develop a health care associated infection?

☐ _____%
☐ Don't know

7. In general, what is the impact of a health care-associated infection on a patient's clinical outcome?

☐ Very low

☐ Low
☐ High
☐ Very high

8. What is the effectiveness of hand hygiene in preventing health care-associated infection?

☐ Very low
☐ Low
☐ High
☐ Very high

9. Among all patient safety issues, how important is hand hygiene within your priorities at Bugiri District Hospital?

☐ Low priority
☐ Moderate priority
☐ High priority
☐ Very high priority

10. On average, in what percentage of situations requiring hand hygiene do health-care workers in Bugiri District Hospital actually perform hand hygiene, either by hand-rubbing or handwashing (between 0 and 100%)?

☐ _____%
☐ Don't know

11. Is it common practice to inform patients about the importance of optimal hand hygiene during health-care delivery at your facility?

☐ Yes
☐ No
☐ I don't know

12. In your opinion, how effective would the following actions be to increase hand hygiene compliance permanently in your facility?

a. Hand hygiene posters are displayed at point of care as reminders.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

b. Health care workers receive education on hand hygiene.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

c. Clear and simple instructions for hand hygiene are made visible to health care workers.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

d. Health care workers regularly receive the results of their hand hygiene performance.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

e. Senior nurses and doctors perform hand hygiene perfectly.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

f. Patients are invited to remind health-care workers to perform hand hygiene.

☐ Not effective
☐ Somewhat effective
☐ Effective
☐ Very effective

Now, we'd like to know what you think about sanitation. All of your answers are completely confidential and no one at the Hospital or the community will know your answers. Remember there are no right or wrong answers.

1. What kind of toilet facility do people at the Hospital usually use?

☐ No facility/bush/field
☐ Flush or pour/flush toilet flushed to: Piped sewer system
☐ Flush or pour/flush toilet flushed to: Septic tank
☐ Flush or pour/flush toilet flushed to: Pit latrines
☐ Flush or pour/flush toilet flushed to: Somewhere else
☐ Ventilated improved pit latrine
☐ Pit latrine with slab
☐ Pit latrine with no slab/open pit
☐ Composting toilet
☐ Bucket toilet
☐ Hanging toilet/latrine
☐ Other (specify) _____
☐ I don't know

2. Which people at the Hospital use this toilet? (Check all that apply)

☐ Male adults
☐ Female adults
☐ Male children
☐ Female children
☐ Health workers
☐ Patients
☐ Hospital visitors
☐ Other _____
☐ I don't know

3. How satisfied are you with the Hospital/s current place of defecation?

☐ Very unsatisfied
☐ Somewhat unsatisfied
☐ No opinion
☐ Somewhat satisfied
☐ Very satisfied

4. Can you use this facility at all hours of the day and night?

☐ Yes
☐ No
☐ I don't know

5. Can this latrine be used during floods or the rainy season?

☐ Yes
☐ No
☐ I don't know

6. In your opinion, what are the features of a hygienic latrine? Or what conditions make a latrine hygienic? (check all that apply)

☐ Excreta should not be seen
☐ No bad odour smelled
☐ No access for flies or insects
☐ Water sealed
☐ Other_____
☐ I don't know

7. In your opinion, why is it important to have a hygienic latrine? (Check all that apply)

☐ Not to spread germs/diseases
☐ To keep all safe and healthy
☐ Security of the female members
☐ To maintain social prestige
☐ Other_____
☐ I don't know

8. Do you know how the diseases spread from one person to another? (Check all that apply)

- ☐ Open feces
- ☐ Through air
- ☐ Through contaminated water
- ☐ Through unclean hands
- ☐ Other _____
- ☐ I don't know

9. Do you think diseases can spread from open feces?

- ☐ Yes
- ☐ No
- ☐ I don't know

10. Do you believe that children's and adult's feces are different when it comes to spreading disease?

- ☐ Yes, adult more potent
- ☐ Yes, child more potent
- ☐ No, they are about the same
- ☐ I don't know

11. What diseases may be caused by defecating in the open or use of an unhygienic latrine? (Check all that apply)

- ☐ Diarrhea
- ☐ Dysentery
- ☐ Typhoid
- ☐ Jaundice
- ☐ Worm infestation
- ☐ Skin disease
- ☐ Other _____
- ☐ I don't know

12. Do you describe the latrine at the Hospital as a hygienic one?

- ☐ Yes
- ☐ No
- ☐ I don't know

13. Do you think that the latrine at the Hospital is clean enough?

- ☐ Yes
- ☐ No
- ☐ I don't know

14. How would you describe the importance of having a hygienic latrine/toilet facility at the Hospital?

- ☐ Very important
- ☐ Important
- ☐ Not that important

Now, we'd like to know what you think about maintenance of sanitation and water facilities at the Hospital. All of your answers are completely confidential and no one at the Hospital or the community will know your answers. Remember there are no right or wrong answers.

1. In your opinion, are the Hospital water facilities successfully maintained, and repaired when required? (Check one only)

☐ Yes
☐ No
☐ Partially
☐ I don't know

2. In your opinion, are the Hospital sanitation facilities successfully maintained, and repaired when required? (Check one only)

☐ Yes
☐ No
☐ Partially
☐ I don't know

Figure 7.4: Patient Survey

PATIENT SURVEY

First, we would like to ask you some general questions about you. Please answer as honestly as possible. All of your answers are completely confidential and no one at the Hospital or community will know your answers.

1. What is your sex?

   ☐ Male
   ☐ Female

2. How old are you?

   ☐ 18-25
   ☐ 26-35
   ☐ 36-45
   ☐ 46-55
   ☐ 56-65
   ☐ 65 and older
   ☐ I don't know

3. Have you ever been to Bugiri District Hospital before?

   ☐ Yes
   ☐ No
   ☐ I don't know

4. For this particular visit, how long have you stayed so far?

   ☐ 3 hours
   ☐ 5 hours or less
   ☐ Ten hours or less
   ☐ One day
   ☐ Less than three days
   ☐ Less than a week
   ☐ Less than two weeks
   ☐ More than two weeks
   ☐ I don't know

Now, we'd like to know how you feel about staying in health centers or hospitals. Please answer as honestly as possible. All of your

answers are completely confidential and no one at the Hospital or community will know your answers.

5. How important is "respectful treatment" to you. This means:

   - Being shown respect when greeted by and when talking to health care providers
   - Having physical examinations conducted in a way that respects your cultural norms

   Would you say it is:

   ☐ Extremely important
   ☐ Very important
   ☐ Moderately important
   ☐ Slightly important
   ☐ Not important

6. How important is "confidentiality of personal information" to you. This means:

   - Having information about your health and other personal information kept confidential
   - Having conversations with health care providers without other people overhearing

   Would you say it is:

   ☐ Extremely important
   ☐ Very important
   ☐ Moderately important
   ☐ Slightly important
   ☐ Not important

7. How important is "involvement in decision making" to you. This means:

   - Being involved as much as you want in deciding about your health care
   - Freedom to discuss other treatment options or care regimes if you want

   Would you say it is:

   ☐ Extremely important
   ☐ Very important
   ☐ Moderately important
   ☐ Slightly important
   ☐ Not important

8. How important is "convenient travel and short waiting times" to you. This means:

   - Having short travel times and convenient access to health care facilities
   - Having short waiting times for consultations and hospital admissions

   Would you say it is:

- ☐ Extremely important
- ☐ Very important
- ☐ Moderately important
- ☐ Slightly important
- ☐ Not important

9. How important is "choice of health care providers" to you. This means:

   - Being able to choose your health care provider (place or person)
   - Being able to consult for a second opinion or with a specialist if so desired

   Would you say it is:

   - ☐ Extremely important
   - ☐ Very important
   - ☐ Moderately important
   - ☐ Slightly important
   - ☐ Not important

10. How important are "good quality surroundings" to you? This means:

    - Having enough space, seating and fresh air in the waiting rooms, examination rooms and hospital wards
    - Having clean facilities

    Would you say it is:

    - ☐ Extremely important
    - ☐ Very important
    - ☐ Moderately important
    - ☐ Slightly important
    - ☐ Not important

11. How important is having "clean drinking water available" to you? This means:

    - Having clean drinking water available to you in the Hospital
    - Being able to drink clean water whenever you need

    Would you say it is:

    - ☐ Extremely important
    - ☐ Very important
    - ☐ Moderately important
    - ☐ Slightly important
    - ☐ Not important

12. How important is having "clean and functional toilet facilities available" to you? This means:

- Having toilet facilities that are not smelly, dirty, or overflowing
- Having toilet facilities with locks on the doors

Would you say it is:

- ☐ Extremely important
- ☐ Very important
- ☐ Moderately important
- ☐ Slightly important
- ☐ Not important

13. How important is having "handwashing facilities available" to you? This means:

- Having a place to wash your hands at the Hospital (inside or outside)
- Having sufficient soap available at the handwashing facility
- Having sufficient water available at the handwashing facility

Would you say it is:

- ☐ Extremely important
- ☐ Very important
- ☐ Moderately important
- ☐ Slightly important
- ☐ Not important

14. How important is "contact with the outside world" to you? This means:

- Having family and friends visit you as much as you want when you are a patient in hospital
- Being able to keep in contact with family and friends and to have information about what is happening outside the hospital

Would you say it is:

- ☐ Extremely important
- ☐ Very important
- ☐ Moderately important
- ☐ Slightly important
- ☐ Not important

15. How important is "clarity of communication" to you. This means:

- Having the health care providers explain things in a way you can understand
- Having enough time to ask questions if you don't understand something

Would you say it is:

- ☐ Extremely important

- ☐ Very important
- ☐ Moderately important
- ☐ Slightly important
- ☐ Not important

Now, we'd like to know how satisfied you were with your stay at Bugiri District Hospital. Please answer as honestly as possible. All of your answers are completely confidential and no one at the Hospital or community will know your answers.

16. For your last hospital stay, how would you rate your experience of being greeted and talked to respectfully?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

17. For your last hospital stay, how would you rate the way your personal information was kept confidential?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

18. For your last hospital stay, how would you rate your experience of being involved in making decisions about your health care or treatment?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

19. For your last hospital stay, how would you rate the way your privacy was respected during physical examinations and treatments?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

20. For your last hospital stay, how would you rate the experience of how clearly health care providers explained things to you?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

21. For your last hospital stay, how would you rate your experience of getting enough time to ask questions about your health problem or treatment?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

22. For your last hospital stay, how would you rate your experience of getting information about other types of treatments or tests?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

23. For your last hospital stay, how would you rate the way the health services ensured you could talk privately to health care providers?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

24. For your last hospital stay, how would you rate the freedom you had to choose the health care providers that attended to you?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

25. For your last hospital stay, how would you rate the cleanliness of the rooms inside the facility?

    - ☐ Very good
    - ☐ Good
    - ☐ Moderate
    - ☐ Bad
    - ☐ Very bad

26. For your last hospital stay, how would you rate the availability of clean drinking water?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

27. For your last hospital stay, how would you rate the cleanliness and functionality of the toilet facilities?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

28. For your last hospital stay, how would you rate the availability of handwashing stations?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

29. For your last hospital stay, how would you rate the amount of space you had?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

30. For your last hospital stay, how would you rate the ease of having family and friends visit you?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad
- ☐ Very bad

31. For your last hospital stay, how would you rate your experience of staying in contact with the outside world when you were in the hospital?

- ☐ Very good
- ☐ Good
- ☐ Moderate
- ☐ Bad

☐ Very bad

32. In your opinion, was the skill of the health providers adequate for your treatment?

☐ Yes
☐ No

33. In your opinion, was the hospital's equipment adequate for your treatment?

☐ Yes
☐ No

34. In your opinion, were the hospital's drug supplies adequate for your treatment?

☐ Yes
☐ No

35. Overall, how satisfied were you with your stay at Bugiri District Hospital?

☐ Very satisfied
☐ Somewhat satisfied
☐ Moderately satisfied
☐ Not very satisfied
☐ Not at all satisfied

36. How much do you agree or disagree with the following statement?

A clean health facility is important to my health.

☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagre

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