

**HANDHYGIENE PRACTICE AMONG HEALTH CARE WORKERS IN OLUKUCOMMUNITY**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF COMMUNITY DENTISTRY, SCHOOL OF DENTISTRY, UNIVERSITY OF BENIN**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR IN DENTAL SURGERY (BDS)**

**NOVEMBER, 2024**

## **CERTIFICATION**

This is to certify that the research study titled “**HANDHYGIENE PRACTICE AMONG HEALTH CARE WORKERS IN OLUKUCOMMUNITY**” will be carried out by Njoku Charles Chinemerem, Ogbon Osasumwen Zino, Joseph Abraham Ihiemegbulem, Okunrobo Osarhounamen David, and Oghenefejiro Stephen Ododo for with matriculation numbers DEN1602079, DEN1602080, DEN1602078, DEN1502133 and DEN1401964 respectively under supervision in the Department of Community Dentistry, School of Dentistry, University of Benin as part of the requirements for the award of Bachelor of Dental Surgery (BDS)

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## **DECLARATION**

We hereby declare that this project work titled “**HANDHYGIENE PRACTICE AMONG HEALTH CARE WORKERS IN OLUKUCOMMUNITY**” has been conducted under the supervision of DRPH ILIPUOGORDI and has neither been presented nor published anywhere else in part or in full for any other purpose.

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## **DEDICATION**

This project is dedicated to our families and friends for their unwavering support and encouragement throughout this journey. We also dedicate this work to our project supervisor, whose guidance and mentorship have been invaluable.

## **ACKNOWLEDGEMENTS**

We extend our heartfelt gratitude to our project supervisor, Dr. P. U. Ogordi, for his expertise and dedication in guiding us through this research. Our appreciation also goes to Professor S. Okeigbemen for his coordination and support. Special thanks to the healthcare workers who participated in this study, and to our families and friends for their encouragement and understanding. Finally, we acknowledge the Department of Community Dentistry, University of Benin, for providing the platform to undertake this research.

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## LIST OF ABBREVIATIONS

<b>CDC:</b>	Centers for Disease Control and Prevention
<b>CI:</b>	Confidence Interval
<b>COVID-19:</b>	Coronavirus Disease 2019
<b>HCAI:</b>	Healthcare-Associated Infection
<b>HH:</b>	Hygiene
<b>HCW:</b>	Healthcare Worker
<b>OR:</b>	Odds Ratio
<b>PHC:</b>	Primary Healthcare Center
<b>SPSS:</b>	Statistical Package for the Social Sciences
<b>WHO:</b>	World Health Organization

## DEFINITION OF TERMS

**Hand Hygiene (HH):** A general term referring to any action of hand cleansing, including washing hands with soap and water or using an alcohol-based hand rub to remove dirt, microorganisms, and harmful pathogens, as recommended by the World Health Organization.

### **Healthcare-**

**Associated Infection (HCAI):** An infection acquired by a patient while receiving treatment in a healthcare facility, which was not present or incubating at the time of admission.

**Healthcare Worker (HCW):** Any person working in a healthcare setting who provides clinical or supportive services directly or indirectly to patients, including doctors, nurses, laboratory technicians, and auxiliary staff.

**Odds Ratio (OR):** A measure of association used in statistics to quantify the strength of the relationship between two events, indicating how much more likely one event is to occur given the presence of another event.

**Primary Healthcare Center (PHC):** A basic health facility that serves as the first point of contact for individuals within the healthcare system, offering essential medical services including preventive, curative, and rehabilitative care.

**World Health Organization (WHO):** A specialized agency of the United Nations responsible for coordinating international public health efforts, providing leadership on global health matters, and setting standards for disease prevention and control.

## ABSTRACT

**Background:** Hand hygiene is a critical preventive measure in healthcare, reducing the transmission of healthcare-associated infections (HCAIs). Despite its importance, compliance among healthcare workers remains inconsistent, particularly in resource-constrained settings.

**Objective:** To assess the knowledge, practice, attitude, and compliance towards hand hygiene among healthcare workers in Oluku community, Benin City.

**Methodology:** A cross-sectional study was conducted among 116 healthcare workers from public and private facilities in Oluku community. Data was collected using structured questionnaires addressing knowledge, practice, compliance, and factors influencing hand hygiene. Descriptive and inferential statistics were employed, with significance set at  $p < 0.05$ .

**Results:** The study included 116 healthcare workers, with females comprising 65.5% and the majority aged between 31–40 years (40.5%). Knowledge of hand hygiene was high, with 81.0% demonstrating good knowledge, predominantly obtained through workshops (85.3%). Good hand hygiene practices were reported by 85.3%, with 54.3% consistently adhering to the WHO's five moments of hand hygiene. Compliance was highest after exposure to body fluids (93.1%) and lowest before patient interaction (50.9%). Alcohol-based hand sanitizers were regularly used by 87.9%, and 94.0% washed hands with soap and water. Factors affecting compliance included the unavailability of soap (59.5%), lack of reminders (57.8%), and busy schedules (51.7%). Public facility workers exhibited higher adherence compared to private facility workers ( $p < 0.05$ ).

**Conclusion:** The study revealed good knowledge and practice of hand hygiene among healthcare workers in Oluku community, but compliance with key protocols was suboptimal. Addressing barriers could enhance adherence and reduce HCAs.

**Keywords:** Handhygiene,healthcareworkers,compliance,infectionprevention,resourceconstraints

# CHAPTER ONE

## 1.0

## INTRODUCTION

### 1.1. Background

Hands are the main pathway of transmission of germs in healthcare. Handwashing, also known as hand hygiene (HH), an act of cleaning one's hands with the use of water and soap or alcohol-based hand wash; is the basis of all infection controls and one of the most effective ways of reducing the transmission of pathogens. Universally, the knowledge of Hand Hygiene is the single most important measure to prevent the cross-contamination of microorganisms from patient to patient (Larson EL, 1995). It is also the mainstay preventive measure of healthcare-associated infection and ensures safe patient care (Yawson AE et al, 2013).

World Health Organization (WHO) reports that infections contracted while receiving medical care, are most often through the hands of healthcare workers (HCWs) and that it has caused thousands of deaths every day (WHO, 2009a). Moreover, improper hand hygiene by HCWs is responsible for 40% of nosocomial infections (Anargh V et al, 2013). This is because hand hygiene prevents infections not only from draining and infected wounds but also from regularly colonized parts of normal, intact skin. WHO encourages Healthcare Workers (HCWs) to practice hand hygiene in five steps: before touching patients; before procedures; after procedures or body fluid exposure; after touching patients, and after touching patients' surroundings (Jenala C et al, 2018).

Multiple factors may influence the performance of hand hygiene, and hand hygiene promotion is complex, particularly in developing countries where culture-specific issues and limited resources can strongly influence practices (WHO 2009a, Pittet D et al 2004, Pittet D 2000). In a West African country, authors reported that limited resources and lack of knowledge on app

ropriate time to perform handwashing or rubbing were the most commonly identified barriers to hand hygiene by health workers (Owusu-Ofori et al., 2010). A study at a teaching hospital in North Western Nigeria showed that lack of water and soap were the major constraints against washing hands among HCWs in their place of work and lack of knowledge of how to wash hands was reported as a constraint by 7.5% of the study participants (Gwarzo GD, 2018).

## **1.2. Statement of the Research Problem**

Hand Hygiene plays a significant role in the prevention and control of infection among healthcare workers in health facilities. The non-practice of hand hygiene as well as poor hand hygiene practices pose an increased risk of disease transmission between patients and health workers, the environment and patients as well as the environment and health workers. For several years, hand hygiene practices have been re-emphasized as one of the ways of infection control, especially within the health care system. However, compliance with these hand hygiene protocols has been threatened due to various reasons which include; inadequate knowledge of the right techniques and the importance of hand hygiene, and the unavailability of handwashing materials which include clean water, soap, and alcohol-based rubs. Others include the unavailability of hand hygiene facilities as well as the heavy workload in health facilities among others.

Moreover, studies have also shown low compliance with HH practices despite available resources, indicating that factors beyond resource availability also influence adherence to guidelines. Developing countries, which face greater financial constraints, are particularly affected by healthcare-associated infections (HAIs) due to their limited capacity to invest in infection control measures such as staffing, HH equipment, and infrastructure. As a result, they bear a higher burden of HAI than developed countries. Understanding Hand Hygiene determinant factors in a low-

income country and also in periurban health care centres will provide the basis for intervention in similar health care settings globally.

### **1.3. Justification**

Although several studies on health care providers' knowledge and practices regarding hand washing have been extensively documented, our literature search did not reveal any studies that assessed hand-washing behaviours, particularly in peri-urban health care facilities in southern Nigeria. This study therefore aims to evaluate the practice of hand hygiene among health care providers in periurban health facilities. The information generated from this study will provide the basis for health educational interventions and technical training of health workers to significantly improve health workers' compliance with health facilities infection prevention standards

### **1.4. Aim of the study**

To evaluate the practice of hand hygiene among health workers in Oluko, Benin City

### **1.5. Objectives of the study**

- To assess the knowledge of hand hygiene
- To assess the practice and method of hand hygiene practices
- To assess the level of compliance with hand hygiene protocols
- Identify factors influencing the practice of hand hygiene

## CHAPTER TWO

### 2.0.

### LITERATURE REVIEW

#### 2.1. Historical perspective of Hand hygiene practice

Hand hygiene has evolved over the years. The importance of hand hygiene was first recognized in the mid-19th century by two pioneers of hand hygiene; the Hungarian physician Ignaz Semmelweis and the English founder of modern nursing, Florence Nightingale. Ignaz Semmelweis emphasized handwashing prevented and reduced the high maternal mortality rate due to puerperal fever which was spread through the contaminated hands of health personnel by infectious particles. At that time, most people believed infections were caused by foul odours called miasmas. However, he observed that medical students went to the delivery room after performing autopsies and their hands had bad odour even after washing with soap and water. As a result, Semmelweis recommended hands scrubbing with chlorinated lime solution before every patient contact after leaving the autopsy room, with this intervention the mortality rate dropped to 3%. As a result of Semmelweis's discovery, handwashing became the most important measure for the prevention of transmission of infections in the health care setting (WHO, 2009a). The outbreak of the COVID-19 pandemic in 2020 and swine flu in 2009 increased awareness in many countries on the importance of washing hands with soap to protect oneself from infectious diseases.

#### 2.2. Microorganisms and disease transmission.

There are numerous normal flora on the skin. The skin has 2 layers, the epidermis and the dermis. On the epidermis are transient flora that can be easily transmitted by physical contact between patients, HCWs and the health care environment. These are the microorganisms that are carried on the skin for a short period and are easily removed with proper HH by the action of rubbing. Microorganisms like *Staphylococcus aureus* are

found on the skin and are the main cause for wound infections. Their entry into the bloodstream leads to serious infections like septicemia, pneumonia and endocarditis. Therefore, Schultz, reported the need to prevent or reduce their transmission through appropriate HH (Schultz M, 2010).

### **2.3. Evidence-based model for hand transmission during patient care**

Hand hygiene is primarily involved in the reduction of the transmission of microorganisms in the health care system. For transmission of pathogens from one patient through the hands of the health care worker the following sequence of events is required:

1. Organisms are present on the patient's skin or have been shed onto fomites in the patient's immediate environment.
2. Organisms must be transferred to health-care workers' hands.
3. Organisms must be capable of surviving on health care workers' hands for at least several minutes.
4. Hand washing or hand antisepsis by the health care worker must be inadequate or omitted entirely, or the agent used for hand hygiene is inappropriate.
5. The caregiver's contaminated hand(s) must come into direct contact with another patient or with a fomite in indirect contact with the patient.

Didier Pittet reviewed the evidence supporting each of these steps and proposed a dynamic model for hand hygiene research and education strategies, together with corresponding indications for hand hygiene during patient care.

### **2.4. Indications for Hand Hygiene**

In a study by Nazarko, 2013; patient safety is the primary focus of health care, and the most crucial part of hand hygiene is completely washing and drying hands. When hands are filthy, clearly drenched in blood or bo

dily fluid, or after using the restroom, the WHO advises washing them (WHO, 2009a). Wilson, 2006; agree that washing with soap and water is adequate to get rid of passing microbes. If there is merely skin contact, the local flora is safe. On the other hand, invasive methods lead to pollution. This might then make it possible for the local flora to infect people seriously. Cleaning your hands alone won't get rid of them. Thus, for an invasive surgery, the use of micro-biocides and antiseptic soap is advised.

The World Health Organization states that evidence suggests that wearing jewelry and artificial nails while receiving routine care is linked to a high level of microbial colonization and may facilitate the spread of some infections linked to health care and obstruct proper hand hygiene (WHO, 2009a). When close to patients, health care workers are advised not to wear jewelry, false fingernails, or extenders. Simple wedding bands are appropriate everywhere but in high-risk environments like operating rooms. Natural nails should not be longer than 0.5 cm. As part of a global push for hand hygiene, the WHO has identified five moments (referred to as the "WHO Five Moments for Hand Hygiene") when HCWs should perform HH (WHO, 2009a).

## **2.5. WHO Five Moments for Hand Hygiene**

The five moments include:

- (1). First Moment: Prior to patient interaction. To stop health care workers from transferring germs to patients via their hands from the treatment area. In the end, to shield the patient from microbial colonization and, in certain situations, external infection.
- (2). Moment 2: Prior to an antiseptic operation or task to stop the spread of germs from the health care area to the patient through vaccination, as well as from the patient to other body sites.

(3).Moment3:FollowingcontactwithbodilyfluidsTopreventthehealthcareenvironmentfrombecomingcontaminatedwithgermsandpossiblyspreadingthelateron,aswellastoshieldhealthcareworkersfrombecomingcolonizedorinfectedbythepatient'sgerms.

(4).Moment4:FollowingpatientcontactPreventingthesurroundingsinthehealthcaresettingfrombecomingcontaminatedwithgermsandpossiblyspreadingthem,aswellasshieldingthehealthcareworkersfrompossibleinfectionandcolonizationbypatientgerms.

(5).Moment5:Followingcontactwiththepatient'senvironmentTosafeguardthehealthcareenvironmentagainstpotentialgermcontaminationanddissemination,aswellastoprotecthealthcareworkersfrombecomingcolonizedbypatientgermsthatmightbeonsurfacesorobjectsinthepatient'simmediatesurroundings.ItisacknowledgedthatoneortwoinstancescanbeincludedwhenevaluatingHHproceduresinprimaryhealthcarecenter(PHC)settingsiffivesignalsbecomeimpractical(WHO2012:20).

## **2.5.PracticeofHandHygiene**

Whenincontactwithpatientsintheclinic,healthcareworkersshouldhavetheirclothingnotextendbeyondelbowlevel,skincutsshouldbecoveredwithwater-resistantdressingandshortnailswithnovarnish.Readyaccessetosinkwithwaterandsoapforwashinghands.Whenusingsoapandwatertowash,healthcareworkersmustunderstandthemechanicalprocessofhandwashinginvolvedintheremovalofmicro-organismsfromhands.

### **2.5a.HandHygienePracticebyMarkDexterHiller**

AccordingtoMarkDexterHiller;beforecommencinghandwashing,handsshouldberinsedandwristsexposedandfree(MarkDexterHillier,2020).Theprocedureforhandwashingwithsoapandwaterisasfollows:

- Turn on the tap at the sink using elbows (or foot pedal). Check that the water is warm and allow water to properly soak hands from fingertip to forearms.
- Dispense a few drops of liquid soap into the palm.
- Rub hands together until foam is formed
- Follow hand washing stages
- Rinse hands properly using water only and ensure that all soap is cleared from hands and lower arms
- Turn off the tap using your elbows. Do not use hands.
- Dry hands and lower arms with a clean paper towel and dispose of the used towel
- If the skin is dry, a hand moisturiser from a wall-mounted dispenser can be applied sparingly until absorbed.
- The whole procedure should take 40-60 seconds (WHO, 2009a).

### **2.5b. Practice of Hand Hygiene according to the Center for Disease Control and Prevention**

The following are the steps involved in hand hygiene according to the Center for Disease Control and Prevention;

1. Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap.

2.

Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails.

3. Scrub your hands for at least 20 seconds.

Need a timer? Hum the "Happy Birthday" song from beginning to end twice.

4. Rinse your hands well under clean, running water.
5. Dry your hands using a clean towel or a hand dryer.

## **2.6. Ways to Implement Appropriate Hand Hygiene Techniques**

Literature has revealed that various ways do exist for the implementation of appropriate hand hygiene techniques. These include

1. Adequate Education by carrying out outreaches and research, the use of media, radio etc.
2. The use of posters with correct hand washing techniques can be hung up next to hand washing sinks in public toilets and the toilets of office buildings, hospitals, airport etc.
3. Improved hand hygiene facilities such as a clean and working tap with a sink.
4. Adequate supply of hand hygiene equipments such as clean water, soap, alcohol-based sanitizers, and clean towels.
5. Creating a culture of awareness.

These are essential in addressing and improving hand hygiene compliance.

## **2.7. Effectiveness of Hand Hygiene Practice**

The use of soap and water and alcohol-based hand gel are both effective hand hygiene methods, despite their limitations. Healthcare workers need to follow local and international best-practice guidelines so they are aware of the circumstances in which each method is ineffective (Mark Dexter

Hillier,2020).Althoughalcohol-basedhandgeliseffectiveinreducingthespreadofGram-positiveandGram-negativebacteriainfections,itisleseffectiveagainstssomenonenvelopedvirussuchasrotavirusandis dependentonthealcoholconcentrationofthegel(KampfG,2018).

Non-

compliance,inadequatesupplyofhandhygienematerialsandinadequateknowledgeofhandhygienehaveallposedchallengestotheeffectivenessandefficiencyofhandhygiene.Non-compliancewithhandhygienecanstemfromvariousfactors,includingforgetfulness,lackofawareness,skinirritationfromfrequentwashing,inadequateaccesstohandhygienefacilities,andperceptionsowflowinfectionrisk.Behavioralandorganizationalfactors,suchasworkloadandtimeconstraints,canalsocontribute tononcompliance.

## **2.8.LiteratureonHandHygienePractice**

Thestudyonassessingtheroleofhandwashinginthe preventionofcommunicablediseases,showsthatstaffknewthebenefitsofhandwashingpracticeshowevercompliancewaslowduetoalackofmotivationandhandwashingfacilities(InamulhaqMetal,2012).Ofthetotalparticipants,55%indicatedlackoftime,34.7%wereheavyrushpatientsand15.7%non-conduciveenvironment.

Inaself-

reportedstudyinHongKong,compliancewithHHpracticeswaslowbeforetouchingthepatient,beforetheaseptictechnique,andlowestaftertouchingthepatient'senvironment.Thenon-compliancewascitedasforgetting,drynessandskinirritationduetoagents,andtoobusy,unpleasantmeliofHHagent(Lauetal,2014)

According to a study conducted in Brazil, there was over 25% overall compliance with HH standards (Borges et al, 2012). However, after receiving feedback and participating in poster campaigns, this percentage increased by 40% to 76%. Nurses had more opportunities to engage with HH, and as such, their compliance was demonstrated to be high. The study found that even after the intervention, HCAI levels remained high and steady, showing no signs of recovery. Low compliance has been linked to a lack of infrastructure, such as empty alcohol gel dispensers and sinks. The nurse was observed touching other objects and re-contaminating other hands. Regardless of HH's established benefits for the prevention and management of HCAs, non-compliance is a global issue.

The results of the research by Baylina and Moreira 2012, showed that a variety of factors, including workload, the availability of HH resources, knowledge, training, perceived risk, and individual attitudes, can contribute to non-compliance. Particularly in developing nations, there is inadequate infection prevention and control, endangering the standard of patient care.

Ider et al 2012, revealed low adherence to HH practice, which was attributed to staff members' lack of infection prevention and control training and lack of technical expertise in this area. A lack of an infection, prevention, and control committee, a lack of accountability, inadequate financial and human resources for infection control, and the infection control nurse's inability to concentrate on infection control due to general administrative work were additional causes of non-compliance.

Tai et al 2009, contend that while 46% of doctors and 60% of nurses agreed that hand hygiene practices can reduce healthcare-associated infections (HCAs), 36% of nurses and 23% of doctors felt that cleansing hands six to ten times a hour was sufficient. Additionally, the number of opportunities to execute the HH did not influence the study participants' assessment of its sufficiency. The same variables that affected compliance were demonstr

ated by Mathai et al. (2010:349–

352), including inconsistent professional attitudes and behaviors, poor HH agents, low protocol adherence, and ignorance.

The overall HH compliance rate in ICU was just 26%, according to a study conducted in India by Mathai et al (2011). There was also a discrepancy between the perceived and actual HH rates. The researchers saw instances of recontamination when nurses followed HH procedures but touched themselves or surfaces before interacting with patients. The implementation of multimodal treatments such as instructional sessions based on the Five Moments of Hand Hygiene, poster displays, vocal reminders, and enough supply of hand hygiene goods resulted in a considerable improvement in compliance.

This is in line with the WHO's (2009a:99–

110) recommendations to use a multimodal, multifunctional HH strategy and an approach that fosters a culture of patient safety. Also, due to the belief that children are more susceptible to infection than adults, a Scandinavian study by Hussien et al (2007) shows that compliance in the pediatric intensive care unit (ICU) is higher than in the adult ICU. Before the intervention, nurses and physicians utilized both alcohol hand rub (AHR) and standard hand cleaning with soap and water equally. Before interventions, it was thought that *Staphylococcus aureus* strains known to be resistant to methicillin could not be treated with AHR. Following the intervention, there was a notable rise in HH compliance with AHR use, with a greater percentage of doctors than nurses using it.

In a study, among dental professionals in tertiary dental clinics in Benin City, there were inadequate hand washing practices and monitoring despite knowledge of the role of hand washing in the prevention of infections especially after contact with patients and removal of gloves, as a result of lack of adequate HH supplies, forgetfulness and busyness of the clinic (Omogbai et al, 2011). Poor compliance to HH was also shown in a

baseline interventional study in two outpatient clinics at 11% and 21% and an improvement of 34% and 54% post-intervention.

The study on assessing the role of handwashing in the prevention of communicable diseases by show that healthcare workers knew benefits of handwashing practices however compliance was low due to lack of motivation and handwashing facilities. 55% of the total participants indicated lack of time, 34.7% heavy virus patients and 15.7% non-conducive environment (Inamulhaq Metal, 2012).

An interventional study by Salamatietal, 2013; on nursing personnel in Bahrani Paediatric Hospital show ed improvement in HH performance with a lecture method and more improvement when the lecture method was combined with motivational interviewing.

## **CHAPTER THREE**

### **3.0. METHODOLOGY**

#### **3.1. STUDY AREA**

The study was carried out in Oluku Community, Benin City, Edo State, Nigeria. Oluku is a community under Ovia North-East Local Government Area, Edo State. It is an emerging hub for commerce in Benin City and also a residential area with a relatively large population of people. Located along the Benin-Lagos Expressway, it is surrounded by various other communities: Ekiadolo, Okunmwum, Ogheghe, Utekon and Uselu. It is a major gateway into Benin City, Edo State from Lagos and Ondo States. There is a major market, a Seven-up Bottling Company plant, a public Primary School, and some private and public health care centres.

#### **3.2. STUDY DESIGN**

A cross-sectional study design was adopted for this study. The study was used to assess the Hand Hygiene knowledge, attitude and practice of health care workers in Oluku Community, Benin City.

#### **3.3. STUDY POPULATION**

The study consisted of health care workers working in public and private health care centers in Oluku community. Doctors whom made direct contact with the patients and also, nurses who are involved in providing clinical care like administering injections, drawing bloods, providing first aid treatment and consulting with patients for minor ailments in the selected PHC clinics

### **3.4.STUDYDURATION**

Thestudyspannedfor6months;fromMarchtoNovember2024.

### **3.5.SELECTIONCRITERIA**

#### **3.5a.InclusionCriteria**

Theeligibleparticipants ofthisstudywerehealthcareworkerswhosatisfiedthefollowingcriteria:

- Employedinthesehealthcarecentres
- Involvedindirectcontactwithpatient-carewhileworking
- Willingtoparticipateinthestudy
- Availableatthetimeofstudy

#### **3.5b.ExclusionCriteria**

Healthcareworkerswhowerenotinvolvedindirectpatientcarewereexcludedbecausetheirriskfactorswillbedifferentfromthehealthcareworkerswhoareindirectcontactwithpatients.Also,healthcareworkerswhowerenotavailableatthetimeofstudy.

### **3.6.SAMPLINGTECHNIQUE**

#### **3.6a.Selectionofstudyarea**

ThestudywascarriedoutinOlukuCommunity,OviaNorth-EastLocalGovernmentArea,BeninCity,EdoState

### **3.6b. Selection of Healthcare Centers**

A list of public healthcare centers in the Oluku community environment was obtained from the Federal Ministry of Health website and there was a government-owned healthcare center, i.e., Oluku Primary Health Centre with Ekosodin Primary Health Centre and Igusa Health Post around the Oluku environment. Also various private healthcare centers were also assessed: Celtack Healthcare Medical Centre, Ripple Medicare Centre, GeonARD Medical Centre, Providence Medical Centre, St Anthony's Satellite Medical Centre etc.

Both public and private health facilities were selected for this study. A total of six health facilities were selected, 2 public and 4 private. This selection was by simple random sampling. A ballot of all the private health facilities was prepared and 4 from the private health facilities were selected.

### **3.6c. Sample selection**

Participants for the study were selected by a convenience sample of all the available healthcare providers in the selected health facility.

## **3.7 METHOD OF DATA COLLECTION**

### **3.7a. Questionnaires**

A quantitative data collection tool was used to collect information in line with the objectives of the study (Appendix I). The tool is a structured self-administered questionnaire which will consist of 5 sections. Section A on demography, B on knowledge, C on practice and method, D on compliance and E on factors influencing HH. The questions were grouped into the following sections to gather the necessary information.

### **Section A: Social-demographic Characteristics**

This part provided information on the demographic characteristics of the healthcare worker respondents such as:

- The age of the respondent as at the last birthday
- Level of Education was grouped into primary, secondary, tertiary and no formal Education.
- Profession included clinical practice staff; doctors, nurses/midwives, laboratory scientists
- Years of clinical practice were grouped into 5-year intervals, ranging from <5 to >20 years.
- Name of the facility of the respondent

### **Section B: Assessment of Knowledge of Hand Hygiene**

This part provided information about awareness and understanding of hand hygiene

### **Section C: Practice and Method of Hand Hygiene**

This part provided information on how and when they perform hand hygiene

### **Section D: Compliance towards Hand Hygiene**

This part provided information about adherence to proper hand hygiene

### **Section E: Factors influencing Hand Hygiene**

This part provided information on the challenges of hand hygiene

## **SCORING SYSTEM**

### **Composite Knowledge Assessment**

Knowledge was assessed using 10 questions. Each correct answer was awarded 1 mark, while incorrect answers received 0 marks. The total score, out of 10, was converted into a percentage, ranging from 0% to 100%. Knowledge levels were categorized as:

-Poor knowledge: Scores between 0% and 49.9%

-Good knowledge: Scores between 50.0% and 100%

### **Composite Practice Assessment**

Practice was evaluated using 6 questions. A score of 1 mark was given for correct practice, while 0 marks were assigned for a response shot of correct practice. The total score, out of 6, was converted into a percentage, ranging from 0% to 100%. Practice levels were categorized as:

-Poor practice: Scores between 0% and 49.9%

-Good practice: Scores between 50.0% and 100%

### **Composite Attitude Assessment**

Attitude was assessed using 4 questions. Each positive response was awarded 1 mark, while negative responses received 0 marks for a response shot of correct. The total score, out of 4, was converted into a percentage, ranging from 0% to 100%. Attitude levels were categorized as:

-Poor attitude: Scores between 0% and 49.9%

-Good attitude: Scores between 50.0% and 100%

### **Composite Compliance Assessment**

Compliance was evaluated using 15 questions. Each compliant response was given 1 mark, while non-compliant responses received 0 marks. The total score of 15, was converted into a percentage, ranging from 0% to 100%. Compliance levels were categorized as:

-Poor compliance: Scores between 0% and 49.9%

-Good compliance: Scores between 50.0% and 100%

## **3.8. DATA MANAGEMENT**

### **3.8a. Measurement of Variables**

**1. Independent variables:** These are individual socio-demographic characteristics

**2. Dependent Variables:**

- Knowledge of Hand Hygiene
- Practice and Methods of Hand Hygiene
- Compliance towards Hand Hygiene
- Factors Influencing Hand Hygiene

### **3.8b. PRE-TESTING**

The questionnaire was pre-

tested among health workers of the University of Benin Teaching Hospital, General Practice Clinic. The ai

mwastoidentifyerrors,effectcorrectionsandensurethevalidityandreliabilityofthequestionnairetoaid appropriatecollectionofdata.Appropriatecorrectionsweremadewhereapplicabletothequestionnaire beforethecommencementofhissurvey.

### **3.9.STATISTICALANALYSIS**

The datathatwasscreenedforcompletenessbytheresearcher,was codedandanalyzedusingtheStatistica I PackagefortheSocialSciences(SPSS)Statisticsv25.0software.

Descriptive data was expressed as frequencies and percentages. The data was analyzed and presented in the form of statements and frequency tables. The statistical tests to determine associations were made using Chi-square. The level of significance was set at 0.05.

### **3.10.ETHICALCONSIDERATIONS**

#### **3.10a.InstitutionalConsent:**

Ethical clearance (Appendix III) to conduct this research was sought and obtained from the University of Benin Teaching Hospital Ethics and Research Committee. Permission was sought from the Project Coordinator of Community Dentistry, University of Benin, Benin City.

#### **3.10b.IndividualConsent:**

Written informed consent (Appendix II) was obtained from each respondent before conducting interviews. The confidentiality and privacy of the respondents was guaranteed during the interviews. To ensure confidentiality, serial numbers rather than names were used to identify the respondents. Respondents were given health education on hand hygiene.

### **3.11. STUDY LIMITATIONS**

This study relied on information provided by the respondents and may therefore be limited by recall bias. It may also be limited by some errors made by the researchers during the course of the study.

## **CHAPTER FOUR**

### **4.0 RESULTS**

The sociodemographic characteristics of the 116 respondents showed that the most common age group was 31-40 years [47 (40.5%)], followed by those aged 30 or younger [43 (37.1%)] and those over 40 [26 (22.4%)], with a mean age of  $34.85 \pm 7.7$  years. Females comprised 65.5% of respondents, while males accounted for 34.5% [Table 1]. Nearly all respondents (94.8%) had attained tertiary education [110 (94.8%)], while 6 (5.2%) had secondary education. Nurses and midwives were the predominant professional group [78 (67.2%)], with doctors making up 32.8% [Table 1]. Most respondents had been in practice for 5-10 years [50 (43.1%)], 31.0% had less than 5 years, 11.2% had 11-15 years, 7.8% had 16-20 years, and 6.9% had over 20 years of experience. A greater proportion of respondents worked in private facilities [65 (56.0%)] than in public ones [51 (44.0%)] [Table 1].

All respondents were aware of hand hygiene [116 (100.0%)], with workshops and training identified as the main sources of information [99 (85.3%)], followed by the internet and social media [82 (70.7%)], friends [73 (62.9%)], books [72 (62.1%)], and radio or television [58 (50.0%)] [Table 2]. Washing with water only was identified as the least effective method [52 (44.9%)], followed by cleaning hands with wipes [44 (37.9%)], washing with soap and water [10 (8.6%)], and using alcohol-based sanitizers [7 (6.0%)] [Table 2]. Familiarity with recommended hand-

washing moments was high, with 91.4% of respondents aware, and 99.1% acknowledged the role of hand hygiene in infection control [Table 2].

The unclean hands of healthcare workers were perceived as the main route for cross-transmission of germs [74 (63.8%)], with 53.4% identifying the healthcare environment as the primary germ source [Table 2]. Most respondents agreed that hand hygiene should be observed after a procedure or body fluid exposure [113 (97.4%)], after patient contact [112 (96.6%)], before patient contact [110 (94.8%)], and before a procedure [110 (94.8%)]. Fewer respondents recognized the need for hand hygiene after touching patients surroundings [85 (73.3%)] or before handling patient files [12 (10.3%)] [Table 2].

In terms of practice, 22.4% of respondents washed hands 1-4 times per workday, 29.3% washed 5 or more times, and 48.3% washed hands each time before or after specific tasks [Table 6]. Consistent hand washing before patient interaction was reported by 75.0%, while 23.3% did so sometimes, and 1.7% did not [Table 7]. After exposure to body fluids, 93.1% reported consistent hand washing, 6.9% did so sometimes, and none reported non-compliance. Regular hand washing after patient interaction was noted in 88.8%, with 10.3% sometimes and 0.9% not washing hands. Compliance with the WHO's five hand-washing moments was observed by 54.3% consistently, 33.6% sometimes, and 12.1% not at all [Table 7]. Overall, 85.3% of respondents demonstrated good hand hygiene practices, while 14.7% had poor practices [Fig 3].

Regarding compliance with hand hygiene, 94.0% of respondents regularly washed hands with soap and water, while 6.0% did so sometimes [Table 11]. Common hand-washing times were 20 seconds [34 (29.3%)], 60 seconds [31 (26.7%)], and 10 seconds [26 (22.4%)] [Table 11]. Most respondents (87.9%) used alcohol-based sanitizers, with 10 seconds being the most frequent application time [42 (36.2%)] [Table 11]. Comp

liance with hand hygiene practices before patient interaction was reported by 50.9%, 44.8% did so sometimes, and 4.3% never [Table 12]. Handwashing after patient interactions showed better adherence, with 84.5% consistent, 15.5% occasional, and none reported non-compliance [Table 12]. Before putting on gloves, 44.8% always practiced hand hygiene, 44.0% sometimes, and 11.2% never. Hand hygiene after glove removal was consistently practiced by 74.1%, sometimes by 24.1%, and not practiced by 1.7% [Table 12].

Specific hand hygiene practices varied by activity. Before patient contact, 60.3% reported washing hands, 31.9% used sanitizers, and 7.8% did neither [Table 13]. For injections, 52.6% washed hands, 38.8% used sanitizers, and 8.6% did not perform hand hygiene. After emptying a bedpan, 89.7% washed hands, 7.8% used sanitizers, and 2.6% did neither. Following glove removal, 74.1% washed hands, 25.0% used sanitizers, and 0.9% did neither. After visible blood exposure, compliance was high, with 96.6% washing hands and 3.4% using sanitizers, resulting in 71.6% good compliance with hand hygiene protocols [Fig 5].

Facility resources for hand hygiene were available to varying degrees. Piped running water was available to 97.4%, while 84.5% had soap, 71.6% had sinks, and 61.2% had wall-mounted hand sanitizers. Other resources included water in a bucket [29 (25.0%)], hand rubs [37 (31.9%)], and disposable towels [15 (12.9%)] [Table 16]. Factors affecting compliance included unavailability of soap [69 (59.5%)], lack of reminders [67 (57.8%)], busy schedules [60 (51.7%)], lack of consistent water [56 (48.3%)], and skin dryness or irritation [47 (40.5%)] [Table 17].

Bivariate analysis showed no significant association between knowledge of hand hygiene and sociodemographic factors such as age ( $p=0.304$ ), sex ( $p=0.619$ ), education level ( $p=0.593$ ), profession ( $p=0.321$ ), and years of practice ( $p=0.471$ ). However, facility type significantly influenced knowledge, with higher levels of knowledge among those in public facilities compared to those in private facilities ( $\chi^2=10.137$ ,  $p<0.05$ ).

001)[Table4].Multivariateanalysisconfirmedthis,indicatingthatrespondentsinprivatefacilitieswerel esslikelytohavegoodknowledge(OR=0.123,95%CI:0.029–0.518,p=0.004)[Table5].

Forhandhygienepactice,bivariateanalysisrevealednosignificantassociationswithage(p=0.259),sex (p=0.238),educationallevel(p>0.999),profession(p=0.790),oryearsofpractice(p=0.111).However,f acilitytypewassignificant,withprivatefacilityworkerspracticinghandhygienelessfrequentlythanthos einpublicfacilities( $\chi^2=3.337$ ,p=0.046)[Table8].Themultivariateamodelindicatedthatrespondentsinp rivatefacilitieshadsignificantlyloweradherencetohandhygienepactices thantheirpublicfacilitycoun terparts(OR=0.235,95%CI:0.054–0.989,p=0.049)[Table9].

Bivariateanalysisofcompliancewithhandhygienepacticesfoundnosignificantassociationswithage( p=0.724),sex(p=0.133),educationlevel(p>0.999),profession(p=0.191),oryearsofpractice(p=0.962). Facilitytypewasalsonotsignificant(p=0.840)[Table14].Multivariateanalysisfurtherconfirmedthatsoc iodemographicfactors,includingfacilitytype(OR=0.938,95%CI:0.380– 2.311,p=0.889),didnotsignificantlyimpactcompliance,indicatingthatcompliancewasuniformlydistr ibutedacrossthese factorsinthisstudysample[Table15].

**Table1:Sociodemographiccharacteristicsofrespondents**

<b>Variable</b>	<b>Frequency(n=116)</b>	<b>Percent</b>
<b>Agegroup(years)</b>		
≤30	43	37.1
31-40	47	40.5
>40	26	22.4
<b>Mean±SD34.85±7.7</b>		
<b>Sex</b>		
Male	40	34.5
Female	76	65.5
<b>LevelofEducation</b>		
Secondary	6	5.2
Tertiary	110	94.8
<b>Profession</b>		
Doctor	38	32.8
Nurse/Midwife	78	67.2
<b>DurationofPractice(years)</b>		
<5	36	31.0
5-10	50	43.1
11-15	13	11.2
16-20	9	7.8
>20	8	6.9
<b>FacilityType</b>		
Private	65	56.0
Public	51	44.0

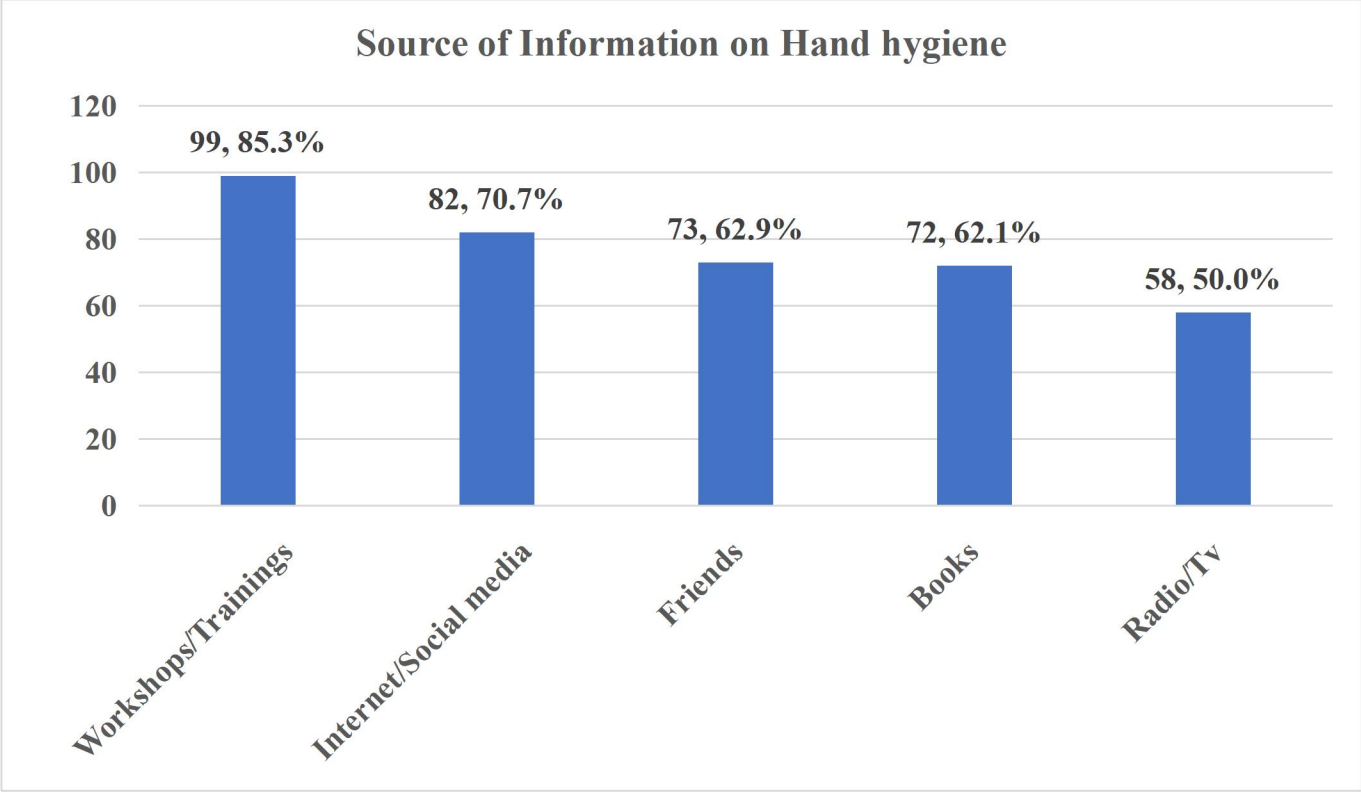
**Table 2: Knowledge of hand hygiene among respondents**

<b>Variable</b>	<b>Frequency(n=116)</b>	<b>Percent</b>
<b>Heard of hand hygiene</b>		
Yes	116	100.0
No	0	0.0
<b>Source of Information</b>		
Workshops/Trainings	99	85.3
Internet/Social media	82	70.7
Friends	73	62.9
Books	72	62.1
Radio/Tv	58	50.0
<b>Least effective hand hygiene method</b>		
Washing with water only	52	44.9
Cleaning hands with wipes	44	37.9
Washing hands with soap and water	10	8.6
Using alcohol-based hand sanitizers	7	6.0
Washing with soap and water/using alcohol-based sanitizer	3	2.6
<b>Familiarity with hand washing moments</b>		
Yes	106	91.4
No	10	8.6
<b>Hand hygiene is effective for infection control</b>		
Yes	115	99.1
No	1	0.9
<b>Main route of cross transmission of germs between patients</b>		

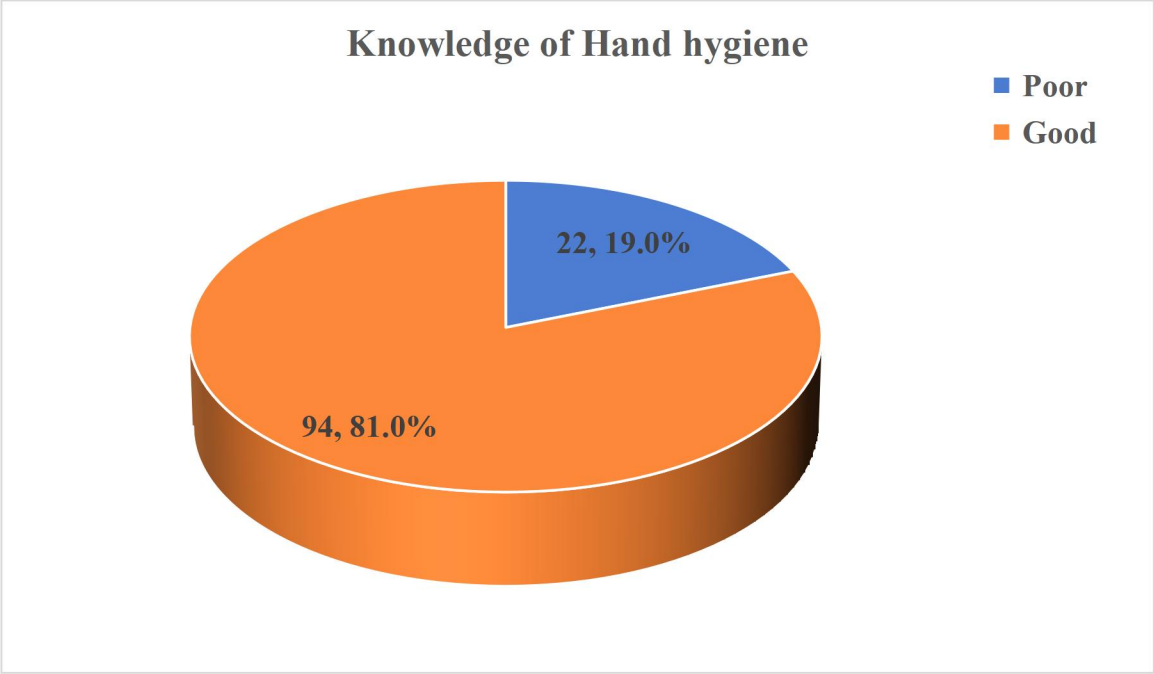
Unclean hands of healthcare workers	74	63.8
Patient exposure to contaminated surfaces	35	30.2
Air circulating in the hospital	4	3.4
Sharing non-invasive equipment between patients	3	2.6
<b>Most frequent source of germs</b>		
Healthcare facility environment	62	53.4
Germs already present on the patient	42	36.2
Healthcare facility's air	7	6.0
Healthcare facility's water system	5	4.3
<b>When should hand hygiene be observed</b>		
After a procedure/body fluid exposure	113	97.4
After touching a patient	112	96.6
Before touching a patient	110	94.8
Before a procedure	110	94.8
After touching a patient's surroundings	85	73.3
Before touching a patient's files	12	10.3

**Table 3: Knowledge of risk of transmission among respondents**

Variable	Frequency (n=116)	Percent
<b>Which of these is associated with increased risk of contact with germs*</b>		
Wearing jewelry	72	62.1
Damaged skin	90	77.6
Artificial fingernails	77	66.4
Regular use of hand cream	12	10.3
<b>Hand hygiene greatly reduces risk of transmitting hospital-acquired infections</b>		
Yes	116	100.0
No	0	0.0
<b>Hand sanitizers are more effective than hand washing against germs</b>		
Yes	60	51.7
No	56	48.3



**Fig1:Sourceofinformationonhandhygiene**



**Fig2: Knowledge of hand hygiene among respondents**

**Table4: Association between knowledge of hand hygiene and sociodemographic characteristics of respondents**

Variable	Knowledge of hand hygiene		X <sup>2</sup>	p-value
	Good (n=94)	Poor (n=22)		
Age (years)				
≤30	32(34.0)	11(50.0)	2.401	0.304
31-40	41(43.6)	6(27.3)		
>40	21(22.4)	5(22.7)		
Sex				
Male	31(32.6)	9(40.9)	0.496	0.619
Female	63(67.4)	13(59.1)		
Level of Education				
Secondary	4(4.3)	2(9.1)	0.850	0.593
Tertiary	90(95.7)	20(90.9)		

Profession					
Doctor	33(35.1)	5(22.7)	1.240	0.321	
Nurses/Midwife	61(64.9)	17(77.3)			
DurationofClinicalPractice					
<5	30(31.9)	6(27.3)	3.613	0.471	
5-10	39(41.5)	11(50.0)			
11-15	11(11.7)	2(9.1)			
16-20	6(6.4)	3(13.6)			
>20	8(8.5)	0(0.0)			
Facilitytype					
Private	46(48.9)	19(86.4)	10.137	<0.001	
Public	48(51.1)	3(13.6)			

**Table5:Determinantsofknowledgeofhandhygieneamongrespondents**

Predictor	B(regression coefficient)	OddsRatio	95%CI FOR OR Lower	Upper	p-value
Age(years) ≤30	-0.669	0.512	0.031	8.500	0.641

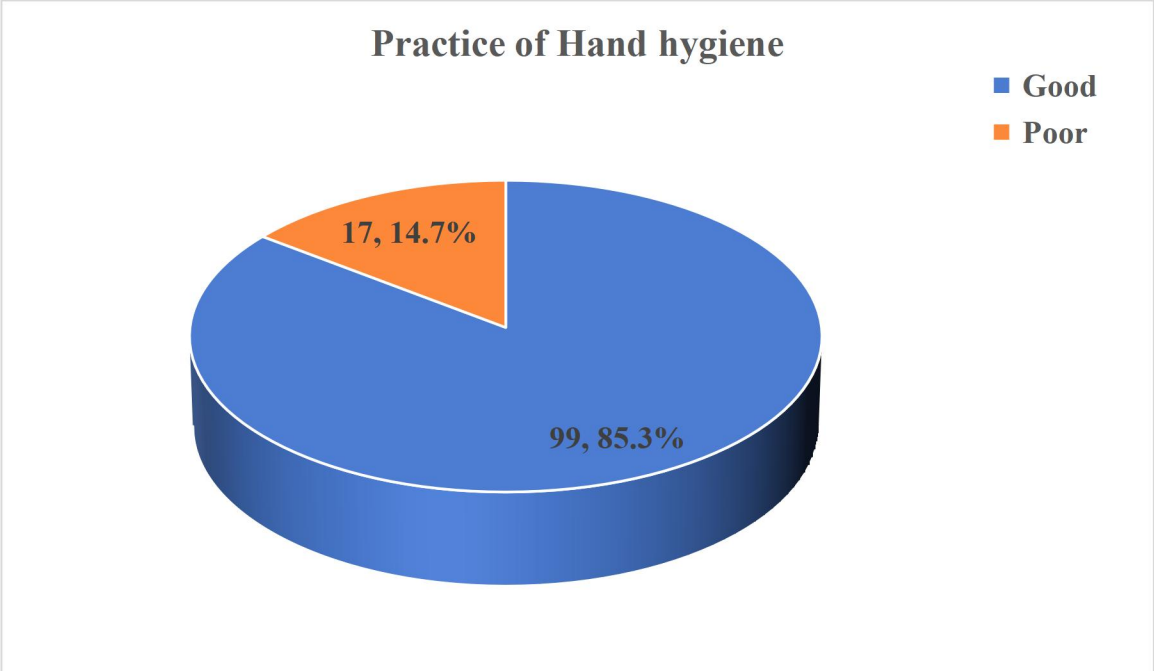
31-40	1.166	3.210	0.253	40.793	0.369
>40*		1			
<b>Sex</b>					
Male	-0.959	0.383	0.089	1.644	0.197
Female*		1			
<b>LevelofEducation</b>					
Secondary	0.040	1.041	0.118	9.215	0.971
Tertiary*		1			
<b>Profession</b>					
Doctor	1.489	4.431	0.883	22.240	0.071
Nurses/Midwife*		1			
<b>DurationofClinicalPractice</b>					
<5*		1			
5-10	-1.489	0.226	0.045	1.118	0.068
11-15	-1.665	0.189	0.009	4.165	0.291
16-20	-2.376	0.093	0.003	2.559	0.160
>20*	-3.446	0.088	0.023	2.268	0.594
<b>Facilitytype</b>					
Private	-2.093	0.123	0.029	0.518	<b>0.004</b>
Public*		1			

**Table6:Frequencyofhandwashingamongrespondents**

<b>Variable</b>	<b>Frequency(n=116)</b>	<b>Percent</b>
<b>Frequencyofhandwashingperworkday</b>		
1-4	26	22.4
≥5	34	29.3
Everytimebeforeorafterspecificactivities	56	48.3

**Table7:Handwashingpracticesamongrespondents**

<b>Handwashingpractices</b>	<b>Yes</b>	<b>Sometimes</b>	<b>No</b>
Washhandsbeforeattendingtoapatient	87(75.0)	27(23.3)	2(1.7)
Washhandsaftercontactwithbodyfluids	108(93.1)	8(6.9)	0(0.0)
Washhandsafterattendingtoapatient	103(88.8)	12(10.3)	1(0.9)
Followthe5momentsofWHOhandwashing	63(54.3)	39(33.6)	14(12.1)



**Fig3:Practiceofhandhygieneamongrespondents**

**Table 8: Association between practice of hand hygiene and sociodemographic characteristics of respondents**

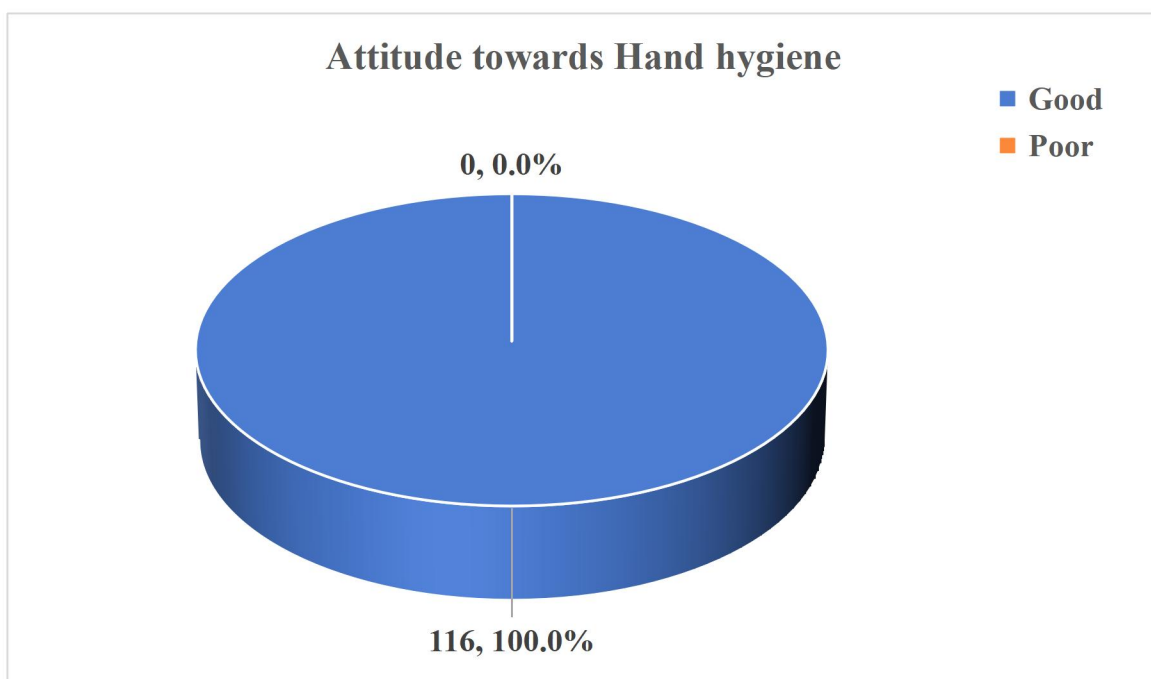
Variable	Practice of hand hygiene		X <sup>2</sup>	p-value
	Good (n=99)	Poor (n=17)		
Age (years)				
≤30	39(39.4)	4(23.5)	2.835	0.259
31-40	37(37.4)	10(58.8)		
>40	23(23.2)	3(17.7)		
Sex				
Male	32(32.3)	8(47.1)	1.394	0.238
Female	67(66.7)	9(52.9)		
Level of Education				
Secondary	5(5.1)	1(5.9)	0.020	>0.999
Tertiary	94(94.9)	16(94.1)		
Profession				
Doctor	33(33.3)	5(29.4)	0.101	0.790
Nurses/Midwife	66(66.7)	12(70.6)		
Duration of Clinical Practice				
<5	34(34.3)	2(11.8)	7.415	0.111
5-10	40(40.4)	10(58.8)		
11-15	11(11.1)	2(11.8)		
16-20	6(6.1)	3(17.6)		
>20	8(8.1)	0(0.0)		
Facility type				
Private	52(52.5)	13(76.5)	3.337	<b>0.046</b>
Public	47(47.5)	4(23.5)		

**Table9:Determinantsofpracticeofhandhygieneamongrespondents**

<b>Predictor</b>	<b>B(regression coefficient)</b>	<b>OddsRatio</b>	<b>95%CI FOR OR</b>		<b>p-value</b>
			<b>Lower</b>	<b>Upper</b>	
<b>Age(years)</b>					
≤30	-1.406	0.245	0.016	3.644	0.307
31-40	-1.589	0.204	0.022	1.868	0.160
>40*		1			
<b>Sex</b>					
Male	-1.222	0.295	0.070	1.246	0.097
Female*		1			
<b>LevelofEducation</b>					
Secondary	0.105	1.111	0.090	13.172	0.934
Tertiary*		1			
<b>Profession</b>					
Doctor	0.882	2.415	0.523	11.158	0.259
Nurses/Midwife*		1			
<b>DurationofClinicalPractice</b>					
<5*		1			
5-10	-1.352	0.259	0.038	1.738	0.164
11-15	-2.518	0.081	0.004	1.446	0.087
16-20	-3.972	0.019	0.001	0.432	<b>0.013</b>
>20*	-3.442	0.068	0.023	2.457	0.559
<b>Facilitytype</b>					
Private	-1.447	0.235	0.054	0.989	<b>0.049</b>
Public*		1			

**Table10:Attitudetowardshandwashingamongrespondents**

Attitude	StronglyDisagree	Disagree
Handwashingisimportantinmyfacility	0(0.0)	0(0.0)
Thereisneedtoobservehandhygieneinhealthfacilities	3(2.6)	0(0.0)
Iwouldadvisecolleaguestoobservehandhygienebeforeandaftertouchingapatient	0(0.0)	0(0.0)
Iwouldattendaworkshop/trainingonhandhygieneifinvited	0(0.0)	4(3.4)



**Fig4:Attitudetowardshandhygieneamongrespondents.**

**Table11:Compliancewithhandhygieneamongrespondents**

Variable	Frequency(n=116)	Percent
<b>Doyouusuallywashyourhandswithsoapandwater</b>		

Yes	109	94.0
Sometimes	7	6.0
No	0	0.0
<b>Whatistheminimaltimeforyourhandwashing?</b>		
3seconds	3	2.6
10seconds	26	22.4
20seconds	34	29.3
30seconds	22	19.0
60seconds	31	26.7
<b>Doyouusuallyusealcohol-basedhandsanitizers</b>		
Yes	102	87.9
No	14	12.1
<b>Ifyes,whatistheminimaltime?(n=102)</b>		
3seconds	20	17.2
10seconds	42	36.2
20seconds	23	19.8
40seconds	4	3.4
60seconds	13	11.2

**Table12:Frequencyofcompliancewithhandhygienepactices**

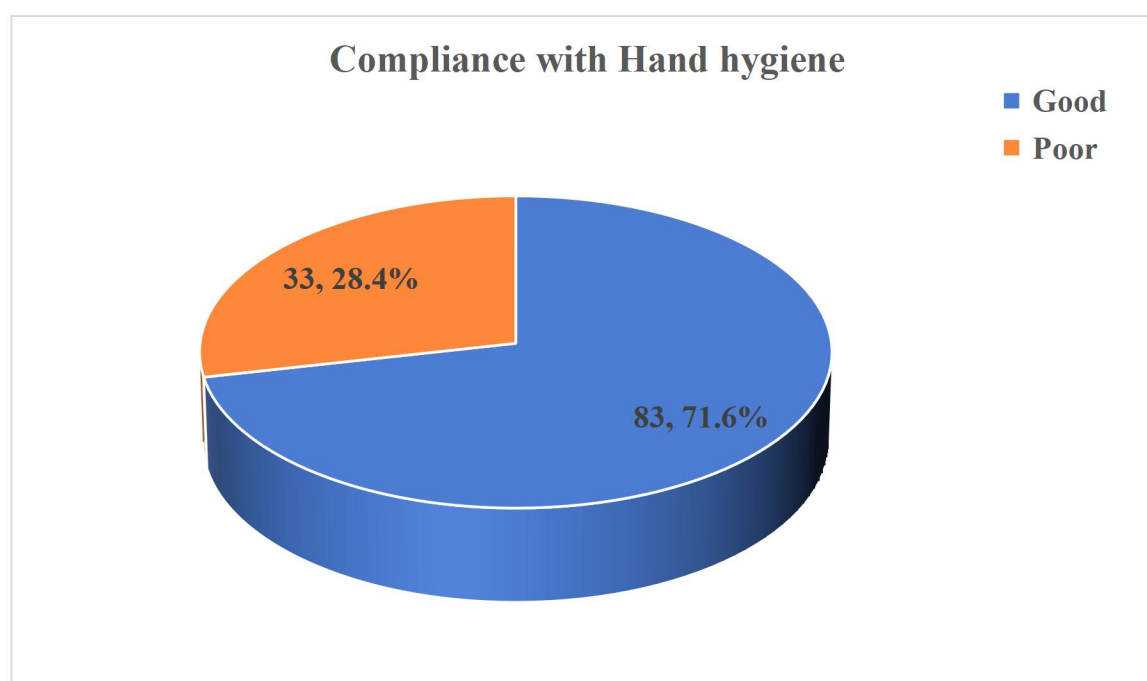
<b>Handwashingpractices</b>	<b>Always</b>	<b>Sometimes</b>	<b>Never</b>
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Howoftendoyouwashhandsbeforepatientinteraction	59(50.9)	52(44.8)	5(4.3)
Howoftendoyouwashhandsafterpatientinteraction	98(84.5)	18(15.5)	0(0.0)
Howoftendoyouobservehandhygienebeforeputtingongloves	52(44.8)	51(44.0)	13(11.2)
Howoftendoyouobservehandhygieneafterremovinggloves	86(74.1)	28(24.1)	2(1.7)

**Table13:Methodsofhandhygiene**

<b>Method</b>	<b>Washing</b>	<b>Sanitizing</b>	<b>None</b>
Beforepatientcontact	70(60.3)	37(31.9)	9(7.8)
Beforegivinginjections	61(52.6)	45(38.8)	10(8.6)
Afteremptyingabedpan	104(89.7)	9(7.8)	3(2.6)

After removing examination gloves	86(74.1)	29(25.0)	1(0.9)
After making patient's bed	83(71.6)	20(17.2)	13(11.2)
After visible exposure to blood	112(96.6)	4(3.4)	0(0.0)



**Fig5: Compliance with hand hygiene among respondents.**

**Table14: Association between Compliance with hand hygiene practices and sociodemographic characteristics of respondents**

Variable	Compliance with hand hygiene practices		X <sup>2</sup>	p-value
	Good (n=83)	Poor (n=33)		
Age (years)				
≤30	32(38.6)	11(33.3)	0.674	0.724
31-40	34(41.0)	13(39.4)		

>40	17(20.5)	9(27.3)		
Sex				
Male	25(30.1)	15(45.5)	2.457	0.133
Female	58(69.9)	18(54.5)		
LevelofEducation				
Secondary	4(4.8)	2(6.1)	0.074	>0.999
Tertiary	79(95.2)	31(93.9)		
Profession				
Doctor	24(28.9)	14(42.4)	1.956	0.191
Nurses/Midwife	59(71.1)	19(57.6)		
DurationofClinicalPractice				
<5	26(31.3)	10(30.3)	0.625	0.962
5-10	36(43.4)	14(42.4)		
11-15	10(12.0)	3(9.1)		
16-20	6(7.2)	3(9.1)		
>20	5(6.0)	3(9.1)		
Facilitytype				
Private	46(55.4)	19(57.6)	0.044	0.840
Public	37(44.6)	14(42.4)		

**Table15:Determinantsofcompliancewithhandhygieneamongrespondents**

Predictor	B(regression coefficient)	ODDSR ATIO	95%CI FOR OR Lower Upper	p-value
Age(years)				

≤30	0.741	2.099	0.297	14.820	0.457
31-40	0.337	1.400	0.273	7.170	0.686
>40*		1			
<b>Sex</b>					
Male	-0.537	0.585	0.188	1.821	0.354
Female*		1			
<b>LevelofEducation</b>					
Secondary	-0.244	0.783	0.119	5.146	0.799
Tertiary*		1			
<b>Profession</b>					
Doctor	-0.556	0.573	0.177	1.859	0.354
Nurses/Midwife*		1			
<b>DurationofClinicalPractice</b>					
<5*		1			
5-10	0.519	1.681	0.458	6.177	0.434
11-15	1.231	3.424	0.391	30.025	0.267
16-20	0.036	1.036	0.103	10.408	0.976
>20*	0.063	1.065	0.085	13.303	0.961
<b>Facilitytype</b>					
Private	-0.064	0.938	0.380	2.311	0.889
Public*		1			

---

**Table16:Factorsinfluencinghandhygieneofrespondents**

<b>Variable</b>	<b>Frequency(n=116)</b>	<b>Percent</b>
<b>Facilitiesavailableforhandwashinginyourfacility*</b>		
Pipedrunningwater	113	97.4
Sinks	83	71.6
Soap	98	84.5
Wallmountedhandsanitizers	71	61.2
Waterinabucket	29	25.0
Handrubs	37	31.9
Disposabletowels	15	12.9

**Table17:Factorsaffectingcompliancewithhandhygieneamongrespondents**

<b>Factors</b>	<b>Agree</b>	<b>Undecided</b>	<b>Disagree</b>
Unavailabilityofsoap	69(59.5)	26(22.4)	21(18.1)
Lackofconstantwater	56(48.3)	23(19.8)	37(31.9)
Unavailabilityofhandsanitizers	71(61.2)	23(19.8)	22(19.0)
Lackofreminders	67(57.8)	34(29.3)	15(12.9)
Skindryness/irritation	47(40.5)	38(32.8)	31(26.7)
Busyschedule	60(51.7)	24(20.7)	32(27.6)

## CHAPTER FIVE

## 5.0

## DISCUSSION

The study assessed the knowledge of hand hygiene and found that all respondents were aware of the concept, with 85.3% identifying workshops and training sessions as their primary source of information. This is comparable to findings conducted in India, which showed that structured training programs significantly improved healthcare workers' awareness of infection control measures (Ahuja & Pandey, 2019). The prominence of workshops as a knowledge source may be attributed to their interactive nature and ability to engage healthcare professionals directly. The public health significance of this finding lies in its potential to enhance infection prevention practices, reducing healthcare-associated infections. It is recommended that regular, mandatory workshops focusing on hand hygiene protocols be implemented across healthcare facilities to sustain and expand this awareness.

Respondents demonstrated strong familiarity with the recommended hand-washing moments, with 91.4% aware of these critical guidelines. This finding is in contrast with a study conducted in Enugu, Nigeria, which showed that less than 50% of healthcare workers were knowledgeable about the "five moments for hand hygiene" framework (Ndu et al., 2021). The high level of familiarity in this study may be linked to the integration of WHO hand hygiene standards into institutional policies. The public health implication of this familiarity is substantial, as adherence to these moments is critical for preventing cross-contamination in healthcare settings. To further enhance compliance, healthcare facilities should adopt visual aids, such as posters or digital displays, prominently placed in clinical areas.

An overwhelming majority of respondents (99.1%) acknowledged the role of hand hygiene in infection control, a finding consistent with a study conducted in Tanzania, which reported that over 95% of healthcare workers recognized hand hygiene as a key preventive measure (Mtweve & Sangeda, 2022). The near-

universal agreement in both studies shows the success of global awareness campaigns about infection prevention. This recognition is vital for fostering adherence to hand hygiene practices. To leverage this knowledge, policymakers should ensure that facilities are equipped with the necessary resources to enable consistent hand hygiene practices.

In evaluating the practice and methods of hand hygiene, the study found that 87.9% of respondents used alcohol-based sanitizers, while 94.0% regularly washed their hands with soap and water. Comparable findings were conducted in the United States in 2019, showing that 95% of healthcare workers used alcohol-based hands sanitizers, and 97% of healthcare workers routinely used soap and water for hand hygiene, with 73% preferring alcohol-based sanitizers due to their convenience and effectiveness (Assefa *et al.*, 2021). The high adoption rates in this study may reflect the availability of these resources and institutional emphasis on their use. The public health significance of these practices lies in their ability to substantially reduce pathogen transmission in healthcare settings. To sustain these positive practices, healthcare facilities should ensure uninterrupted supplies of sanitizers and soap.

Compliance with hand hygiene after visible blood exposure was the highest (96.6%) among the tasks evaluated, aligning with a study conducted in India, which showed that healthcare workers were most compliant after being exposed to body fluids (Krishnamoorthy *et al.*, 2023). This heightened compliance is likely driven by a perceived increased risk of infection in such scenarios. The public health implication is clear: high compliance rates in critical situations can prevent the spread of bloodborne infections. It is recommended that similar levels of vigilance be encouraged for all hand hygiene moments through targeted training programs.

However, adherence to the WHO's five moments of hand hygiene was consistently observed by only 54.3% of respondents, lower than findings conducted in Paraguay, where adherence exceeded 65% (Grau *et al.*, 2024). The lower compliance in this study may stem from time constraints or insufficient monitoring mechanisms, as well as poor availability of accessible handwashing stations at vantage positions. This is important, as lapses in compliance can facilitate nosocomial infections. Healthcare facilities should develop time-efficient workflows and implement regular audits to improve adherence to these protocols.

The level of compliance with hand hygiene protocols revealed that while 94.0% adhered to soap-and-water washing, only 50.9% consistently observed hygiene before patient interaction. This finding aligns with a study conducted in Nigeria, which showed similarly low pre-contact hand hygiene compliance rates among healthcare workers, with only 25% of doctors and 22% of nurses washing their hands before touching patients (Ataiyero *et al.*, 2022). This discrepancy might result from underestimating the risk of contamination prior to patient interaction. Public health risks include increased pathogen transmission to patients, emphasizing the need for interventions. Behavioural modification strategies, such as real-time feedback systems, should be implemented to improve pre-contact hand hygiene compliance.

Only 74.1% of respondents consistently practiced hand hygiene after glove removal, comparable to findings conducted in Enugu, Nigeria, showing bigger lapses in compliance with glove-related hygiene practices, with only 41.8% of healthcare workers washing their hands after glove removal (Ndu *et al.*, 2021). This behaviour may stem from a misconception that gloves eliminate the need for subseq

uenthandhygiene.Publichealthimplicationsincludetheriskofspreadingpathogensresistanttogloves materials, endangering both healthcare workers and patients. Healthcare institutions should prioritize training to dispel myths about glove use and reinforce the importance of hand hygiene post-glove removal.

The availability of hand hygiene facilities was high, with 97.4% of respondents having access to piped water and 84.5% to soap. This finding contradicts a study conducted in Ethiopia, which showed that barely 21% of healthcare facilities had access to soap and clean running water (Berihun, 2022). The low availability reflects poor institutional investments in infection control. Public health hazards include poor compliance and elevated nosocomial infections. To improve this, regular audits of infrastructure should be conducted to address gaps and ensure that resources are made available.

Factors influencing hand hygiene practices included the unavailability of soap, affecting 59.5% of respondents. This aligns with findings conducted in Liberia, which reported that resource shortages were a significant barrier to compliance (Tantum *et al.*, 2021). This issue is likely exacerbated by inconsistent funding or supply chain disruptions. The public health impact includes increased risks of healthcare-associated infections due to non-compliance. It is recommended that government and institutional stakeholders prioritize the provision of essential hand hygiene resources to all healthcare facilities.

Bus schedules were cited as a barrier to compliance by 51.7% of respondents, comparable to findings conducted in Bangladesh in 2019, in which workload and shortage of time were identified as major hindrances to hand hygiene adherence (Harun *et al.*, 2023). Overburdened healthcare workers may prioritize patient care tasks over hygiene protocols, inadvertently increasing infection risks. To address this, healthcare institutions should adopt staffing policies that reduce workload pressures and enable workers to comply with hygiene protocols effectively.

## **CONCLUSION**

The study found that respondents had high knowledge of hand hygiene, with 85.3% citing workshops as the main source of information.

Hand hygiene practices were generally good, with 87.9% using alcohol-based sanitizers and 94.0% washing hands with soap and water.

Compliance with recommended hand hygiene moments was inconsistent, with only 54.3% adhering to the WHO's five moments.

Barriers to hand hygiene included the unavailability of soap for 59.5% of respondents and busy schedules for 51.7%.

## **RECOMMENDATIONS**

### **TO THE GOVERNMENT:**

1. Ensure nationwide execution of mandatory hand hygiene training for healthcare workers.
2. Allocate funds for infrastructure improvements to guarantee consistent availability of hand hygiene resources in all healthcare facilities.

3. Develop strategies to address resource shortages, ensuring that soap and sanitizers are continuously available in healthcare settings.

#### **TO THE HOSPITAL MANAGEMENT:**

1. Provide regular, interactive workshops and training sessions to sustain and expand hand hygiene awareness.
2. Implement visual aids in clinical areas to remind healthcare workers of the recommended hand hygiene moments.
3. Prioritize the reduction of workload pressure through adequate staffing and time-efficient workflows to improve hand hygiene compliance.

#### **TO THE HEALTHCARE PROFESSIONALS:**

1. Reinforce the importance of practicing hand hygiene before patient interactions, including during busy periods.
2. Actively participate in training and adopt a proactive approach to hand hygiene protocols.
3. Use alcohol-based sanitizers and soap regularly while adhering to the WHO's five moments for hand hygiene, especially in critical situations.

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## **Appendix I**

### **ASSESSMENT OF THE HAND HYGIENE PRACTICES AMONG HEALTH CARE REWORKERS IN LUKU COMMUNITY**

#### **Section A: Social Demographic Characteristics**

1. Age (in years): \_\_\_\_\_
2. Sex: Male() Female()
3. Level of Education: No Formal Education() Primary() Secondary() Tertiary()
4. Profession/Cadre: Doctor() Nurse/Midwife()

5. Duration of clinical practice (Years): <5() 5-10() 11-15() 16-20() >20()
6. Name of Facility: \_\_\_\_\_

### Section B: Assessment of Hand Hygiene Knowledge

1. Have you heard of hand hygiene practices? Yes() No().  
If yes, where did you hear about it? (**Multiple responses allowed**) Radio/Television() Friends/Colleagues() Internet/Social Media() Books() Workshop/Lectures/Training()
2. The following option is **not correct** about hand hygiene. Washing the hands with water only() Washing with soap and water() Using alcohol-based hand sanitizer() Washing the hands with soap and water or using alcohol-based hand sanitizer()
3. Do you think hand hygiene is a good method or way of infection control? (a) Yes (b) No
4. Are you familiar with the different hand hygiene moments outlined in the WHO's "Five Moments for Hand Hygiene"? - Yes() No()
5. What is the main route of cross-transmission of germs between patients in healthcare facilities? (**Singleresponseonly**)
  - a) Unclean hands of healthcare workers()
  - b) Air circulating in the hospital()
  - c) Patient's exposure to contaminated surfaces()
  - d) Sharing non-invasive medical equipment between patients()
6. What is the most frequent source of germs responsible for healthcare-associated infections? (**singleresponseonly**)
  - a) The healthcare facility's water system()
  - b) The healthcare facility's air()
  - c) Germs already present on/within the patient()
  - d) The healthcare facility's environment()
7. Hand hygiene should be observed during this period **except**?  
Before touching a patient() After touching a patient() Before a procedure() After a procedure/body fluid exposure risk() Before touching a patient's files()
8. Which of the following is **not associated** with an increased risk of contact of hands with harmful germs? Wearing jewellery() Damaged skin() Artificial fingernails() Regular use of hand sanitizer()
9. Hand hygiene greatly reduces the risk of transmission of hospital-acquired infections. Yes() No()
10. Hand sanitizers are more effective against germs than hand washing. Yes() No()

**Section C: Assessment of Practice and Method of Hand Hygiene**

1. How frequently do you wash your hands in a typical workday?
  - (a) Less than once a day
  - (b) 1-4 times a day
  - (c) 5 or more times a day
  - (d) Every time before/after specific activities (procedures, patient contact, eating, using the restroom, all activities that contaminate the hand, etc.)
  - (e) Only when hands are visibly dirty
  - (f) Never
  
2. Are you aware of the recommended hand hygiene guidelines issued by your healthcare facility or governing body? - Yes() No() Partially()
  
3. Do you believe that your colleagues adhere to hand hygiene protocols consistently? - Strongly Agree() Agree() Disagree() Strongly Disagree() Don't Know()
4. Do you wash your hands before attending to a patient (a) Yes (b) No
5. Do you wash your hands after coming in contact with a patient's body fluids like sweat, blood, or saliva (a) Yes (b) No
6. Do you wash your hands after attending to a patient (a) Yes (b) No
7. Do you follow the 5 moments of hand washing as stated by WHO (a) Yes (b) No

	Strongly Agree	Agree	Disagree	Strongly Disagree
Handwashing is important in my facility				
There is a need to observe hand hygiene in health facilities.				
I would advise colleagues to observe hand hygiene before and after touching a patient.				
I would attend a workshop/training on hand hygiene if invited.				
I would advise colleagues to attend a workshop/training on hand hygiene if they are invited.				

**Section D: Assessment of Compliance towards Hand Hygiene Practices**

1. Do you usually wash your hands with soap and water for hand hygiene? Yes() No()
2. If yes, what is the minimal time needed to wash hands with soap and water? 3 seconds() 10 seconds() 20 seconds() 30 seconds() 60 seconds()

3. Do you usually use an alcohol-based hand sanitizer for hand hygiene? Yes() No()
4. If yes, what is the minimal time needed for alcohol-based hand sanitizer to kill most germs on your hands? 3 seconds() 10 seconds() 20 seconds() 40 seconds() 60 seconds()

	<b>Always</b>	<b>Sometimes</b>	<b>Never</b>
How often do you wash your hands with soap and water?			
How often do you practice hand washing before interacting with patients?			
How often do you practice hand washing after interacting with patients?			
How often do you observe hand hygiene before putting on gloves?			
How often do you observe hand hygiene after removing gloves?			

Which type of hand hygiene method is required in the following situations?

		<b>Washing</b>	<b>Sanitizing</b>	<b>None</b>
10.	Before palpation of abdomen			
11.	Before giving injection			
12.	After emptying a bedpan			
13.	After removing examination gloves			
14.	After making a patient's bed			
15.	After visible exposure to blood			

### **Section E: Assessment of Factors Influencing Hand Hygiene Practices**

1. What facilities are available for the observation of hand hygiene in your facility?  
**(Multiple responses allowed)**  
 Piped running water() Water in a bucket() Soap() Sinks() Wall-mounted hand sanitizers() Hand rubs() Disposable towels()

2. Which facilities would you recommend for effective compliance with hand hygiene practices in your facility? (multiple responses allowed) Provision of soap() Provision of water() Provision of hand sanitizers() Provision of reminder posters() Provision of sinks()
3. What would your facility need for the establishment of a hand hygiene program? Funding() Provision of hand hygiene facilities() Provision of facilitators for hand hygiene program() Training sessions on hand hygiene compliance() Provision of hand hygiene educational materials()

What are the challenges influencing compliance with hand hygiene in your facility?

		Agree	Undecided	Disagree
4.	Unavailability of soap			
5.	Lack of constant water supply			
6.	Lack of sink			
7.	Unavailability of hand sanitizers			
8.	Lack of reminders like posters			
9.	Skin dryness/irritation from sanitizers			
10.	Busy work schedule			

## Appendix II

### INFORMED CONSENT FORM

**TITLE OF RESEARCH:** HAND HYGIENE PRACTICE AMONG HEALTH CARE WORKERS IN OLUKU COMMUNITY

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Benin City, Edo State.

Emails:

**PURPOSE OF RESEARCH:** To assess the knowledge, practice, method, compliance and factors influencing hand hygiene practices amongst Health Care workers, in health care centers in Oluku Community with a view to improving the quality of patient care in these centers through improvement in knowledge, attitude and compliance with hand hygiene.

**PROCEDURES INVOLVED IN THE STUDY:** In this study questions will be asked regarding the knowledge, practice, method, compliance and factors influencing hand hygiene practices amongst Health Care workers, in primary health centers in Oluku community.

**CONFIDENTIALITY:** All data collected will be treated with utmost confidentiality. Health workers who volunteer to take part in this study will be given a unique study number and data will be collected. Participants' information will be stored safely secured by codes in computers using only the study identification number. All those handling data will not at any time reveal participants' identity.

**FINANCIAL COMPENSATION:** There shall be no financial compensation for participation in this study.

**VOLUNTARY PARTICIPATION:** Your participation in this study is entirely voluntary and if you desire to withdraw out of this study at any time, no punitive measures will be meted out against you on account of your withdrawal. Your refusal to participate or withdraw from the study will not involve any negative consequences or loss of benefits to which you are otherwise entitled to.

**RISK:** It is not expected that any harm will come to you because of your participation in this study. The study does not entail any activity that would result in harm to you.

**BENEFIT:** The study will help assess the knowledge, practice, method, compliance and factors influencing hand hygiene practices amongst primary health care workers, in Oluku community.

**FINANCIAL SPONSORSHIP:** This study will be sponsored by both principal investigators. The investigators may be contacted in case you have any clarification to make. The under-listed may be contacted in case you have any clarification to make.

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Ododo for Fejiro:

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Ihiemegbulem Abraham:

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OR

Ethics and Research Committee,

University of Benin Teaching Hospital

Phone Number: +2348023521840

## Appendix III

## University of Benin

Department of Preventive Dentistry,  
Community Dentistry Unit,  
Benin City.

12<sup>th</sup> April, 2024

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

### **REQUEST FOR INFORMATION/ PERMISSION BY DENTAL STUDENTS CONDUCTING RESEARCH**

Master David OKUNROBO is a dental student leading a group of research students in Community Dentistry Unit of the Department of Preventive Dentistry.

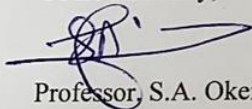
They are required to conduct a research project titled '*HAND HYGIENE PRACTICE HEALTH WORKERS OLUKU*' as part of the training programme which will involve administering questionnaire and dental screening of selected subjects. Your community has been selected for this project.

This is to request your permission and assistance for the success of this research project..

Looking forward to your anticipated favorable response and co-operation.

Thank you

Yours faithfully,



Professor, S.A. Okeigbemen *BDS, MPH, FMCDS*

Community Dentistry.

(Project Coordinator)

# HEALTH RESEARCH ETHICS COMMITTEE (HREC)

## UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR  
Prof. Darlington E. Obaseki  
E-mail: darlobaseki@gmail.com

DIRECTOR OF ADMINISTRATION  
Jim Uwadie, Esq

CHAIRMAN  
Prof. (Mrs.) Antoinette N. Ofili



### HREC OFFICE:

Committee email: ubthresearchethics@gmail.com

Registration Number:

NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1486549133

PROPOSAL TITLE: "HAND HYGIENE PRACTICE AMONG HEALTH CARE WORKERS IN OLUKU"

PRINCIPAL INVESTIGATOR(S): NJOKU CHARLES CHINEMEREM, OGBON OSASUMWEN ZINO,  
JOSEPH ABRAHAM IHIEMEGBULEM, OKUNROBO  
OSARHOUNAMEN DAVID, OGHENEFEJIRO STEPHEN  
ODODOFOR

DEPARTMENT/INSTITUTION: DEPARTMENT OF COMMUNITY DENTISTRY, SCHOOL OF  
DENTISTRY, UNIVERSITY OF BENIN, BENIN CITY

DATE CONSIDERED: SEPTEMBER 3RD, 2024

DECISION OF THE COMMITTEE: APPROVED

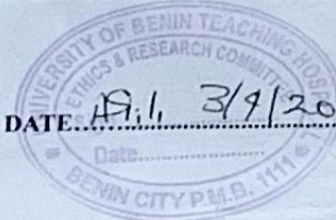
*THIS APPROVAL DATES 03/9/2024 TO 02/9/2025. IF THERE IS DELAY IN STARTING THE RESEARCH,  
PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY*

### REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI

SIGNATURE & DATE

SUPERVISOR (S): DR. P. U. OGORDI




### DECLARATION BY INVESTIGATOR(S):

PROTOCOL NUMBER (please quote in all enquiries)

Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date

 23/09/2024



ubthresearchethics@gmail.com

Registration Number: NHREC/24/01/2020