KNOWLEDGE AND COMPLIANCE WITH PREVENTIVE MEASURES OF NOSOCOMIAL INFECTIONS AMONG HEALTH CARE WORKERS IN EDO STATE

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BENIN CITY

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A THESIS WRITTEN IN THE DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION, FACULTY OF EDUCATION AND SUBMITTED TO THE SCHOOL OF POST GRADUATE STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY IN COMMUNITY HEALTH EDUCATION OF THE UNIVERSITY OF BENIN, BENIN CITY.

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CERTIFICATION

We, the undersigned, certify that this research was carried out by **Patience UWADIALE**, with matriculation number **PG/EDU1208771** in the Department of Health Safety and Environmental Education, Faculty of Education, University of Benin, Benin City.

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DEDICATION

I dedicate this work to the Almighty God the author and giver of life. I also dedicate this work to my daughter Chelsea Oseremen Uwadiale and my late son Eromonsele Lugard Uwadiale.

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ABSTRACT

This study examines the knowledge and compliance of Health care workers with preventive measures for nosocomial infections in Edo State. It addresses five research questions which were answered and three hypotheses were tested at 0.05level of significance. Using descriptive survey design, 478 samples were selected from a 4781 population, the multi stage sampling technique applied in the selection, in the first stage, nine wards were randomly selected from the three senatorial districts (Edo North, Edo South and Edo Central). In the second stage, 26 health facilities were chosen through cluster sampling and in the final stage, purposive sampling was used to select the participant. Data collected was facilitated through an adapted questionnaire, whose reliability was ensured via pilot testing of 20 participants that were not part of the study and conbach's alpha of 0.75 was attained. Research was analyzed using mean, standard deviation, frequency count and percentage, while hypotheses were tested using ANOVA at 0.05 level of significance.

Findings revealed that Healthcare workers have a moderate level knowledge about nosocomial infection prevention, but knowledge did not translate into compliance with preventive measures. Years of experience influence knowledge level but did not significantly impact compliance, while educational qualifications also showed no significant differences in compliance rate.

The study conclude that improving training programs, promoting consistent compliance practice, and ensuring the availability of necessary resources are crucial for enhancing health care workers' knowledge on nosocomial infection prevention. Recommendations include implementing targeted educational initiatives, conducting routine audit and reinforcing infection prevention measures to mitigate nosocomial infections and improve patient safety in

CHAPTER ONE

INTRODUCTION

Background to the Study

Health care professionals are essential to the healthcare system and have the primary responsibility for overseeing individuals' health throughout their lives. They play a vital role in the healthy development of individuals, families, and communities worldwide. The saying that health is equivalent to wealth applies to healthcare workers as well, even though they are obligated to care for others. According to Olatade and Ifeoluwa (2021), a thorough understanding of healthcare-associated infections and proactive strategies to prevent their spread among health care professionals will improve health management and the well-being of society.

Nosocomial infections represent a major global health challenge and are on the rise despite attempts to improve hospital infection control measures, which significantly affect morbidity and mortality rates. These infections, often called hospital-acquired infections, are described by Khan, Ahmad, and Mehboob (2015). Nosocomial infections develop in patients during their treatment in a healthcare facility, although they were not present or incubating at the time of admission.

Research conducted by Kelly, Kristin, and John (2012) determined that these infections typically arise 48 hours after admission for reasons unrelated to any pre-existing conditions. Globally, nosocomial infections impact hundreds of millions, contributing to elevated morbidity and mortality rates among hospitalized patients. They pose a serious threat to patient safety, making their ongoing surveillance and prevention a critical focus in safe healthcare environments (World Health Organisation, 2009). Health care workers (HCWs) are at an increased risk of contracting various infections while on duty.

Health Care Associated Infections affect over 1.4 million individuals worldwide (WHO 2010). The prevalence of hospital-acquired infections among healthcare professionals in developed nations ranges between 5% and 10%, while intensive care units see rates of 15% to 40% (WHO, 2010). In Africa, the rates of hospital-acquired infections vary from 2.5% to 14.8% in countries such as Algeria, Senegal, Nigeria, Burkina Faso, and Tanzania (WHO, 2012). These infections can be caused by bacteria, fungi, viruses, and parasites. Within hospital settings, healthcare personnel are tasked with activities like administering medications, managing wound care, and performing sterilization and disinfection procedures. They interact directly with patients more frequently than other staff, putting them at greater risk of contracting different nosocomial infections during their duties (Shinde and

Mohite, 2014). Therefore, healthcare workers significantly facilitate the spread of these infections, making their adherence to infection prevention protocols crucial. It is essential for healthcare workers to grasp how to prevent the transmission of nosocomial infections and the risks they pose to patients, families, and the wider community.

In the field of health promotion and prevention, the researcher has observed instances where healthcare workers handle contaminated instruments or linens without gloves, try to recap needles post-injection, neglect to clean stethoscopes following patient interactions, and fail to wash their hands consistently in clinical settings. A lack of proper knowledge and insufficient infection control practices among healthcare professionals contribute to the increase in hospital-acquired infections. Maintaining hand hygiene is the most effective method to prevent transmission within healthcare environments. A study by Nair and Hanumantappa (2014) conducted in India analyzed the knowledge, attitudes, and practices relating to hand hygiene among medical and nursing students at a tertiary healthcare facility, revealing that most students had a limited understanding of hand hygiene.

The study revealed that nursing students had a limited understanding of the importance of hand hygiene, which adversely impacted their attitudes and practices

regarding hand cleanliness. Healthcare professionals who practice good hand hygiene are less prone to acquiring hospital-acquired infections. Infections linked to healthcare environments significantly affect the quality and efficiency of medical services, and a report from the World Health Organization underscored that individuals in developing nations have a twenty-fold higher risk of nosocomial infections compared to those in developed countries (World Health Organization [WHO], 2012).

Hospitals frequently admit patients with infections, making them common places for the spread of diseases. Infected patients within hospitals can transmit viruses to fellow patients, healthcare staff, and visitors (Sydnor & Perl, 2011). Patients suffering from bacterial, hepatitis viral, and fungal infections can linger in a hospital setting, with these pathogens leading to conditions that vary from minor skin infections to severe ailments like sepsis (Sydnor & Perl, 2011). Vincent et al. (2021) agree that many healthcare-associated infections are transmitted by healthcare workers who do not follow proper handwashing procedures and neglect to change gloves between patient interactions. Healthcare personnel are at greater risk of exposure to pathogens due to their frequent contact with patients and their families, more than any other member of the healthcare team.

Grasping and adhering to nosocomial infection prevention strategies by healthcare workers is vital, as studies indicate that adherence to safety protocols in healthcare settings is often related to the staff's knowledge (Vincent et al., 2021). The Centers for Disease Control and Prevention (CDC, 2012) set forth standard precautions for infection control, which include hand hygiene, the use of personal protective equipment, respiratory/cough hygiene, safe handling of sharps, sterile instruments, and effective environmental practices. Nonetheless, despite the proven efficacy of these recommended procedures, there are low compliance rates among healthcare professionals. The lack of access to safety equipment or unfamiliarity with nosocomial infection guidelines may also affect healthcare workers' willingness to adhere to preventive strategies.

The emergence and spread of illnesses such as viral hemorrhagic fevers, including Ebola and Lassa, as well as the recent Coronavirus outbreak, are indeed remarkable.

Problem Statement

Healthcare-associated infections (HAIs), also known as nosocomial infections, present a serious threat to both patients and healthcare providers in Edo State, Nigeria. These infections, which occur within healthcare settings, are often

preventable, highlighting the necessity to close gaps in healthcare workers' knowledge and adherence to preventive strategies. The loss of healthcare professionals due to nosocomial infections can negatively affect families and entire communities. Research conducted by Dan-Nwafor, Ipadeola, Smout, Ilori, Adeyemo, Umeokonkwo, and Ihekweazu (2019) shows that healthcare workers comprised 7% of confirmed cases and 5.8% of deaths. The challenges can be divided into two main categories: lack of knowledge and inadequate compliance. Many healthcare workers lack access to current training on infection control and related resources, resulting in outdated or insufficient understanding. Even when they possess the correct information, healthcare workers may encounter hurdles such as time limitations, scarce resources, or workplace culture, obstructing their ability to consistently follow preventive measures. The consequences of this situation are significant. Increased rates of nosocomial infections lead to higher morbidity and mortality rates, extended hospital stays, and rising healthcare expenses. Moreover, healthcare workers face health hazards and may unknowingly act as infection carriers.

Despite the World Health Organization's defined safety protocols for managing hospital-acquired infections, challenges persist in Edo State. Tackling these issues is vital for improving patient safety, enhancing the quality of healthcare, and alleviating the financial strain on both the healthcare system and patients. This

study aims to pinpoint the underlying causes of knowledge and compliance deficits to foster a safer healthcare atmosphere for all personnel in Edo State.

Research Questions

The following research inquiries were investigated:

1. What is the extent of knowledge among healthcare workers regarding hospital-acquired infections in Edo State?

2. To what degree do healthcare personnel in Edo State follow guidelines for the prevention of hospital-acquired infections?

3. How knowledgeable are healthcare workers in Edo State about preventing hospital-acquired infections in relation to their experience?

4. How compliant are healthcare personnel in Edo State with infection prevention strategies based on their years of experience?

5. How does the educational background of healthcare workers influence their adherence to hospital-acquired infection prevention in Edo State?

Hypotheses

The following hypotheses were developed and tested at a significance level of 0.05.

1. Healthcare professionals in Edo State possess similar knowledge regarding the prevention of hospital-acquired infections, regardless of their years of experience.

2. Healthcare professionals in Edo State do not demonstrate significant differences in their compliance with preventive measures for hospital-acquired infections, irrespective of years of experience.

3. Healthcare workers in Edo State do not show significant variation in their adherence to preventive measures for hospital-acquired infections based on their educational credentials.

Purpose of the Study

This research was conducted to assess healthcare workers' knowledge and adherence to strategies for preventing hospital-acquired infections in Edo State. The study aimed to evaluate healthcare professionals' understanding of preventing hospital-acquired infections in Edo State in connection with their educational qualifications.

• To explore the compliance of healthcare workers with hospital-acquired infection prevention in Edo State in relation to their years of experience.

• To investigate how years of experience affect healthcare workers' knowledge about preventing hospital-acquired infections in Edo State.

• To evaluate the influence of education level on healthcare workers' understanding of hospital-acquired infection prevention in Edo State.

Significance of the Study

The researcher hopes that the results of this study will provide benefits to the government, relevant non-governmental organizations, and the healthcare workers involved in this research.

For the government, the results would heighten awareness among both federal and state Ministries of Health regarding the issues they face in protecting their healthcare workforce, which is currently compromised due to hospital-acquired infections.

National and international NGOs should identify key areas for intervention programs that could be initiated to safeguard healthcare staff while performing their duties.

It will also assist healthcare workers in developing and implementing strategies to reduce hospital-acquired infections within healthcare settings.

In summary, the insights from this research will significantly contribute to the prevention of hospital-acquired infections in Nigeria by enhancing healthcare

personnel's understanding and adherence to guidelines. This will also provide valuable perspectives for other researchers pursuing related studies.

Scope and Limits of the Study

The purpose of this research was to assess the understanding and compliance with nosocomial infection prevention strategies among healthcare professionals in Edo State. This study focuses on Medical Doctors, Laboratory Scientists, Pharmacists, Nurses, Community Health Workers (CHW), Community Health Officers (CHO), Community Health Extension Workers (CHEWs), and Health Attendants within selected health centers in Edo State, considering their educational qualifications and years of service. Knowledge and adherence are treated as independent variables, whereas healthcare personnel serve as the dependent variables.

****Limitations of the Study****

The researcher faced challenges related to the response and return rates from some participants, as complete participation was not achievable due to the demands of their jobs, which required considerable attention to patients.

Definition of Terms

To enhance clarity and comprehension, the following terms are defined operationally as they appear in this study:

Intention to practice: in this context, refers to the readiness of healthcare personnel to treat infected patients fairly in accordance with their professional ethical standards.

Normative belief evaluates an individual's perception of the consequences associated with their intended actions or practices.

Professional Norm: is an evaluation of the professional's expectations or codes related to specific actions or practices.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents a review of relevant literature, organized under the following subheadings:

• Theoretical and conceptual frameworks

• A summary of hospital-acquired infections

• Utilizing Personal Protective Equipment (PPE) to prevent hospital-acquired infections

• Environmental cleaning and disinfection

• General strategies for infection prevention and control

• Understanding how healthcare workers can prevent hospital-acquired infections

• Compliance of healthcare personnel in preventing hospital-acquired infections

• Overview of the reviewed literature

Theoretical Framework

This study will be based on the Health Belief Model (HBM).

HBM suggests that individuals' beliefs and perceptions about health risks and preventive strategies affect their behaviors.

Concepts:

1. Awareness: Understanding of hospital-acquired infections, their transmission methods, and preventive measures (like hand hygiene, sterilization, and isolation protocols) among healthcare staff.

2. Adherence: The degree to which healthcare personnel comply with established preventive guidelines and protocols.

3. Beliefs: The views held by healthcare workers regarding the importance and effectiveness of preventive measures.

4. Social Norms refer to the perceptions of healthcare staff about the expectations and support from peers and supervisors related to preventive practices.

5. Perceived Control indicates the level of confidence that healthcare workers have in their ability to carry out preventive measures.

6. Intentions: The goals healthcare workers set to follow preventive measures.

7. Actions: The actual compliance of healthcare personnel with preventive protocols.

Relationships:

- Knowledge, beliefs, intentions, and actions (HBM).

- Knowledge affects perceived behavioral control, which in turn impacts intention and actions (Theory of Planned Behavior - TPB).

- Beliefs influence subjective norms, which then affect intention and actions (TPB).

Hypotheses: 1. An increase in knowledge among healthcare personnel will result in more positive beliefs and intentions regarding preventive measures.

2. Greater perceived behavioral control among healthcare workers will lead to better compliance with preventive actions.

3. Healthcare staff with positive beliefs and encouraging subjective norms are more likely to show increased intentions and adherence to preventive protocols.

Conceptual Framework

Hospital-acquired infections represent a significant threat to patient safety and the overall standard of healthcare. Healthcare personnel (HCWs) play an essential role in preventing these infections, yet their knowledge and adherence to preventive practices often are inadequate. This conceptual framework aims to explore the connection between healthcare workers' knowledge and their adherence to strategies designed to prevent hospital-acquired infections. Healthcare personnel

(HCWs) are crucial in combating these infections; however, their compliance with preventive measures often falls short. The conceptual framework seeks to examine the relationship between the knowledge of healthcare workers and their adherence to strategies intended to prevent hospital-acquired infections.

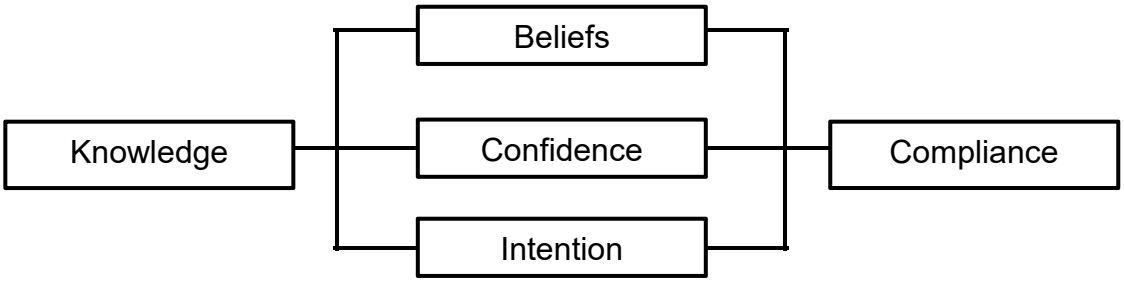

Figure 1: Schematic Diagram of Knowledge and Compliance

Knowledge includes healthcare professionals' comprehension of hospital-acquired infections, along with how they are transmitted and the preventive measures necessary, such as proper hand hygiene, sterilization techniques, and isolation protocols. However, simply having knowledge does not guarantee that protocols will be followed, as factors like belief, self-assurance, and intention are also essential for compliance.

The way preventive actions are perceived in terms of their importance and effectiveness affects how well they are followed. Confidence in their capability to apply these strategies is another element to assess prior to executing preventive measures. Plans for compliance and intentions are influenced by various factors

that can promote or obstruct adherence. For example, the ingrained habits of veteran healthcare providers and the availability or absence of prevention resources can impact the following of these protocols.

A summary of hospital-acquired infections outlines their categories, sources, and prevention strategies. A nosocomial infection refers to a condition that arises while a patient is hospitalized for a different issue, often called a hospital-acquired infection or a healthcare-associated infection.

Healthcare professionals in Nigeria face a significant risk of such infections. These nosocomial infections, or healthcare-associated infections (HAIs), occur within medical settings. Key contributors to the heightened risk of nosocomial infections in Nigeria include poor infection control measures, overcrowding, inadequate facilities, insufficient training and knowledge, limited resources, and the rise of multidrug-resistant organisms.

To tackle these challenges and reduce nosocomial infections among healthcare workers in Nigeria, a focus on infection prevention strategies is essential. This entails enhancing infrastructure, ensuring adequate training and resources, encouraging hand hygiene, establishing effective waste management practices, and creating monitoring systems to thwart the spread of infections in hospitals.

According to the NCDC (2018), the rate of nosocomial infections in Nigeria is alarmingly elevated. The overall incidence of such infections was reported at 19.5%. The most frequently noted nosocomial infections in the survey were surgical site infections (31.5%), urinary tract infections (22.8%), and bloodstream infections (19.9%). Additionally, the presence of multidrug-resistant organisms like methicillin-resistant Staphylococcus aureus (MRSA) and extended-spectrum bacteria has a significant impact on hospital environments. Nigeria is currently working to tackle the issue of nosocomial infections through initiatives aimed at improving infection control practices, enhancing hand hygiene adherence, initiating antimicrobial stewardship programs, and fortifying monitoring systems to identify and reduce the spread of multidrug-resistant organisms. Overall, the prevalence of nosocomial infections in Nigeria remains a serious concern that requires ongoing efforts to decrease their occurrence and enhance patient safety in healthcare environments.

Both patients and healthcare professionals can introduce pathogens into hospitals and transmit them to each other. Individuals may carry these bacteria without presenting symptoms, allowing for unnoticed spread. If a patient is admitted for surgery or another health issue, their immune system may be weakened, complicating the fight against these pathogens. Nosocomial infections manifest when microorganisms provoke illness within 48 hours post-hospital admission.

Healthcare workers in any medical setting have the potential to spread these infections, which, if not properly addressed, can result in more serious health complications.

Categories of Nosocomial Infections:

Typical hospital-acquired infections include the following:

Bacterial infections: Bacteria are tiny living organisms that are not visible without a microscope. While many are harmless, a small number can lead to significant health problems. Bacteria are the leading cause of nosocomial infections, with E. coli and Staphylococcus being two common examples.

Fungal infections: Fungi encompass living organisms like mushrooms, molds, and yeast. Certain fungi can lead to severe illnesses. The fungi that are most frequently associated with hospital-acquired infections are Candida (thrush) and Aspergillus. Viruses are microscopic pathogens that propagate throughout the body by resembling genetic material, tricking the body into producing copies of them, similar to how the body generates other cells.

Viruses can lead to serious health issues, with influenza and respiratory viruses frequently being sources of hospital-acquired infections.

Symptoms of hospital-acquired infections:

The indications of infections contracted in a healthcare setting can differ depending on the infection type. Typical symptoms may include fever, painful urination, cough, severe fatigue or weakness, swelling and tenderness around surgical or injection sites, excessive sweating, muscle pain, and nausea or vomiting.

Causes of hospital-acquired infections:

Various elements in a hospital environment can contribute to hospital-acquired infections.

Antibiotics: A physician might prescribe antibiotics to either prevent or treat an existing infection during your hospital stay. While some bacteria in your body are beneficial and help eliminate harmful germs, antibiotics can kill both good and bad bacteria, heightening your risk for hospital-acquired infections.

Urinary catheters are flexible tubes inserted into the bladder via the urethra. They can be essential during surgeries or situations when you cannot use the restroom for an extended time. Nonetheless, if a catheter remains in place too long, it may lead to a bacterial urinary tract infection. A central line is a tube connected to areas like the neck, chest, arm, or groin that delivers medication directly into the bloodstream. Pathogens can infiltrate through this line, leading to severe

bloodstream infections. These germs can persist on medical gloves, the skin surrounding the insertion point, and the external part of the line.

Inadequate cleaning before surgery: Surgical operations require incisions in your skin. If your skin, hair, or surgical equipment are not properly sanitized beforehand, harmful bacteria may enter your system.

Diagnosing hospital-acquired infections:

A physician will conduct tests to identify the type of illness contracted within a healthcare setting. They may take blood samples, gather material from your lungs, or perform various other examinations. Furthermore, they will assess your condition and inquire about your symptoms.

Ventilators are instruments that aid in breathing by moving air in and out of your lungs. Bacteria can reside within a ventilator and enter your body, potentially causing pneumonia.

Treatment of hospital-acquired infections:

Antibiotics are frequently utilized to manage hospital-acquired infections. Medical testing helps doctors pinpoint the bacteria responsible for your illness. Subsequently, your physician can prescribe antibiotics that specifically target the harmful bacteria while preserving the beneficial ones.

Rest: Recovery from an infection generally necessitates adequate rest for your body. Physical rest enables your immune system to effectively combat the infection.

Fluids: Staying well-hydrated is vital for your body while fighting an infection. If you are experiencing a fever, drinking water helps maintain your body's temperature and keeps your airways moist, which may reduce coughing. Your doctor might recommend that you drink abundant water, and you could also require receiving fluids through an IV.

Preventing hospital-acquired infections:

To avoid hospital-acquired infections, healthcare providers and caregivers should:

a. Sanitize skin and instruments

b. Frequently wash hands

c. Employ protective equipment such as facemasks and gloves

d. Regularly replace urinary catheters and remove them promptly

e. Shave hair in surgical areas

f. Prescribe antibiotics only when absolutely essential

Hand hygiene in preventing hospital-acquired infections:

Hand hygiene is essential for all infection prevention and control strategies aimed at reducing the transmission of infections in medical settings. Hand hygiene involves more than simply washing hands. According to NCDC (2017), hand hygiene includes any actions that diminish the number of microorganisms, such as hand washing, antiseptic hand washes, alcohol-based hand rubs, and surgical hand scrubs.

As stated by WHO (2014), hands that could be contaminated require thorough washing.

When hands are visibly clean, an alcohol-based hand rub should be used (WHO, 2014). Nevertheless, there are specific moments when hand washing is necessary, which include:

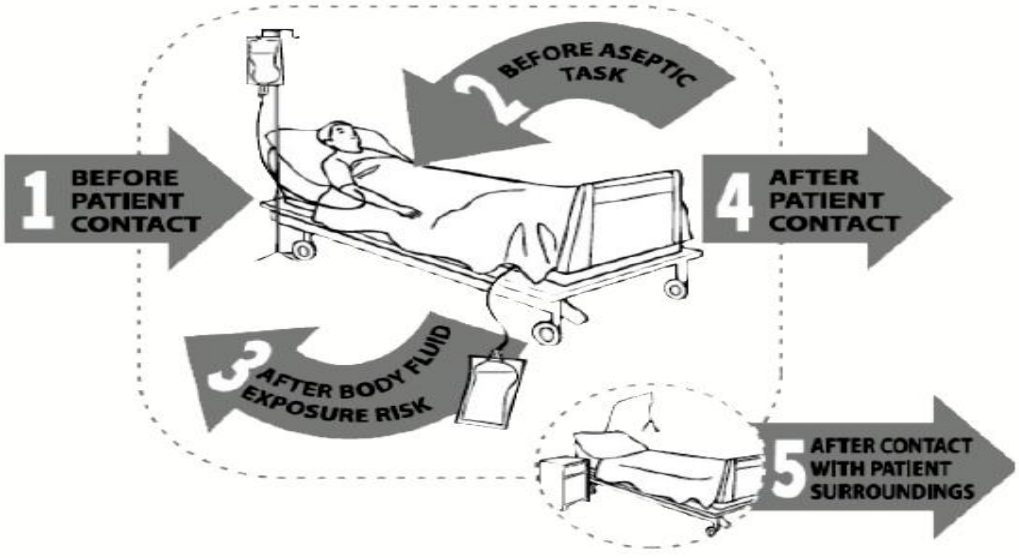

Figure 2: Moments for hand hygiene (NCDC 2017).

These can be summarized into five main moments for health care personnel to wash their hands, which include the ones mentioned above. These are depicted in Figure 2.

- Before touching a patient

- Before clean/aseptic procedures

- After body fluid exposure

- After touching a patient

- After touching patient surroundings - Between procedures

- When travelling from one patient to another.

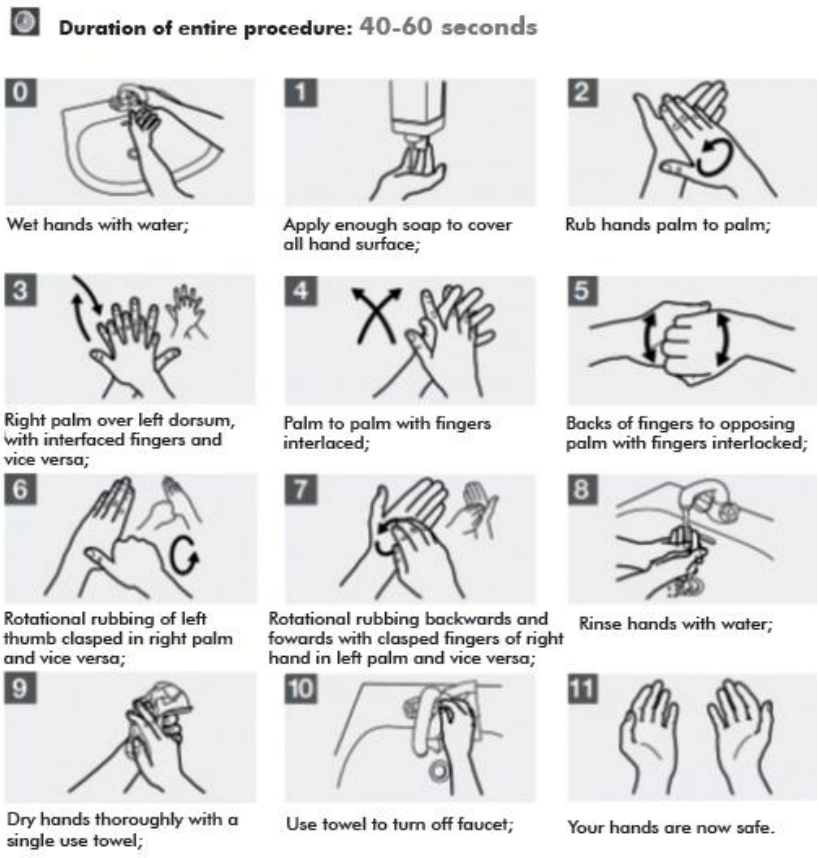

Figure 3: Proper Handwashing Procedure (NCDC 2017).

Practicing hand hygiene after interacting with a patient's surroundings is often neglected or misunderstood by healthcare workers (NCDC, 2017).

The healthcare setting includes everything located within the patient's immediate area (such as the bed, heart/saturation monitors, patient documents, and bedside furniture).

Healthcare professionals should maintain proper hand hygiene after coming into contact with these items or surfaces.

Handwashing techniques must be accurately followed to ensure infection-free healthcare practices and treatments.

This process typically takes about 40 to 60 seconds to complete, as illustrated in figure 3.

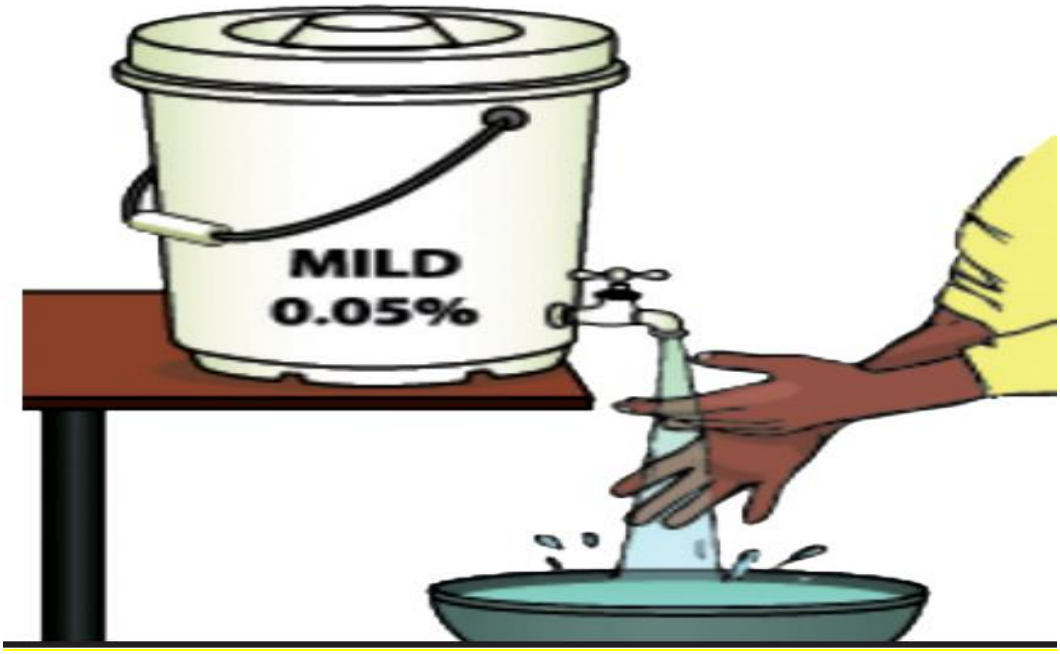

Figure 4 shows a tap bucket with 0.05% chlorine solution (NCDC 2017).

As depicted in Figure 4, water for hand washing should have a chlorine concentration of 0.05, while a higher concentration of 0.5 is advised for sanitizing floors or the surrounding area (NCDC, 2017). Required items for proper hand washing consist of chlorinated running water at a 0.05 concentration, soap (preferably liquid), disposable clean towels, and an alcohol-based hand sanitizer.

Additionally, the WHO (2014) emphasized the following best practices for maintaining hand hygiene:

• Avoid the use of artificial nails or extensions when interacting with patients.

• Keep natural nails trimmed to a length shorter than 0.5 cm, approximately ¼ inch.

• Ensure the skin on your hands is healthy.

• Refrain from wearing jewelry such as rings, wristwatches, or bracelets.

• Make sure your hands are completely dry before beginning any task.

• Use a disposable towel to dry your hands.

Table 1: Applications of Chlorine Solutions for Disinfection

Solution	Uses
0.5%	o Disinfection of body fluids o Disinfection of corpses o Disinfection of toilet and bathrooms o Disinfection of gloved hands o Disinfection of floors o Disinfection of beds and mattress covers o Disinfection of footbaths
0.05%	o Disinfection of bare hands and skin o Disinfection of medical equipment o Disinfection of laundry o Washing up of plates and eating utensils

Adapted from Respiratory Hygiene and Cough Etiquette (NCDC, 2017).

While there is no epidemiological evidence suggesting airborne transmission of Lassa fever among humans (WHO, 2014; 2017), it remains essential for healthcare professionals to uphold proper respiratory hygiene and coughing protocols. One could argue that prioritizing respiratory hygiene and cough etiquette is necessary to guarantee comprehensive protection against infections and accidental exposure to blood or other bodily fluids. Coughing and sneezing pose an increased risk as they can release larger droplets alongside aerosols onto healthcare workers or nearby surfaces. Viral hemorrhagic fevers are primarily transmitted between individuals

through direct contact with the infected person's contaminated blood or bodily fluids, or by touching surfaces contaminated with these secretions. The virus is commonly spread via contact with oral or mucous membranes (such as eyes, mouth, and nose) or through any skin breaches (WHO, 2014). Therefore, because of the potential for airborne transmission via coughing and sneezing, which can expel significant amounts of contaminated material, the NCDC (2017) recommended that patients diagnosed with Lassa fever be given either a filtering face piece (FFP) or a surgical mask upon their admission to the hospital (an FFP without an expiratory valve is preferred since masks with valves may impede the patient's breathing).

Adopting respiratory hygiene and cough etiquette includes several measures. Adebayo, Labiran, and Imarhiagbe (2015) have defined respiratory and cough etiquette as covering one's mouth and nose when sneezing or coughing, practicing hand hygiene after touching respiratory secretions, and isolating individuals displaying acute febrile respiratory symptoms. The Centers for Disease Control and Prevention (CDCP) (2011) indicated that in instances of viral hemorrhagic fever, an N95 or P3 respirator may be essential. Standard precautions should always be employed with every patient, regardless of their diagnosis, across all work practices, which include thorough hand hygiene, respiratory hygiene,

utilizing personal protective equipment based on the risk of splashes or contact with infected materials, and safe injection practices (Adebayo et al., 2015).

All healthcare workers, patients, and visitors should adhere to effective respiratory and cough etiquette. According to WHO (2014), everyone, including healthcare staff, patients, and hospital visitors, should follow these guidelines:

- Cover your mouth and nose when coughing or sneezing.

- Practice proper hand hygiene after coming into contact with respiratory secretions.

- Offer single-use tissues or medical masks in the waiting area and dispose of used tissues in no-touch containers; then, wash your hands.

If tissues, cloths, or face masks are unavailable, it is recommended that staff, healthcare workers, patients, and visitors use their arm or forearm to shield their nose and mouth while coughing or sneezing.

- For individuals displaying respiratory symptoms: (1) Use a tissue or mask to cover your nose and mouth when coughing or sneezing. (2) Maintain a distance of one meter from those showing acute febrile respiratory symptoms.

Personal Protective Equipment (PPE) for Healthcare-Associated Infections

Studies have shown that the regular and effective use of protective barriers or Personal Protective Equipment (PPE) reduces healthcare workers' skin and mucous membrane exposure to blood and bodily fluids by creating a physical barrier. Abdulraheem, Amodu, Saka, Bolarinwa, and Uthman (2012); CDCP (2011); WHO (2015). These protective devices decrease the chances of healthcare workers' skin or mucous membranes encountering potentially infectious materials. However, Adebayo et al. (2015) contend that merely providing protective barriers is inadequate; supplementary precautions must be taken to prevent injuries while handling needles, scalpels, and other sharp instruments.

Protective barriers should be employed whenever there is a possibility of exposure, and hands or skin must be thoroughly washed immediately after contact with blood or bodily fluids. In case of exposure, the standard post-exposure prophylaxis (PEP) protocol must be followed.

Healthcare workers' compliance with wearing personal protective equipment (PPE) is affected by the risks associated with the treatment or care procedures. As per NCDC (2017), the necessity for PPE should be based on the tasks being performed and the level of risk present. Due to concerns about infection, healthcare workers, especially in areas where Lassa fever is common, might choose to wear all

available PPE for greater safety. However, WHO (2014) warns against this practice, as it may create unnecessary anxiety for patients. This anxiety could negatively affect their psychological well-being, which is a vital component of care and recovery. Such stress might potentially traumatize patients and influence their determination to recover. The focus should be on using suitable PPE according to the specific task and risk assessment. The following discussion will concentrate on the appropriate PPE to be used based on the task at hand and associated risk. Table 1 consolidates findings from the literature (Adebayo et al., 2015; NCDC, 2017; WHO, 2014) to provide a foundation for knowledge and practice evaluation regarding PPE usage.

Additionally, NCDC (2017) advises the following preventive and control measures concerning PPE:

"Based on the specific task and risk assessment, additional PPE may include disposable overshoes and leg coverings.

- Use heavy-duty (rubber) gloves when cleaning or managing waste.

- Employ a particulate respirator (FFP2/FFP3, or an equivalent approved by EN or US NIOSH-approved N95) for tasks that generate aerosols.

- Personal clothing is not permitted in the general access or low-risk zones of the isolation unit, hence scrub suits and boots must be worn.

- After exiting the care area, disinfect the PPE before removal. Carefully take off and dispose of PPE (including boots) in designated containers, and ensure hand hygiene is practiced.

- While removing PPE, keep contaminated items (e.g., gloves, gowns) away from the body.

- After doffing PPE, wash hands with a 0.5% chlorine solution.

- Reusing disposable PPE is prohibited.

- After doffing, sanitize bare hands with a 0.05% chlorine solution.

PPE should be worn for a duration of 45-60 minutes due to the inspiratory resistance created by the respirator.

- This time frame results in fluid loss from perspiration.

- Removing the respirator typically necessitates at least 15 minutes (NCDC, 2017).

Grasping the correct techniques for donning and doffing personal protective equipment (PPE), as well as proper conduct during these actions, is essential for its effective usage. This importance stems from the fact that the main objective of PPE, which is to prevent infection, can be compromised if errors occur due to improper application, handling, and removal of the equipment. Consequently, established guidelines provide instructions on the correct methods for donning and

doffing PPE to ensure maximum safety. It is evident that level/procedure 0 requires PPE in a low-risk area, comprising surgical tunics and pants, disposable gloves, and rubber boots. Depending on specific tasks and assessed risks, face shields and respirators could also be necessary (WHO, 1998; NCDC, 2017). In contrast, procedures 1-6 are intended for high-risk environments where confirmed or suspected Lassa fever cases are treated or isolated.

In low-risk healthcare environments, utilizing the PPE specified in procedures 1–6 can create difficulties, as it may cause unnecessary worry and distress for patients. Essentially, the procedure for doffing emphasizes that all gear must be sanitized with 0.5 chlorinated water prior to removal, excluding the face shield and respirator. After taking off each piece of equipment, it is crucial to wash hands thoroughly with 0.05 chlorinated water. This process requires careful attention due to the possibility of infection transmission, which could lead healthcare providers to rethink their use of PPE if they fail to adhere to proper protocols (NCDC, 2017). According to WHO (2014), individuals wearing PPE should refrain from touching or adjusting it, remove gloves if they become twisted or damaged, change gloves between patients, and maintain hand hygiene before putting on new gloves.

The risk of infection transmission is significant with sharp instruments such as hypodermic needles, scalpels, blades, biopsy needles, and other similar tools, which must be managed and stored appropriately (CDCP, 2011; WHO, 2004). It is highly recommended to use safer alternatives, like retractable lancets (WHO, 2014). Adebayo et al. (2015) suggest that authorities advise against recapping needles after they have been used, disposing of sharps in secure, puncture-resistant, leak-proof, clearly labeled, and color-coded containers that indicate biohazard, while minimizing invasive procedures to lower the likelihood of accidental injuries. Needle stick injuries often occur during recapping, disassembly, and improper disposal. Adhering to standard recommendations for handling finger-stick injuries is essential. In the event of an accidental needle stick, the Post Exposure Prophylaxis (PEP) protocol must be initiated immediately (Adebayo et al., 2015).

In conclusion, the IPC guidelines from WHO (2014) recommend the following for the safe management and handling of sharp instruments:

- Caution should be exercised when handling, using, cleaning, and disposing of sharp items.

- Bending, breaking, or manipulating used needles, scalpels, or other sharp objects should be avoided.

- Needles should not be recapped.

- A sharps container should be readily accessible during injections. Single-use needles and syringes should be disposed of immediately after use in the sharps receptacle, without recapping or passing them to others. WHO (2014) also emphasizes that sharps containers must be closed, sealed, and incinerated before reaching full capacity.

Improper disposal of medical waste, particularly that which is contaminated with pathogens, can lead to the outbreak of diseases. An insufficient disposal site could serve as a breeding ground for infectious agents, enabling transmission from animals to people, from materials to people, and eventually from one individual to another. The established infection prevention and control (IPC) guidelines for the safe disposal of medical waste (WHO, 1998, 2014; NCDC, 2017) stipulate that waste tainted with blood, bodily fluids, secretions, excretions, human tissue, and laboratory materials associated with specimens should be categorized as clinical waste.

- Waste should be classified into four classifications at the origin: sharps, non-sharps, infectious waste, non-sharp non-infectious waste, and hazardous waste.

- Proper disposal of single-use items is critical.

- When dealing with infectious waste (such as solid waste, secretions, or excretions containing visible blood), personal protective equipment (PPE) and durable or rubber gloves should be worn. Goggles offer better protection than visors against splashes when pouring liquid waste from containers. It is important to take care to avoid splashes when disposing of liquid infectious waste.

- Sharp objects and tubes that have been in contact with blood should be disposed of in puncture-resistant containers, such as needles, syringes, and glass items, which should be positioned as close as possible to their point of use.

- Use leak-proof bags and covered containers to collect solid, non-sharp medical waste.

- Manually handling infectious solid waste can lead to accidents or injuries from infectious substances or improperly disposed sharps. Instead, a covered cart or wheeled container with a lid should be used.

- It is crucial to clean and sanitize the environment for effective infection prevention and control in healthcare facilities. Healthcare personnel should employ suitable methods to disinfect their workspaces and tools. Standard recommendations (NCDC, 2017; WHO, 2014) suggest using a 0.5% chlorine solution for sanitizing the work area and disinfecting equipment. The use of sprays for disinfectants is not advisable.

- According to NCDC (2017), "the application of disinfectants through spraying (i.e., fogging) in clinical settings, whether occupied or not, poses potential risks without providing any clear advantages for disease control." Specific IPC protocols exist for cleaning and disinfection. WHO (2014) recommends that floors and flat surfaces be cleaned on a daily basis; cleaning should be conducted from "clean" areas to "dirty" areas to prevent the spread of contaminants; dry sweeping with a broom should be avoided; dust rags should not be shaken; and dry cloths should not be used to wipe surfaces. Additionally, utilizing a damp cloth minimizes the risk of airborne particles, and cleaning should occur prior to disinfection (WHO, 2014). Linens from patients may carry infectious disease pathogens (Towey 2014). Personal protective equipment (PPE) should be utilized when handling such linens (WHO, 2014). The National Centre for Disease Control and Prevention (NCDC) advises that heavily soiled linens should be separated from non-infected ones within the patient's room to assist with laundry processes. Linens must be taken directly to the laundry area and washed promptly with water and detergent. They should be washed with detergent and water, rinsed, and then soaked for 30 minutes in a 0.05% chlorine solution (NCDC, 2017). The National Infection Prevention Control Guideline (NCDC) discourages the hand-washing of soiled linens. However, in instances where washing machines are unavailable, which is common in many Primary Health Care Centres (PHCs) across the country, the NCDC

recommends soaking soiled linens in hot water within a large drum, ensuring the linens are covered. A stick should be employed to agitate the contents of the drum before disposing of the hot water.

- Historical outbreaks provide substantial evidence that primary transmission routes for Viral Haemorrhagic Fever (VHF) involve direct contact (through damaged skin or mucous membranes) with blood or bodily fluids as well as indirect contact with environments contaminated by splashes or droplets of blood or body fluids (WHO, 2014). Consequently, all personnel in healthcare facilities, particularly those directly involved in the care and treatment of infected patients, laboratory staff, and cleaning or environmental workers, must meticulously follow standard precautions, droplet precautions, and contact precautions. The Advisory Committee on Dangerous Pathogens (2012) emphasized that while the epidemiology during VHF outbreaks does not indicate airborne transmission, measures should be taken to protect healthcare workers, family members, and other patients during procedures that could aerosolize the virus. Here are the standard practices recommended by WHO (2014) and followed by the NCDC (2017) for infection control:

- Ensure effective hand hygiene, respiratory etiquette, and appropriate coughing behavior.

- Utilize suitable personal protective equipment (PPE) based on risk evaluation at the point of care.

- Prevent injuries from sharp instruments.

- Dispose of waste securely.

- Clean and disinfect the surrounding area.

- Safely handle contaminated linens.

- Disinfect equipment used in patient care.

- Use aseptic techniques.

Awareness among healthcare personnel

The phenomenon of nosocomial infections has been recognized for nearly a century, with sterilization acknowledged as a strategy to prevent the spread of infections between patients and healthcare professionals. Heightened awareness enables healthcare staff to understand the importance of patient care while gaining a comprehensive knowledge of universal standard precautions. As per the standards set by the Wisconsin Department of Health, these precautions encompass: proper hand hygiene, utilization of personal protective equipment (gloves, masks, and goggles), respiratory hygiene/cough etiquette, sharps safety (including engineering controls and work practices), safe injection techniques (employing

aseptic methods for parenteral medications), sterile instruments and devices, as well as the cleaning and disinfection of environmental surfaces.

A study by Olatade and Ifeoluwa (2021), which examined the knowledge and preventive practices concerning nosocomial infections among healthcare workers in two tertiary facilities in Ogun state, revealed that healthcare personnel demonstrate a strong understanding of nosocomial infections. This aligns with research conducted by Arinze-Onyia, Ndu, Aguwa, Modebe, and Mwamoh (2018), which investigated the knowledge and practices of healthcare workers regarding standard precautions. The findings indicated a correlation between years of experience and the incidence of nosocomial infections, rather than a direct causative link, as suggested by other investigations. Healthcare professionals not only possess awareness about nosocomial infections but also grasp the methods of prevention and control of these infections.

A different study by Nag, Datta, Karmakar, and Chakraborty (2018) found that a significant majority of healthcare workers (87.4%) demonstrated knowledge about Hospital Acquired Infections (HAI). Survey respondents indicated that urinary tract infections (60.5%) ranked among the most prevalent hospital-acquired conditions, closely followed by respiratory tract infections (35.3%). Nurses were identified as the group most at risk for HAI (34.6%), with sweepers following at (31.9%). Moreover, 84.3% of those surveyed acknowledged their understanding of

how to prevent hospital-acquired infections. Hand washing emerged as the most frequently mentioned preventive practice (66.5%), succeeded by the use of PPE (22.4%) and medications (6.8%). Mattresses and pillows were noted as common sources of hospital-acquired infections, trailed by white coats, nurse uniforms, thermometers, and mobile devices.

Various empirical studies have explored this topic in relation to different factors. Ojulong, Mitonga, and Lipinge (2013) examined the knowledge and attitudes of health science students regarding infection prevention and control at the University of Namibia. To gauge students' comprehension and views on infection prevention and control, alongside the sources of their information—focusing on routine practices like hand hygiene—a self-administered questionnaire was utilized. This study involved 132 participants: 31 medical students, 17 radiography students, and 114 nursing students. The results from Ojulong et al indicated that medical students attained a higher average score overall (73%) compared to nursing students (66%) and radiology students (61%). No significant differences in scores were evident based on gender or whether participants attended high school in a rural or urban area.

Arinze-Onyia, Ndu, Aguwa, Modebe, and Nwamoh (2018) assessed the knowledge and adherence of healthcare personnel to Standard Precautions (SP) in a tertiary healthcare setting in Enugu, Nigeria. Their research found that among the 629

healthcare workers surveyed, the majority were female (64.4%), married (62.3%), identified as Christian (94%), and were within the age range of 20 to 59 years. A large segment of nurses (46.1%) operated in the wards. More than 90% of participants were familiar with SP, primarily through formal education (62%). Over 70% were able to define SP, 74.6% knew when SP was necessary, and over 70% recognized most elements of SP. A significant majority believed that SP is essential and felt that organizations should provide training.

The majority of participants engaged in hand hygiene after taking off their gloves (73.6%) and prior to exiting the patient's area (33.1%). Over 70% had contact with patients' bodily fluids and disinfected the affected area using soap, water, and disinfectant (52.1%). Gloves were the most frequently utilized personal protective equipment (PPE) (53.4%), with inconsistent availability cited as the main reason for their irregular use (57.7%). More than half of the respondents recapped needles before disposing of them. Doctors and nurses were significantly more exposed to patient serum ($P < 0.05$), while laboratory scientists reported the greatest use of personal protective equipment (82.4%). Those who had received training in Standard Precautions (SP) (70.8%) and PPE (69.7%) were significantly more likely to utilize PPE ($P < 0.05$). Arinze-Onyia et al emphasized the importance of training in SP and the reliable provision of PPE to promote adherence to SP.

Mukwato, Ngoma, and Maimbolwa (2015) performed a study in Zambia aiming to evaluate health professionals' practices and compliance with essential infection prevention measures. They collected data using a self-administered interview schedule and an observational checklist, employing a convenient sampling technique. The study included 77 healthcare professionals such as doctors, registered midwives and nurses, enrolled midwives and nurses, clinical officers, laboratory technicians, and physiotherapists. Additionally, 40 out of the 77 healthcare workers observed were involved in at least one practice that required compliance with Infection Prevention (IP) guidelines. Mukwato et al found that strong compliance correlated with embedding guidelines into the curriculum, a solid understanding of infection prevention and hospital-acquired infections, a favorable attitude towards infection prevention, and the availability of infection prevention resources.

The results demonstrated varying levels of adherence to different aspects of infection prevention. The highest compliance level (100%) was recorded when needles and syringes were used solely once, while the lowest (35.1%) occurred when needles and syringes were disinfected with a 0.5% chlorine solution prior to disposal. Compliance with hand hygiene was moderate at 61%. In conclusion, the study emphasized the significance of knowledge regarding Infection Prevention and Control (IPC) as a vital factor influencing practice.

HCWs' Adherence to Infection Control Protocols

According to Ellison (2000), between 96-99% of healthcare workers wore gloves for at least 95% of their working hours. A nationwide study in England found that 99% of HCWs reliably donned gloves during trauma situations, but only 18-22% engaged in using face masks and eye protection (Sudaram and Parkinson, 2007).

The research outcomes highlighted varying levels of adherence to different infection prevention components. The highest compliance (100%) was noted when needles and syringes were used exclusively once, while the lowest (35.1%) was found when needles and syringes were decontaminated with a 0.5% chlorine solution before disposal. Hand hygiene compliance was moderate at 61%. In summary, the research underscored the substantial influence of understanding infection prevention and control (IPC) on practical adherence.

Healthcare Workers' Compliance with Infection Control Protocols

As noted by Ellison (2000), between 96-99% of healthcare workers utilized gloves for at least 95% of their work hours. A national survey conducted in England revealed that 99% of healthcare workers consistently wore gloves in emergency situations, while only 18-22% made use of face masks. Nurses frequently fear contracting infections. According to Stein et al. (2003), 86% of healthcare staff in the United Kingdom treated patients under the belief that they possibly had blood-

borne infections. The CDC (2002) observed that 53.3% of nurses and midwives expressed concern about occupational exposure, particularly when dealing with HIV-positive patients, and 93.4% preferred to be informed about a patient's HIV/HBV/HCV status.

Nurses in Uganda reported experiencing various forms of physical, psychological, and spiritual distress due to ethical dilemmas, which negatively impacted their capacity to deliver care. Over time, these nurses lost their sense of professional duty, leading to a decline in their professionalism as they faced ongoing challenges (Harrowing & Mill, 2010).

Research by Stein et al. (2003) indicated that 86% of healthcare professionals in the UK treated individual patients under the assumption that they might have blood-borne infections. The CDC (2002) found that 53.3% of nurses and midwives expressed concerns about occupational exposure, particularly during interactions with HIV-positive patients, with 93.4% desiring to know a patient's status for HIV/HBV/HCV. Nurses in Uganda experienced various symptoms resulting from moral distress, which hindered their ability to deliver adequate patient care. Gradually, these nurses lost sight of the importance of their roles, and their professionalism waned due to the constant challenges they encountered (Harrowing & Mill, 2010).

A study at Mulago National Referral Hospital revealed that healthcare workers possess a good understanding of healthcare-associated infections (HCAIs) but demonstrate low levels of practical adherence (Charles et al. 2010). Nurses may feel pressured to disregard universal precautions when resources are lacking or when no clear guidelines are available, resulting in poor compliance with infection control protocols (Nderitu et al. 2015). Research involving 65 nurses and several physicians in intensive care and surgical departments across five hospitals of different sizes in the Netherlands showed that handwashing was often done only when healthcare professionals believed they had recently come in contact with patients; however, it was frequently overlooked by senior staff who lacked proper role models in the hospital and convincing evidence on the importance of hand hygiene in preventing cross-contamination (Erasmus et al 2009). Care providers often sustain injuries while delivering care, and many of these go unreported, contributing to a negative outlook (Mondiwa, 2007). About 42% of the 51% of American trainee surgeons reported having sustained injuries while treating patients (Makary et al., 2007). According to Burke and Madan (1997), 64% of the 91% of UK doctors and 29% of the 54% of UK nurses who reported injuries attributed them to insufficient time for patient care, which resulted in a negative perception of post-exposure prophylactic measures, as they regarded time as less critical compared to the chance of contracting HBV or other bloodborne pathogens.

A study involving 65 nurses and certain physicians in intensive care and surgical units across five hospitals of varying sizes in the Netherlands found that hand washing was only carried out when healthcare professionals believed they had previously interacted with patients. Surgeons who reported injuries indicated that Personal Protective Equipment would not have prevented the harm (Makary et al. 2007). A study conducted at Mulago Hospital suggested that handwashing was viewed as more important for individual safety rather than preventing cross-transmission among patients, reflecting the prevailing belief that infection control is crucial for maintaining a safe work environment (Charles et al., 2010).

To effectively prevent and manage healthcare-associated infections (HAIs), most hospitals have created written, measurable benchmarks (Sarani, 2014). This initiative aims to address fundamental issues and prevent transmission, making it vital for ensuring quality patient care. Nurses are instrumental in decreasing the rate of nosocomial infections while tending to patients (Yatin et al., 2014). This practice involves understanding the principles that support informed decision-making. Therefore, having sufficient information, a positive attitude, and effective practices is essential for aiding and serving patients (WHO, 2010).

In a study conducted in Ethiopia, doctors indicated that they adhered to hand hygiene protocols only 7% of the time before patient interactions and 48% after. Factors hindering proper hand hygiene included a lack of hand hygiene supplies (77%), inadequate sinks (30%), and insufficient training (50%). Other challenges to maintaining hand hygiene also encompassed a shortage of supplies (77%), sinks (30%), and proper training (50%), as well as irritation and dryness caused by WHO-approved hand sanitizers (Admasu, 2008). A research project by African Health Sciences (2005) at Makerere Medical School sought to encourage handwashing as a quality care practice and a measure to prevent infections acquired in hospitals in Eritrea. It assessed handwashing practices at Keren Hospital through semi-structured interviews and focus groups involving 34 hospital staff members and 30 patients from medical, surgical, and obstetric wards. Additionally, direct observations of handwashing techniques and facilities were conducted. Only 30% of healthcare staff practiced hand hygiene between patient visits. The study concluded that there is a significant need for global improvement in handwashing practices among hospital healthcare workers, emphasizing that complacency should not be tolerated, especially among women of reproductive age.

The Uganda Ministry of Health (MOH, 2013) states that hygiene is the most critical method for preventing nosocomial infections in hospitals or healthcare

settings, and proper hygiene can reduce contamination levels by 70%. Hygiene within a health facility encompasses personal hygiene, which refers to individual cleanliness; facility hygiene, which involves maintaining a clean environment to minimize microbial presence and the risk of infection transmission; instrument hygiene, which pertains to sanitizing all tools used in patient care; and hand hygiene, which remains the most effective method. In Anambra State, Nigeria, Osuala and Oluwatosin (2017) researched nurses' understanding, attitudes, and practices concerning infection control, as well as barriers to implementation, to collect data informing future interventions designed to enhance practices. A descriptive survey involving a sample of 197 nurses was conducted. The findings revealed that 84 (42.6%) of the participants indicated their hospital had an infection control unit, while 66 (34.1%) reported the existence of an infection control committee. Only 20 (10.2%) participants achieved a knowledge score above 60%, with 170 (86.3%) and 120 (60.9%) scoring above 60% for their attitudes and practices, respectively. Only 5 respondents (2.5%) strongly agreed on the importance of hand hygiene in preventing infections. As a result, the authors emphasized the necessity of exploring the discrepancies between knowledge, attitudes, and practices. Tobin, Alice, Akhere, Ikponwonsa, and Grace (2013) investigated the knowledge and adherence to standard precautions (SP) among healthcare providers in Edo State, Nigeria. A descriptive cross-sectional study was

performed with consenting doctors, nurses, laboratory technicians, and health attendants in the clinical departments of a rural tertiary teaching hospital. Data were gathered using structured self-administered questionnaires that focused on knowledge and practices regarding hand hygiene, glove and protective gown usage, and sharp management. The results indicated that one hundred and ninety-three (93.2%) participants were aware of the standard precautions. Among the respondents, 11 (5.7%) showed a low understanding of SP, while 85 (44.0%) had acceptable knowledge, and 97 (50.3%) displayed excellent comprehension. Knowledge was significantly associated with profession ($p = 0.00$), with doctors showing the highest level of good knowledge, whereas porters had the lowest. Eight (3.9%) respondents reported poor adherence to standard precautions, 103 (49.8%) complied moderately, and 96 (46.8%) complied well. Compliance was significantly linked to the occupation ($p = 0.00$), with nurses demonstrating the highest level of good practices.

Aigbiremolen, Duru, Awunor, Abejegah, Abah, Asogun, and Eguavoen (2012) investigated the awareness and methods concerning Lassa fever control among primary healthcare workers in Esan West and Esan Central Local Government Areas of Edo State. This research utilized a cross-sectional survey targeting health professionals across 34 primary care clinics located in regions where Lassa fever is endemic, employing 231 self-administered semi-structured questionnaires.

Knowledge was evaluated using a scoring system consisting of ten questions. The results were illustrated through various tables and figures. Every participant recognized Lassa fever, with 77.9% demonstrating a strong knowledge of disease control, while 9.1% had insufficient knowledge. There was no significant association between the level of knowledge and the designation of health workers ($\chi 2=8.99$, df=4, $p>0.05$). Only 13.0% and 16.9% consistently practiced barrier nursing and hand washing to mitigate the spread of the infection. Although there was a general awareness of Lassa fever, the adherence to standard preventive measures was lacking. As a result, Aigbiremolen et al. highlighted the necessity for continual education and retraining of primary care staff to lower the risk of nosocomial infections. Factors that influence standard infection prevention practices include the high occurrence of Hospital Acquired Infections (HAIs) in patients and healthcare professionals in developing countries, as indicated by Oluwagbemiga, Akinsete, Ana, and Ogunseye (2021). This may stem from issues like understaffing, improper personnel distribution, motivation challenges, attitudes toward hospital protocols, insufficient hygiene and sanitation, absence of essential equipment, poor infrastructure, overcrowding, and limited financial resources. Olalekan, Olusegun, Olufunmilayo, and Lanre (2012) noted that both awareness and knowledge regarding HAIs, nosocomial pathogens, and associated risks are lacking even among healthcare workers (HCWs); while some awareness

exists, adherence to hand hygiene protocols was found to be inadequate in a study performed at Lagos University Teaching Hospital and various facilities in Southeast Nigeria. Ekwere and Okafor (2013) and Oli et al. (2016) revealed that hygiene practices were significantly lacking. Oluwagbemiga's (2021) study showed a considerable level of understanding; however, adherence was not consistently observed, mainly due to the distance from water sources to the wards. Therefore, it was recommended that water supplies should be provided closer to the wards.

When exploring the factors influencing the adoption of standard infection prevention practices, socio-demographic elements should also be factored in. A study carried out by Bayleyegn, Mehari, Damtie, and Negash (2021) at the University of Gondar Comprehensive Specialized Hospital in Northwest Ethiopia assessed knowledge, compliance, and practices relevant to the prevention of hospital-acquired infections. Despite adequate knowledge being present, only 36% participated in safe infection prevention practices. The findings indicated that the educational background and levels of experience among HCWs significantly influenced their practices concerning HAIs. Years of experience and education were shown to positively impact their attitudes and behaviors. This literature review encapsulates critical components of preventing and controlling nosocomial infections, underscoring the theoretical framework, an overview of nosocomial

infections, the cleaning and disinfection of healthcare settings, comprehensive strategies for infection prevention and control, as well as the knowledge and compliance of healthcare workers in addressing nosocomial infections. The Theory of Reasoned Action (TRA) is often utilized to frame the understanding of nosocomial infection prevention, emphasizing the significance of healthcare staff's knowledge and subjective norms that shape their attitudes and behaviors regarding infection prevention and control.

A separate investigation by Nag, Datta, Karmakar, and Chakraborty (2018) revealed that a substantial majority of healthcare workers (87.4%) possess knowledge regarding Hospital Acquired Infections (HAI). Participants in the survey indicated that urinary tract infections (60.5%) were among the most commonly encountered hospital-acquired conditions, closely followed by respiratory tract infections (35.3%). Nurses were indicated as the group most at risk for HAI (34.6%), followed by sweepers (31.9%). Additionally, 84.3% of respondents in the study recognized methods to prevent hospital-acquired infections. Hand washing was the most frequently cited preventive action (66.5%), succeeded by the use of PPE (22.4%) and medications (6.8%). Mattresses and pillows were acknowledged as prevalent sources of hospital-acquired infections, with white coats, nurse uniforms, thermometers, and mobile phones following closely behind.

Numerous empirical studies have examined this topic in relation to various factors. Ojulong, Mitonga, and Lipinge (2013) investigated the knowledge and attitudes of health science students regarding infection prevention and control at the University of Namibia. To assess students' comprehension and views on infection prevention and control, particularly focusing on routine measures like hand hygiene, a self-administered questionnaire was utilized. This research comprised 132 participants: 31 medical students, 17 radiography students, and 114 nursing students. Findings from Ojulong et al showed that medical students attained a higher overall average score (73%) as compared to nursing students (66%) and radiology students (61%). No significant score differences were observed based on gender or the rural or urban location of the high school attended.

Arinze-Onyia, Ndu, Aguwa, Modebe, and Nwamoh (2018) assessed the knowledge and adherence of healthcare professionals to Standard Precautions (SP) at a tertiary healthcare facility in Enugu, Nigeria. The study revealed that, out of the 629 surveyed healthcare workers, the majority were female (64.4%), married (62.3%), identified as Christian (94%), and were aged between 20 and 59 years. A notable portion of nurses (46.1%) were employed in the wards. More than 90% of the

participants were knowledgeable about SP, primarily through formal training (62%). Over 70% were capable of defining SP, 74.6% understood when SP was necessary, and more than 70% recognized most elements of SP. A significant majority believed that SP is vital and thought that organizations should provide training. The majority of respondents performed hand hygiene after removing gloves (73.6%) and before exiting the patient's care area (33.1%).

Over 70% had contact with patients' bodily fluids and cleaned the contaminated area with soap, water, and disinfectant (52.1%). Gloves were the most frequently utilized personal protective equipment (PPE) (53.4%), with inconsistent availability being cited as the main reason for infrequent usage (57.7%). More than half of the participants recapped needles prior to disposal. Doctors and nurses exhibited significantly higher exposure to patient serum ($P < 0.05$), while laboratory scientists reported the highest usage of personal protective equipment (82.4%). Those who had received training in SP (70.8%) and PPE (69.7%) were significantly more likely to utilize PPE ($P < 0.05$). Arinze-Onyia et al emphasized the importance of SP training and the consistent availability of PPE to enhance adherence to SP.

Mukwato, Ngoma, and Maimbolwa (2015) carried out a study in Zambia to evaluate the practices and compliance of healthcare professionals with essential infection prevention measures. They collected information via a self-administered interview schedule and an observation checklist, employing a convenience sampling technique. The study included 77 healthcare professionals, comprising doctors, registered midwives and nurses, enrolled midwives and nurses, clinical officers, laboratory technicians, and physiotherapists. In addition, out of 77 healthcare workers monitored, 40 were engaged in at least one practice that necessitated compliance with the Infection Prevention (IP) guidelines. Mukwato et al found that strong adherence correlated with the incorporation of guidelines into training, a thorough understanding of infection prevention and hospital-acquired infections, a favorable attitude towards infection control, and the availability of preventive resources.

The results revealed differing levels of adherence to various aspects of infection prevention. The highest compliance rate (100%) was recorded when needles and syringes were utilized only once, while the lowest rate (35.1%) was observed when needles and syringes were disinfected with a 0.5% chlorine solution before disposal. Compliance for hand hygiene was moderate at 61%. In summary, the

study emphasized that knowledge of infection prevention and control (IPC) is a vital factor influencing practice.

Healthcare Workers' Adherence to Infection Control Protocols

Ellison (2000) indicated that 96-99% of healthcare workers utilized gloves for at least 95% of their working hours. A national study in England revealed that 99% of healthcare workers reliably wore gloves during emergency situations, whereas only 18-22% used face masks and eye protection (Sudaram and Parkinson, 2007).

The findings of the research demonstrated varying levels of adherence to different elements of infection prevention. The highest compliance (100%) occurred when needles and syringes were utilized only once, whereas the lowest compliance (35.1%) was noted when needles and syringes were decontaminated with a 0.5% chlorine solution prior to disposal. Compliance regarding hand hygiene was moderately recorded at 61%. To summarize, the study highlighted the crucial role of understanding infection prevention and control (IPC) in influencing practices.

Compliance among Healthcare Workers with Infection Control Protocols

As noted by Ellison (2000), between 96-99% of healthcare workers employed gloves for at least 95% of their work hours. A national survey undertaken in England discovered that 99% of healthcare workers consistently donned gloves in emergency situations, while only 18-22% adhered to using face masks. Nurses often express concern about the risk of contracting infections. According to Stein et al. (2003), 86% of healthcare personnel in the United Kingdom treated patients with the belief that they could potentially have blood-borne infections. The CDC (2002) reported that 53.3% of nurses and midwives had concerns regarding occupational exposure, especially when dealing with HIV-positive patients, and 93.4% preferred to be informed about a patient's HIV/HBV/HCV status.

Nurses in Uganda reported suffering from physical, psychological, and spiritual distress due to ethical dilemmas, which negatively impacted their capacity to deliver care. Over time, nurses lost perspective on their professional responsibilities, and their professionalism declined as a consequence of ongoing difficulties (Harrowing & Mill, 2010).

Stein et al. (2003) discovered that 86% of healthcare professionals in the UK assumed that their patients could have blood-borne infections. Furthermore, the CDC (2002) indicated that 53.3% of nurses and midwives were worried about

occupational exposure, particularly while engaging with HIV-positive patients, and 93.4% wanted to be aware of a patient's status regarding HIV/HBV/HCV. Nurses in Uganda faced various symptoms arising from moral distress, which hindered their ability to offer adequate patient care. Over time, nurses lost a sense of the importance of their duties, and their professionalism suffered due to the persistent obstacles they encountered (Harrowing & Mill, 2010).

Research at Mulago National Referral Hospital indicated that healthcare workers have a solid grasp of healthcare-associated infections (HCAIs) but show low levels of practical compliance (Charles et al. 2010). Nurses may feel pressured to bypass universal precautions when resources are lacking or when clear guidelines are absent, resulting in poor infection control protocol adherence (Nderitu et al. 2015). A study involving 65 nurses and several physicians in intensive care units and surgical departments across five hospitals of different sizes in the Netherlands found that handwashing was practiced when healthcare workers believed they had previously engaged with the patient, but it was often overlooked by senior staff who lacked role models in the hospital and convincing evidence about the significance of hand hygiene in preventing cross-contamination (Erasmus et al 2009). Healthcare workers frequently experience injuries while providing care, some of which go unreported, contributing to a pessimistic outlook (Mondiwa, 2007). Around 42% of American trainee surgeons reported having sustained

injuries while treating patients (Makary et al., 2007). Burke and Madan (1997) observed that 64% of the 91% of UK doctors and 29% of the 54% of UK nurses who had injuries attributed it to insufficient time for patient care, which fostered a negative perspective on post-exposure prophylactic measures since they considered time less crucial than the risk of contracting HBV or other bloodborne pathogens. A study involving 65 nurses and some physicians in intensive care and surgical units across five hospitals of varying sizes in the Netherlands found that handwashing was practiced only when healthcare workers felt they had previously interacted with patients. Surgeons who had experienced injuries mentioned that Personal Protective Equipment would not have prevented the harm (Makary et al. 2007). Research at Mulago Hospital indicated that handwashing was viewed as more essential for individual safety rather than as a means to prevent cross-transmission between patients, which mirrors the common belief that infection control is vital for a safe working environment (Charles et al., 2010).

To effectively prevent and manage healthcare-associated infections (HAIs), most hospitals have put in place written, measurable standards (Sarani, 2014). This initiative seeks to address fundamental issues and prevent transmission, making it crucial for improving patient care quality. Nurses play an essential role in minimizing the incidence of hospital-acquired infections while providing care to

patients (Yatin et al., 2014). This practice includes understanding principles that enable informed decision-making. Therefore, adequate information, a positive attitude, and effective practices are vital for supporting and aiding patients (WHO, 2010).

In a study conducted in Ethiopia, physicians indicated that they practiced hand hygiene only 7% and 48% of the time before and after patient interactions, respectively. Challenges to maintaining hand hygiene included a lack of hand hygiene supplies (77%), sinks (30%), and sufficient training (50%). Additional obstacles to hand hygiene encompassed a shortage of hand hygiene supplies (77%), sinks (30%), and proper training (50%), as well as irritation and dryness caused by WHO-approved hand sanitizers (Admasu, 2008). A study by African Health Sciences (2005) at Makerere Medical School aimed to encourage handwashing as a quality care measure and a strategy to prevent hospital-acquired infections in Eritrea. It assessed handwashing practices concerning care quality at Keren Hospital through semi-structured interviews and focus groups with 34 hospital staff members and 30 patients from medical, surgical, and obstetric departments. Furthermore, there was direct observation of handwashing methods and facilities. Only 30% of healthcare personnel adhered to hand hygiene protocols between patient visits. They determined that the handwashing habits of healthcare workers

in hospitals need significant global enhancement, and complacency, especially among women of reproductive age, should not be tolerated.

The Ministry of Health in Uganda (MOH, 2013) considers hygiene to be the most important method for preventing nosocomial infections in healthcare settings, with effective hygiene able to reduce contamination levels by 70%. Moreover, hygiene in healthcare facilities encompasses personal hygiene, which refers to an individual's bodily cleanliness; facility hygiene, which involves maintaining a clean environment to lower microbial presence and decrease the risk of spreading infections; instrument hygiene, which pertains to the cleaning of all equipment utilized in patient care; and hand hygiene, which is recognized as the most effective strategy. In Anambra State, Nigeria, Osuala and Oluwatosin (2017) investigated nurses' knowledge, attitudes, and practices concerning infection control, as well as obstacles to implementation, in order to gather data to support future efforts aimed at enhancing practices. A descriptive survey was performed with a sample of 197 nurses. The findings showed that 84 (42.6%) of participants reported their hospital had an infection control unit, while 66 (34.1%) indicated their hospital had an infection control committee. Only 20 (10.2%) respondents achieved a knowledge score above 60%, whereas 170 (86.3%) and 120 (60.9%) scored over 60% for attitudes and practices, respectively. A mere 5 respondents

(2.5%) strongly agreed that hand hygiene is vital for preventing infections. As a result, the authors emphasized the importance of exploring the discrepancies between knowledge, attitudes, and practices. Tobin, Alice, Akhere, Ikponwonsa, and Grace (2013) investigated understanding and adherence to standard precautions (SP) among healthcare providers in Edo State, Nigeria. A descriptive cross-sectional study was conducted involving consenting doctors, nurses, laboratory technicians, and health attendants in clinical departments of a rural tertiary teaching hospital in Edo State. Data collection utilized structured self-administered questionnaires that concentrated on hand hygiene knowledge and practices, the use of gloves and protective gowns, and the management of sharps. The results indicated that one hundred and ninety-three (93.2%) participants were aware of standard precautions. Among them, 11 (5.7%) displayed a low comprehension of SP, while 85 (44.0%) had acceptable knowledge, and 97 (50.3%) demonstrated excellent understanding. Knowledge was significantly associated with profession ($p = 0.00$), with doctors showing the highest proportion of good knowledge, whereas porters ranked the lowest. Eight (3.9%) of respondents reported poor adherence to standard precautions, 103 (49.8%) complied moderately, and 96 (46.8%) adhered well. Compliance was significantly connected to occupation ($p = 0.00$), with nurses exhibiting the highest level of good practices. Aigbiremolen, Duru, Awunor, Abejegah, Abah, Asogun, and Eguavoen (2012)

studied the knowledge and practices concerning Lassa fever control among primary healthcare workers in Esan West and Esan Central Local Government Areas of Edo State. This research involved a cross-sectional survey of health professionals from 34 primary care clinics in areas where Lassa fever is endemic, using 231 self-administered semi-structured questionnaires. Knowledge was evaluated through a ten-question scoring system. The analyzed data was displayed in various tables and figures. All participating individuals recognized Lassa fever, and 77.9% exhibited a high level of knowledge about disease control, while 9.1% had inadequate understanding. No significant relationship was found between knowledge level and health worker designation ($\chi 2=8.99$, df =4, $p>0.05$). Only 13.0% and 16.9% regularly engaged in barrier nursing and handwashing to prevent infection spread. Even though Lassa fever was well recognized by the general population, adherence to standard preventive practices was inconsistent. As a result, Aigbiremolen et al. highlighted the necessity for continuous education and retraining for primary care staff in order to minimize the risk of nosocomial infections.

The standard infection prevention practices are influenced by various factors, including a higher prevalence of Hospital Acquired Infections (HAIs) among patients and healthcare workers in developing countries, as highlighted by

Oluwagbemiga, Akinsete, Ana, and Ogunseye (2021). These issues can stem from challenges such as insufficient staffing, poor personnel distribution, lack of motivation, negative attitudes towards hospital protocols, inadequate hygiene and sanitation measures, unavailability of essential equipment, poor infrastructure, overcrowded facilities, and restricted financial resources. Olalekan, Olusegun, Olufunmilayo, and Lanre (2012) noted that both awareness and information regarding HAIs, nosocomial pathogens, and related hazards are lacking even among healthcare professionals (HCWs). While some degree of knowledge exists, a study conducted at Lagos University Teaching Hospital and other facilities in Southeast Nigeria revealed that adherence to hand hygiene protocols was insufficient. Ekwere and Okafor (2013) and Oli et al. (2016) reported that hygiene practices were notably inadequate. Oluwagbemiga's (2021) study indicated a reasonable understanding of the issues, yet consistent compliance was not observed, mainly due to the distance between water sources and the wards. Therefore, it was proposed that water supplies should be positioned closer to the wards.

When examining the variables that affect the adoption of standard infection prevention practices, it is important to consider socio-demographic factors as well. A study by Bayleyegn, Mehari, Damtie, and Negash (2021) at the University of Gondar Comprehensive Specialized Hospital in Northwest Ethiopia assessed the

knowledge, compliance, and practices related to preventing hospital-acquired infections. Despite the presence of adequate knowledge, only 36% implemented safe infection prevention practices. The findings indicated that the educational qualifications and experience levels of HCWs significantly influenced their practices concerning HAIs. Both years of experience and education were found to positively impact their attitudes and behaviors.

This literature review summarizes critical aspects of preventing and controlling nosocomial infections, focusing on the theoretical framework, an overview of nosocomial infections, the cleaning and disinfection of healthcare settings, comprehensive strategies for infection prevention and control, and the knowledge and adherence of healthcare professionals in the fight against nosocomial infections. The Theory of Reasoned Action (TRA) is commonly used to provide insight into the prevention of nosocomial infections, emphasizing the significance of healthcare personnel's knowledge and the subjective norms that shape their attitudes and actions towards infection prevention and control. Nosocomial infections, often referred to as healthcare-associated infections (HAIs), are those acquired during medical treatment within healthcare facilities. These infections pose a substantial global health challenge, leading to increased morbidity,

mortality, and healthcare expenditures. Recognizing their prevalence and effects highlights the need for effective preventative strategies.

Maintaining a clean and sanitized healthcare environment is crucial for preventing nosocomial infections. Proper environmental hygiene, which includes the effective cleaning of surfaces and equipment, is vital in reducing pathogen reservoirs and disrupting transmission pathways in healthcare settings. Infection prevention and control methods, such as hand hygiene, utilization of personal protective equipment (PPE), and patient isolation when necessary, are among the strategies deployed to lower the risk of nosocomial infections. Grasping how these strategies are implemented and their effectiveness is essential for any comprehensive infection prevention program. The success of infection prevention heavily depends on the knowledge possessed by healthcare personnel. Knowledge gaps, often linked to new best practices and guidelines, may hinder their capacity to effectively prevent nosocomial infections. A review of the literature will investigate the current levels of understanding among healthcare personnel and identify areas needing improvement. Although there may be a sufficient level of knowledge, consistently adhering to recommended infection prevention measures can be quite challenging. Various factors such as time limitations, resource shortages, and organizational culture can significantly influence healthcare personnel's ability to

follow these guidelines. This literature review delves into compliance-related issues as well as potential strategies for enhancing healthcare professionals' commitment to infection prevention. It provides a thorough analysis of the primary factors affecting the practices of preventing and controlling nosocomial infections among healthcare workers, emphasizing the need to comprehend the theoretical basis alongside the challenges of knowledge and compliance encountered in formulating effective strategies to reduce nosocomial infections and enhance patient safety within healthcare settings.

The aim of this literature review is to tackle the significant gap in knowledge and compliance among healthcare professionals regarding the prevention of nosocomial infections. It has revealed deficiencies in healthcare personnel's understanding of infection control measures and inconsistency in following established protocols. This shortcoming underscores the necessity for specific interventions and strategies to bolster healthcare workers' knowledge and promote adherence to preventive measures, ultimately reducing the occurrence of nosocomial infections and enhancing patient safety in healthcare environments.

CHAPTER THREE

METHODOLOGY

This chapter outlines the methods and procedures utilized in conducting this research. It is divided into the following sections:

Study design,

population,

sampling method.

- Research tools

- Validity and reliability –

Data collection and analysis techniques

Study Design

A descriptive survey research design was employed for this examination. This method is considered suitable for the research as it facilitates the collection of important data from a large number of respondents, which can be extrapolated to the broader study population. Consequently, this design was appropriate since it enables the researcher to gather data using fundamental descriptive statistics, such as frequency counts and percentages, to evaluate the research question. It provides

insights into the knowledge and compliance of Health Care Workers, which is the focus of the study.

Population of the Research

The study population encompassed all health care professionals working in agencies and hospital management organizations within any health facility in Edo State. Edo State has a total population of 4,781 across its 18 Local Government Areas (Ministry of Health, Edo State, Nigeria 2023).

Table 3: Designation and Numbers of Health Care Workers in Edo State Board and Agency

S/N	Description of Health Care Workers	Numbers of HCWs
1.	Community Health Extension Workers	1,006
2.	Community Health Officers	143
3.	Medical Doctors	368
4.	Nurses/Midwives	1,348
5.	Pharmacist	137
6.	Lab Scientist	100
7.	Junior Community Health Extension Workers	141

8.	Health Attendant	1498
9.	Dentist	20
10.	Optometrist	20
	Total	**4781**

Sample and Sampling Technique

The research involved a sample size of 478, representing 10% of the total study population of 4781. Out of the 450 questionnaires distributed, 426 were completed and returned, leading to a return rate of 94.7%. This study utilized a multi-stage sampling method.

In Stage 1, nine (9) wards were randomly selected from a pool of 192 across three (3) Senatorial Districts (Edo North, Edo Central, and Edo South) through a process of replacement balloting. Stage 2 involved the selection of twenty-six (26) health facilities from these three senatorial districts, with the distribution of three health facilities in each ward, except for one ward, which had two facilities. In Stage 3, participants were chosen from the 26 health facilities (refer to Appendix B).

Research Instrument

The research tool was a self-constructed questionnaire focused on the knowledge and adherence of health care workers (HCWs) to nosocomial infection prevention protocols. This instrument was organized into two sections: A and B.

Section A includes socio-demographic information, while Section B contains questions related to awareness and adherence to nosocomial infection prevention strategies.

Section A (items 1–5) gathers demographic details such as gender, profession, age, working experience, highest educational qualification, and prior experiences with nosocomial infections.

Section B (items 6–23) assesses health care workers' knowledge of nosocomial infections, whereas questions 24–38 evaluate their compliance with infection prevention measures.

Validation of the Instrument

The tool underwent validation by the researcher's supervisors and another expert from the Department of Health, Safety, and Environmental Education at the University of Benin. Their suggestions and revisions were incorporated into the final version of the instrument.

Dependability of the Instrument

Initially, the instrument was pilot tested with 20 respondents from the study population who were excluded from the primary sample. The data collected from this pilot test were analyzed using the Cronbach Alpha statistic to assess the instrument's internal consistency. The resulting Cronbach alpha coefficient was 0.75, which is considered sufficient.

Method of Data Collection

The researcher, along with two research assistants in the area, used a structured questionnaire to gather data from respondents. Data collection was performed after obtaining the necessary permissions from relevant authorities.

Method for Data Analysis

The data obtained were analyzed using basic descriptive statistics, including mean and standard deviation, along with frequency counts and percentages to address the research questions, and one-way ANOVA to evaluate the variables; inferential statistics of ANOVA were used to test the established hypothesis at a significance level of 0.05.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDINGS

This chapter analyzes the data collected for this study. The presentation and analysis were conducted based on a detailed examination of each research question. The findings are provided in tabular format and will be discussed further.

The initial research question is: What is the level of understanding of nosocomial infections among healthcare personnel in Edo State?

Table 5 displays the frequency and percentage of healthcare professionals' knowledge regarding nosocomial infections in Edo State (n=426).

Knowledge	**Frequency**	**Percentage**
High	221	51.9
Moderate	161	37.8
Low	44	10.3
Total	426	100.0

*Score of 0-8 (low knowledge), score of 9-14 (Moderate knowledge) and score of 15-18 (High knowledge)

Table 5 presents the frequency and percentage of healthcare workers in Edo State who are knowledgeable about nosocomial infections. It was found that 51.9% of respondents possessed comprehensive knowledge of nosocomial infections, 10.3% had limited knowledge, and 37.8% had a moderate level of awareness. This suggests that a majority of respondents demonstrated a high level of understanding, as they answered correctly between 15 to 18 questions in the knowledge section of the assessment tool.

Research question 2: To what extent do healthcare personnel in Edo State adhere to nosocomial infection prevention practices?

Table 6: The frequency and percentage of healthcare workers' adherence to preventing nosocomial infections in Edo State.

s/n	Items	Frequently	Sometimes	Rarely	Never
1.	How frequently do you wash your hands thoroughly with soap and water before and after patient contact?	105(24.6%)	162(38.2%)	119(27.9%)	39(9.2%)
2.	Do you always use hand sanitizers when	77(18.1%)	160(37.6%)	154(36.2%)	35(8.2%)

soap and water are not readily available?				
3. How often do you wear personal protective equipment (PPE) such as gloves, masks, and gowns during patient care activities?	178(41.8%)	118(27.7%)	92(21.6%)	38(8.9%)
4. Do you follow the proper procedures for donning and doffing PPE?	90(21.1%)	170(39.9%)	136(31.9%)	30(7.0%)
5. Do you engage in proper respiratory hygiene, such as covering your mouth and nose when coughing or sneezing?	102(23.9%)	161(37.8%)	116(27.2%)	47(11.0%)

6. Do you always dispose of used needles and sharp objects in designated sharps containers?	72(16.9%)	185(43.4%)	124(29.1%)	45(10.6%)
7. How often do you clean and disinfect medical equipment and surfaces in patient care areas?	87(20.4%)	158(37.1%)	120(28.2%)	61(14.3%)
8. Are you compliant with the recommended vaccination schedules for healthcare workers?	96(22.5%)	155(36.2%)	137(32.2%)	38(8.9%)
9. How frequently do you attend infection prevention and control training sessions?	77(18.1%)	154(36.2%)	160(37.6%)	35(8.2%)

10	Do you always adhere to protocols for the safe handling and disposal of biohazardous waste?	58(13.6%)	161(37.8%)	163(38.3%)	44(10.3%)
11	How often do you encourage patients and their families to follow infection prevention measures?	72(16.9%)	147(34.5%)	149(35.0%)	58(13.6%)
12	Are you consistently using aseptic techniques during medical procedures and interventions?	175(41.1%)	134(31.5%)	79(18.5%)	38(8.9%)
13	How frequently do you practice proper cough etiquette, such as using tissues and disposing of them appropriately?	87(20.4%)	170(39.9%)	132(31.0%)	37(6.7%)

14	Do you always follow the established protocols for isolating patients with infectious diseases?	113(26.5%)	155(36.4%)	112(26.3%)	46(10.8%)
15	How often do you report incidents of exposure to blood or bodily fluids promptly?	53(12.4%)	131(30.8%)	147(34.5%)	95(22.3%)

Table 6 illustrates the adherence of healthcare professionals to measures preventing nosocomial infections in Edo State. It was found that a significant portion of respondents occasionally wash their hands thoroughly with soap and water before and after interacting with patients (38.3%); use hand sanitizers when soap and water are not immediately available (37.6%); follow the correct procedures for putting on and taking off PPE (39.9%); practice proper respiratory hygiene by covering their mouth and nose while coughing or sneezing (37.8%); and dispose of used needles and sharp instruments in designated sharps containers. They also clean and disinfect medical equipment and surfaces in patient care

settings (37.1%); comply with recommended vaccination schedules for healthcare workers (36.4%); demonstrate basic cough etiquette by using and properly discarding tissues (39.9%); and adhere to established protocols for isolating patients with contagious infections (36.4%). Additionally, respondents consistently wear personal protective equipment (PPE) like gloves, masks, and gowns during patient care activities (41.8%) and use aseptic techniques in medical procedures and interventions (41.1%). Furthermore, they seldom report incidents of exposure to blood or bodily fluids in a timely manner (37.6%), participate in training sessions on infection prevention and control (38.3%), follow guidelines for the safe management and disposal of biohazardous waste (35.0%), and urge patients and their families to adhere to infection prevention practices (34.5%). According to the participants' feedback, most of them occasionally engage in activities aimed at preventing nosocomial infections.

Hypothesis:

There is no significant difference among healthcare providers in Edo State regarding their understanding of nosocomial infection prevention based on their years of experience.

Table 7 presents a one-way ANOVA examining the differences in knowledge of nosocomial infection prevention among healthcare workers in Edo State according to their years of experience.

ANOVA

Knowledge

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	319.470	5	63.894	6.728	.000
Within Groups	3988.775	420	9.497		
Total	4308.244	425			

Table 7 presented a one-way ANOVA analyzing the differences in knowledge regarding nosocomial infection prevention among healthcare workers in Edo State, categorized by years of experience. The results indicated an F-value of 6.72 and a significance level of 0.00, which is below the established alpha level of 0.05. Consequently, the null hypothesis, which asserts that there is no significant

difference in the knowledge of nosocomial infection prevention among healthcare workers based on their years of experience in Edo State, is dismissed. This suggests that there is indeed a significant difference in the understanding of nosocomial infection prevention among healthcare personnel in Edo State when considering their years of experience.

Table 8: LSD post-hoc

(I) yrs_experience	(J) yrs_experience	Mean Difference (I-J)	Std. Error	Sig.
less than 5yrs	6-10yrs	-1.65995*	.47566	.001
	11-15yrs	-.16718	.45610	.714
	16-20yrs	.32842	.58024	.572
	21-25yrs	-2.15331*	.58476	.000
	above 25yrs	.13240	.50149	.792
6-10yrs	less than 5yrs	1.65995*	.47566	.001
	11-15yrs	1.49277*	.45015	.001
	16-20yrs	1.98837*	.57558	.001
	21-25yrs	-.49336	.58013	.396
	above 25yrs	1.79236*	.49609	.000
11-15yrs	less than 5yrs	.16718	.45610	.714
	6-10yrs	-1.49277*	.45015	.001
	16-20yrs	.49560	.55952	.376
	21-25yrs	-1.98613*	.56420	.000
	above 25yrs	.29958	.47736	.531

16-20yrs	less than 5yrs	-.32842	.58024	.572
	6-10yrs	-1.98837*	.57558	.001
	11-15yrs	-.49560	.55952	.376
	21-25yrs	-2.48173*	.66857	.000
	above 25yrs	-.19601	.59711	.743
21-25yrs	less than 5yrs	2.15331*	.58476	.000
	6-10yrs	.49336	.58013	.396
	11-15yrs	1.98613*	.56420	.000
	16-20yrs	2.48173*	.66857	.000
	above 25yrs	2.28571*	.60149	.000
above 25yrs	less than 5yrs	-.13240	.50149	.792
	6-10yrs	-1.79236*	.49609	.000
	11-15yrs	-.29958	.47736	.531
	16-20yrs	.19601	.59711	.743
	21-25yrs	-2.28571*	.60149	.000

Table 8 illustrates the LSD on the differences in knowledge regarding the prevention of nosocomial infections among health care workers in Edo State, categorized by years of experience. A significant difference was found between respondents with less than 5 years of experience and those with 6-10 years (mean

difference = 1.65), as well as between less than 5 years and 21-25 years (mean difference = 2.15), between 6-10 years and 11-15 years (mean difference = 1.49), between 6-10 years and 16-20 years (mean difference = 1.98), 6-10 years and over 25 years (mean difference = 1.79), between 11-15 years and 21-25 years (mean difference = 1.98), and between 21-25 years and over 25 years (mean difference = 2.28). Therefore, respondents with 6-10 years of experience exhibited the highest average knowledge concerning the prevention of nosocomial infections among health care providers.

Ho2: There is no significant difference in adherence to preventive measures for nosocomial infections among health care workers in Edo State based on years of experience.

Table 9 presents a one-way ANOVA analysis of the variations in adherence to preventive measures for nosocomial infections among health care workers in Edo State, categorized by years of work experience.

ANOVA

compliance

	Sum of Squares	df	Mean Square	F	Sig.

Between Groups	712.681	5	142.536	2.048	.071
Within Groups	29226.718	420	69.587		
Total	29939.399	425			

Table 9 presents a one-way ANOVA examining the differences in compliance with nosocomial infection prevention among healthcare personnel in Edo State based on their years of experience. The results revealed an F-value of 2.04 and a significance level of 0.07, which exceeds the predetermined alpha level of 0.05. Consequently, the null hypothesis, which posits that there is no significant difference in compliance with nosocomial infection prevention among healthcare personnel in Edo State due to years of experience, is upheld. This indicates that there is no meaningful difference in adherence to preventive measures for nosocomial infections among healthcare staff in Edo State related to their experience levels.

Ho3: There is no significant difference in compliance with nosocomial infection prevention strategies among healthcare professionals in Edo State based on their educational qualifications.

Table 10: One-way ANOVA assessing the variations in compliance with preventive measures for nosocomial infection prevention among healthcare professionals in Edo State according to their educational attainment.

ANOVA

compliance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	87.000	2	43.500	.616	.540
Within Groups	29852.399	423	70.573		
Total	29939.399	425			

Table 10 presented the results of a one-way ANOVA analyzing compliance with nosocomial infection prevention strategies among health care professionals in Edo state, categorized by educational attainment. The findings indicated an F-value of 0.61 and a significance level of 0.54, which exceeds the established alpha level of 0.05. Therefore, the null hypothesis, which posits that there is no significant

difference in compliance with nosocomial infection control strategies among health care professionals in Edo state based on educational attainment, is supported. Consequently, there is no significant difference in adherence to preventive measures for nosocomial infections among health care workers in Edo state with respect to educational level.

Ho4: There is no significant difference in awareness of nosocomial infection prevention techniques among health care workers in Edo State based on their educational background.

Table 11: One-way ANOVA examining differences in understanding of nosocomial infection prevention techniques among health care workers in Edo State based on educational qualifications.

ANOVA

Knowledge

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.066	2	5.033	.495	.610

Within Groups	4298.178	423	10.161
Total	4308.244	425	

Table 11 presented the results of a one-way ANOVA regarding the differences in understanding preventive strategies for nosocomial infection prevention among healthcare professionals in Edo state based on their educational levels. The results indicated an F-value of 0.49, with a significance level of 0.61, exceeding the predetermined alpha level of 0.05. Consequently, the null hypothesis—which posits no significant difference in understanding preventive strategies for nosocomial infection prevention among healthcare professionals in Edo state according to their educational background—was accepted. Thus, there is no significant variation in the understanding of preventive strategies for nosocomial infections among healthcare personnel in Edo state attributed to their educational levels.

Analysis of outcomes.

The main aim of this research was to evaluate the knowledge and adherence of healthcare workers to preventive strategies against nosocomial infections in Edo State. The findings showed that a significant number of participants exhibited a

solid grasp of nosocomial infection prevention, as evidenced by their correct responses to 15 to 18 questions on the knowledge aspect of the assessment tool. This study utilized a quantitative approach to investigate healthcare workers' understanding and compliance with practices for preventing nosocomial infections throughout Edo State. A standardized survey was distributed to a group of healthcare workers across various medical facilities in the state, addressing issues such as awareness of nosocomial infections, adherence to preventive practices, and demographic information.

Prior research has examined healthcare workers' knowledge and adherence to preventive measures for nosocomial infections in other settings. Olatade and Ifeoluwa (2021) performed a study in Ogun State, Nigeria, which revealed that healthcare workers had a high level of knowledge regarding nosocomial conditions. In a similar vein, Arinze-Onyia, Ndu, Aguwa, Modebe, and Mwamoh (2018) observed a strong comprehension of standard precautions among healthcare professionals in Enugu, Nigeria, while Nag, Datta, Karmakar, and Chakraborty (2018) reported that a considerable majority of healthcare workers were aware of healthcare-associated infections (HAIs).

The findings illustrate a mixed picture concerning adherence to preventive measures. While many healthcare workers consistently follow guidelines such as the use of personal protective equipment (PPE) and respiratory hygiene practices, compliance in certain areas remains inconsistent. For instance, Sudaram and Parkinson (2007) noted differences in the use of face masks and eye protection among healthcare staff in England, despite high rates of glove usage.

The results revealed that the overwhelming majority of participants had a solid knowledge foundation about nosocomial infections. This is consistent with earlier studies indicating that healthcare workers are generally well-informed in this domain (Olatade & Ifeoluwa, 2021; Arinze-Onyia et al., 2018; Nag et al., 2018). However, many healthcare workers indicated that they engage in preventive measures against nosocomial infections only sporadically.

Specifically, healthcare workers reported thoroughly washing their hands, using hand sanitizers, adhering to appropriate protocols for donning and doffing PPE, practicing respiratory hygiene, properly disposing of medical waste, and keeping up with immunization schedules. While they consistently used PPE and applied aseptic techniques during patient care activities, there was variability in their adherence to other preventive strategies.

The discrepancy between healthcare workers' knowledge and their compliance underscores the necessity for focused interventions to enhance adherence to preventive practices. Even though healthcare workers may appreciate the importance of infection control, obstacles such as time limitations, insufficient resources, and competing priorities may impede consistent compliance. Strategies to tackle these issues could include further training, ensuring an adequate supply of PPE and hand hygiene resources, and cultivating a culture of safety within healthcare settings.

Based on the analyzed hypotheses, it was determined that the null hypothesis, which posits that there is no significant difference in the knowledge of preventing nosocomial infections among healthcare workers based on their years of experience in Edo State, is rejected. This indicates that there is a significant difference in the understanding of nosocomial infection prevention among healthcare personnel in Edo State based on their years of experience. Respondents with 21-25 years of experience exhibited the highest average knowledge regarding nosocomial infection prevention among healthcare providers.

These findings are consistent with the research conducted by Arinze-Onyia, Ndu, Aguwa, Modebe, and Mwamoh (2018), which suggested a correlation between years of experience and the risk of nosocomial infections, rather than a direct causal relationship as observed in other studies. Healthcare professionals not only

identified nosocomial infections but also comprehended the strategies for infection prevention and control. Concerning the second hypothesis, the null hypothesis—that there is no significant difference in compliance with nosocomial infection prevention among healthcare workers according to years of work experience in Edo State—is accepted. This signifies that there is no marked difference in adherence to preventive measures for nosocomial infections among healthcare staff in Edo State relative to their years of experience. This is supported by the research of Bayleyegn, Mehari, Damtie, and Negash (2021) regarding Knowledge, Attitude, and Practice towards Hospital-Acquired Infection Prevention and Associated Factors among Healthcare Workers at the University of Gondar Comprehensive Specialised Hospital in Northwest Ethiopia, which found that, despite possessing good knowledge, the actual practice of infection prevention was low (36%). The work experience of healthcare professionals is significantly linked to their practices in preventing hospital-acquired infections. Years of experience can positively affect attitudes and practices. Nosocomial infections, or healthcare-associated infections (HAIs), pose serious risks to both patients and healthcare workers. Understanding the factors that influence healthcare workers' adherence to preventive measures and their comprehension of nosocomial infection prevention is crucial for devising effective strategies to lessen the transmission of these infections in healthcare settings. In this extensive study, we examine the effect of

educational attainment on healthcare workers' adherence to preventive measures and their understanding of nosocomial infection prevention in Edo State, Nigeria. The educational level of healthcare professionals is a vital factor that influences their awareness of nosocomial infections and their capacity to effectively implement preventive measures. Higher education may provide healthcare workers with the knowledge and skills necessary to follow infection prevention guidelines. Nevertheless, the link between educational attainment and adherence to preventive measures in healthcare contexts is complex and multifaceted. The null hypothesis, which claims no significant difference in adherence to preventive measures for nosocomial infection prevention among healthcare workers in Edo State based on educational level, was accepted. This suggests that educational attainment has a negligible effect on healthcare workers' compliance with preventive measures. The results of this study are in accordance with those of Bayleyegn et al. (2021), who reported similar findings in their research at the University of Gondar Comprehensive Specialised Hospital in Northwest Ethiopia. In spite of healthcare workers' robust knowledge, the study by Bayleyegn, Mehari, Damtie, and Negash (2021) indicated that the practice of safe infection prevention measures was insufficient (36%). This discrepancy between knowledge and practice indicates that factors beyond educational attainment may have a more substantial impact on healthcare workers' compliance with preventive measures. While education can

equip healthcare workers with the required knowledge, elements such as organizational culture, the availability of resources, and individual attitudes and behaviors can also influence their actual practices. Various factors may account for the differences noted in healthcare workers' (HCWs) knowledge and practices regarding the prevention of hospital-acquired infections. These factors encompass the organizational culture within healthcare institutions, including leadership support, along with policies and practices related to infection prevention and control, all of which considerably impact HCWs' adherence to preventive strategies. Access to essential resources, such as hand hygiene facilities, personal protective equipment (PPE), and cleaning supplies, is critical for ensuring compliance with preventive measures.

Limited access to these resources may impede healthcare workers' ability to consistently adhere to established protocols. Heavy workloads, time constraints, and competing priorities in healthcare settings may limit healthcare workers' capacity to concentrate on infection prevention strategies while fulfilling their daily responsibilities. While education can provide healthcare workers with essential knowledge, ongoing training and educational programs are vital for improving awareness and encouraging compliance with preventive measures. Observing the behaviors and practices of peers can help healthcare workers follow

preventive strategies. Positive role models and peer support can inspire adherence to established measures and foster a culture of safety among healthcare staff.

Likewise, the accepted null hypothesis, which indicates no significant difference in the awareness of preventive strategies for hospital-acquired infections among healthcare workers in Edo State based on their educational background, suggests that educational level does not influence healthcare workers' awareness. Although educational achievement can equip healthcare workers with basic knowledge about nosocomial infections and preventive practices, other factors such as access to continued education, opportunities for career development, and hands-on experience in healthcare settings can also enhance healthcare workers' comprehension of preventive strategies.

Additionally, disseminating evidence-based guidelines and best practices through structured training programs and professional networks can assist healthcare workers in heightening their awareness concerning nosocomial infection prevention. Healthcare organizations should prioritize creating a robust safety culture, providing sufficient resources and support for infection prevention efforts, and implementing strategies to address workload and time constraints that may influence healthcare workers' adherence to preventive measures. Ongoing, customized education and training programs for healthcare workers can reinforce knowledge, skills, and best practices related to nosocomial infection prevention.

These programs should be readily accessible, relevant, and regularly updated in accordance with current guidelines and recommendations.

Encouraging teamwork and peer support among healthcare workers can help nurture a shared sense of responsibility for infection control and improve compliance with established measures. Healthcare organizations should establish mechanisms to monitor and evaluate healthcare workers' adherence to preventive practices, identify areas for improvement, and carry out targeted interventions to address gaps in practice. Public health campaigns designed to raise awareness of hospital-acquired infections and the significance of infection prevention should be tailored for healthcare workers with different levels of knowledge. These campaigns should emphasize the role of individual healthcare workers in preventing the spread of infections and highlight the importance of following established protocols.

In conclusion, educational achievement may not significantly affect healthcare workers' compliance with preventive measures or their understanding of nosocomial infections. While education provides a foundation of knowledge, other factors such as organizational culture, resource availability, and individual attitudes and behaviors are crucial in influencing healthcare workers' adherence to recommended protocols. By addressing these elements and implementing targeted interventions, healthcare organizations can foster a safety culture, enhance

compliance with preventive measures, and reduce the incidence of hospital-acquired infections within clinical environments.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This study explored the knowledge and adherence of healthcare professionals in Edo State concerning strategies for preventing nosocomial infections. Participants included medical doctors, laboratory scientists, chemists, nurses, community health workers (CHWs), community health officers (CHOs), community health extension workers (CHEWs), and health attendants from selected healthcare centers in Edo State, along with their educational aspirations and years of experience. A descriptive survey research design was employed for this study. The study population consisted of all healthcare personnel across medical facilities in Edo State.

A sample size of 450 participants was selected, accounting for approximately 10% of the total study demographic. The research employed a modified questionnaire based on previous studies that assessed healthcare workers' knowledge and attitudes regarding infection prevention and control in relation to nosocomial infections. The data collected were analyzed using fundamental descriptive statistics, including frequency counts and percentages, while one-way ANOVA was utilized to explore differences in mean values at a significance level of 0.05.

Results

There is a significant understanding among healthcare staff concerning the prevention of nosocomial infections. However, compliance levels indicate that many respondents infrequently engage in preventive behaviors related to nosocomial infections. Notable differences were identified in knowledge regarding nosocomial infection prevention among healthcare workers, depending on their years of experience. However, there were no substantial differences in adherence to practices for nosocomial infection prevention linked to their years of experience. Additionally, educational levels did not lead to significant differences in the compliance with preventive measures among healthcare personnel. Awareness of strategies for preventing nosocomial infections among healthcare workers in the state did not show significant variation with respect to educational qualifications.

Conclusions

The findings indicated that: • The majority of respondents exhibited a considerable level of expertise, successfully answering many questions related to nosocomial infection prevention. Despite their substantial knowledge, the consistency of compliance with preventive measures varied; while some respondents engaged in preventive behaviors, others did not routinely maintain practices such as thorough

handwashing, use of hand sanitizers, and good respiratory hygiene. • Upon reviewing the hypotheses, the study rejected the null hypothesis concerning knowledge of nosocomial infection prevention based on work experience, indicating notable differences in knowledge levels among healthcare workers in Edo State, with individuals having 6 to 10 years of experience achieving the highest average scores. However, the null hypothesis regarding compliance with preventive measures related to years of experience was accepted, signifying no meaningful difference in compliance among healthcare professionals in Edo State as it pertains to their professional experience. Moreover, the null hypotheses related to compliance and knowledge in association with educational attainment were accepted, indicating that both the number of educational years and the level of education do not significantly influence healthcare workers' adherence and understanding of nosocomial infection control. In conclusion, while there are clear variations in knowledge based on years of experience, compliance with preventive actions appears to remain stable across differences in both experience and education among healthcare workers in Edo State. These results underscore the necessity for focused interventions to improve consistent adherence to preventive measures, particularly given the high levels of knowledge identified. Future research might investigate the factors impacting compliance and explore effective

methods to enhance preventative practices for nosocomial infections among healthcare professionals.

Suggestions

The following recommendations are offered:

1. Ongoing training sessions for healthcare staff should include updates and improvements in nosocomial infection control, facilitated by government and hospital administration. This will aid in maintaining and advancing their knowledge while emphasizing the significance of consistent preventive practices.

2. Targeted educational programs are crucial for healthcare professionals with different levels of expertise. Address the gaps highlighted in the study, specifically the variations in knowledge related to years of experience. Tailoring educational content to different experience levels could improve its effectiveness.

2. Cultivating Consistent Compliance Practices: Launch awareness initiatives and workshops emphasizing the significance of continual adherence to preventive actions. Highlight success stories and exemplary practices to inspire healthcare staff to adopt and sustain these measures in their everyday routines.

3. Employ behavioral strategies to address the identified gaps in compliance. Methods such as peer support, feedback mechanisms, and incentives can be implemented to encourage positive behaviors and foster a culture of responsibility.

4. Improve monitoring and evaluation systems to ensure adherence to preventive measures. Create feedback loops to identify areas requiring enhancement and success, enabling prompt interventions and modifications to existing efforts.

5. Encourage partnerships with educational institutions to incorporate nosocomial infection prevention training within healthcare training programs. This will prepare future healthcare professionals with a thorough education to actively participate in infection control.

6. Conduct longitudinal studies and follow-up research to evaluate the effectiveness of interventions over time. These studies can assess the long-term sustainability of knowledge and compliance improvements, offering valuable insights for refining strategies and sustaining positive outcomes.

Contributions to Knowledge

The survey revealed that the majority of participants were knowledgeable about nosocomial infection prevention.

Understanding of nosocomial infection control varies considerably with work experience.

Neither years of experience nor education level significantly affects adherence to strategies for nosocomial infection prevention.

Implications for Health Education:

Improved Training Programs. There is a need to create and execute comprehensive training programs centered on nosocomial infection prevention. This should include regular workshops, seminars, and continuous education sessions to keep healthcare personnel updated on the latest protocols and guidelines.

Targeted Educational Initiatives: Identifying knowledge and compliance gaps among healthcare workers can aid in developing customized educational programs. For example, departments or types of healthcare professionals with lower adherence can receive focused training.

Practical demonstrations and simulations in health education can improve understanding and compliance. This hands-on approach ensures that healthcare staff grasp both the theoretical and practical aspects of preventive measures.

Regular assessments and feedback: Continuous evaluations to gauge healthcare personnel's knowledge and compliance are vital. Providing feedback based on these assessments can assist individuals and organizations in addressing weaknesses and enhancing their practices.

Establishing a Culture of Safety: By maintaining consistent messaging and support from leadership, a culture that emphasizes infection control and the importance of adherence can be developed. Health education should emphasize each healthcare worker's role in preventing nosocomial infections.

Utilizing Technology and E-learning: Harnessing technology to create e-learning modules can present more flexible and accessible educational options. Online courses, webinars, and digital resources can complement traditional training methods.

Policy Formulation and Enforcement: The thesis likely stresses the necessity of implementing and strictly enforcing infection-control protocols. Health education initiatives should inform healthcare workers about these policies and the repercussions of non-compliance.

Encouraging collaboration and communication across various healthcare roles can promote adherence to preventive measures. Educational programs should endorse teamwork and shared responsibility for infection prevention.

Educating Patients and Families: Informing patients and their families about preventing nosocomial infections can reinforce healthcare workers' efforts, resulting in a more integrated approach to infection control.

Suggestions for additional research:

1. Evaluating the impact of current education and training programs on healthcare workers' understanding of preventive measures in Edo state.

2. Exploring the elements that influence compliance with nosocomial infection prevention tactics in Edo state.

3. Performing a comparative study to assess the awareness and adherence to nosocomial infection prevention among healthcare practitioners in South South Nigeria.

REFERENCES

Abdulraheem, I.S., Amodu, M.O., Saka M.J., Bolarinwa, O.A., & Uthma, M.M., (2012). Knowledge, awareness and compliance with standard precautions among health workers in North Eastern Nigerian. *Journal of community Med Health Education 3(1) 221-223*

Adebimpe, W.O., (2015). Knowledge and Preventive Practices Against Lassa Fever among Primary Health Care Workers in Osogbo. *University Of Mauritius Research Journal*, 21, 579-593

Aigbiremolen, O. Duru, C.B., Awunor, N.S., Agbejegah, C., Abah, S.O., Asogun, A.D., & Eguaroen, O.L. (2012). Knowledge and applicaton of infectious diseases control measures among Primary Care Workers in Nigeria: The Lassa Fever example. *International Journal of Basic, Applied and Innovative Research, 4(1).* Doi:https://www.ajol.info/index.php/ijbair/article/view/108366

Ajzen, I. & Fishbein, M. (1980). Understanding attitudes and predicting social behavior, Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.

Arinze-Onyia S.U, Ndu A.C, Aguwa E.N, Modebe I, & Nwamoh UN (2018). Knowledge and practice of standard precautions by health-care workers in a tertiary health institution in Enugu, Nigeria. *Nigeria Journal of Clinical Practice* 21:149-155.

Armitage, C.L.& Corner, M. (2001). Efficacy of the theory of planned behaviour: A meta analytic review. *British Journal of Social Psychology*.40(4), 471-99

Babbie, E.R. (2010). *The Practice of Social Research (12th ed.).* Belmont, CA: Wadsworth Cengage Learning.

Bayleyegn, B., Mehari, A., Damtie, D., & Negash (2021). Knowledge, Attitude and Practice on Hospital-Acquired Infection prevention and associated factors among healthcare workers at university of Gondar Comprehensive specialized

hospital, Northwest Ethiopia. *Dove Press Journal: Infection and Drug Resistance.* 14 (1) 259-266.

Centre for Disease Control (2010). "Guideline for hand hygiene in health-care settings: Recommendations for the healthcare infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Taskforce', Mobidity Mortality Weekly Report, 51 (RR-16), 1 – 48.

Conner, M., & Sparks, P. (2005).The theory of planned behaviour and health behaviours. In M. Conner and P. Norman (Eds). Predicting health behaviour: Research and practice with social cognition models (2nd Edn, pp. 170- 222).

Dan-Nwafor, C. C., Ipadeola, O., Smout, E., Ilori, E., Adeyemo, A., Umeokonkwo, C., Nwidi, D., Nwachukwu, W., Ukponu, W., Omabe, E., Anaebonam, U., Igwenyi, N., Igbodo, G., Eteng, W., Uzoma, I., Saleh, M., Agboeze, J., Mutbam, S., de Gooyer, T., Ihekweazu, C. (2019). A cluster of nosocomial Lassa fever cases in a tertiary health facility in Nigeria: Description and lessons learned, 2018. *International Journal of Infectious Diseases, 83, 88–94.* https://doi.org/10.1016/j.ijid.2019.03.030

David M.M., (2012) Hospital-acquired Infections – when are hospitals legally liable? *South African Medical Journal* 102(6); 353-354.

Doncho D., Luka K., & Ulrich L., (2014). The role and organization of health systems. *Research gate International Journal.*

Ekwere T.A., & Okafor I.P., (2013) Hand hygiene knowledge and practices among healthcare providers in a tertiary hospital, south-west Nigeria. *International Journal Infection control.* 9 (4).

Godin, G., & Kok, G. (1996). The theory of planned behaviour: A review of its applications to health-related behaviours. *American Journal of Health Promotion,* 11, 87-98.

Godin, G., Belanger-Gravel, A., Eccles, M., & Grimshaw, J. (2008). Healthcare professionals' intentions and behaviours: a systematic review of studies based on social cognitive theories. *Implement Sci*., 3; 36 Doi: 10.1186/1748-5908-3-36

Gurler, B., (2014). Holistic approach to infection control and healing: the Florence Nightingale Story. *Microbiology Australia,* 174-176.

Hegge, M., (2013). Nightingale' environment, *Nursing Science Quarterly,* 26(3) 311- 319.

Iliyasu, G., Dayyab, F.M., Habib, Z.G., Tiamiyu A.B., Abubaka S., Mijinyawa M.S., Habib A.G., (2016). Knowledge and Practices of infection control among health care workers in a tertiary Referral Centre in North-Western Nigeria.

Kelly, K.N., & John R.T M., (2012). "Hospital-acquired infections." *"Surgery (Oxford)* 30 (12). 640-644.

Khan, H.A., Amad, A. & Mehboob, R. (2015). Nosocomial infections and their control strategies. *Asian Pacific Journal of Tropical Biomedicine* 5 (7), 509-514.

Mbim, E.N., Mboto, C.I., & Agbo, B.E., (2016). A Review of nosocomial infections in sub-Saharan Africa. *British Microbiology Research Journal,* 15(1), 1-11.

Montano, D.E.& Kasprzyk, D. (2002). The theory of reasoned action and theory of planned behaviour. In: Glanz k, Rimer, BK, Lewis FM, editors. Health behaviour and health education : theory, research, and practice. Wiley & Sons, Inc; San Franscisco: pp. 67 – 98

Mukwato, K.P., Ngoma, C.M., & Maimbolwa, I. (2015). Compliance With Infection Prevention Guidelines By Health Care Workers At Ronald Ross General Hospital Mufulira District. *Medical Journal of Zambia*, 35(3), 110-16

Nag K., Datta, A, Karmakar, N., Charaborty T., (2018). Knowledge, attitude and practice about hospital acquired infection among health care personnel in a tertiary care hospital of Tripura. *International Journal of Research in Medical Sciences.* 6(10) 3303-3308.

Ojulong, J., Mitonga, K.H., & Lipinge, S.N. (2013). Knowledge and attitudes of infection prevention and control among health sciences students at University of Namibia. *Africa Health Science*.; 13(4): 1071–1078.

Olalekan A.W., Olusegun, B.J., Olufunmilayo A.E., Lanre A.O., Awareness and attitude of health care workers in a teaching hospital in southwestern Nigeria

towards nosocomial infections. *Journal of Public Health Epidemiology* 4 (10): 285-9

Olatade M.J., & Ifeoluwa A., (2021). Knowledge and Preventive Practices of Nosocomial infections among Health Workers in two selected tertiary Hospitals in Ogun State. *International Journal of Caring Sciences.* 14 (1) 174.

Oluwagbemiga A.O., Akinsete S.J., Ana, G.R., & Ogunseye O.O (2021). Knowledge, attitude and self-reported practice of health care workers on infection control in a health facility in Akure, Nigeria. *International Journal of Infection Control.*

Osuala EO, Oluwatosin O A. (2017). Infection control by nurses in selected hospitals in Anambra State, Nigeria. *Tropical Journal of Medical Research* 2017;20:53-60

Sarani, H., Balouchi, A., Masinaeinezhad, N., & Ebrahimitabs, E. (2014). Knowledge, attitude and practice of nurses about standard precautions for hospital-acquired infection in teaching hospitals affiliated to Zabol University of Medical Sciences. *Global Journal of Health Science,* 8(3), 193-198.

Shinde, M.B., & Mohite, V., (2014). A study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. *International Journal of Science and Research,* 3(2), 311-321.

Syndnor, E.R.M, & Perl, T.M., (2011). Hospital epidemiology and infection control in acute-care setting. *Clinical microbiology review.*

Vincent C.C.N., Asodike M.C., Naze N.S., Echendu G.E., Iwuchukwu I., Udemba N. Obeagu E.I, Ibebuike J., & Ezeama. M.C (2021). Knowledge, attitudes and practices of nurses regarding infection, prevention and control in Imo State University Teaching Hospital (IMSUTH), Orlu, Imo State, Nigeria. *European Journal of Pharmaceutical and Medical Research.* 8(6), 127-134

WHO (2014). Clinical management of patients with Viral haemorrhagic fever**:** A pocket guide for the Front-line health worker. Interim emergency guidance-generic draft for West African adaptation. Accessed: Geneva, WHO

World Health Organization (2009). Practical guidelines for infection control in health care. No. 41 III *WPRO Regional Publication*. New Delhi.

World Health Organization (2011). Health-care-associated infection in Africa: a systematic review. Bulletin of the World Health Organization; 89:757-765. Doi:10.2471/BLT.11.088179.

World Health Organization (2012). Health-care-associated infection in Africa: a systematic review. Bulletin of the World Health Organization; 89:757-765. Doi: 10.2471/BLT.11.088179.

World Health Organization (2015). Infection prevention and control in healthcare. Available at http://www.who.int/csr/bioriskreduction/infectioncontrol/en/.

Yakob, E., Lamaro, T., & Henok, a. (2017). Knowledge, attitudes and practice toward infection control measures among Mizan-Aman general Hospital Workers, South West Ethiopia. *Journal of Community Medicine and Health Education;* 5: 370.

APPENDIX A

Letter of Introduction

Department of Health, Safety and Environmental Education

Faculty of Education, University of Benin, Benin City, Edo State Nigeria

Dear Respondent

I am a PhD student of Department of Health, Safety and Environmental Education, Faculty of Education, University of Benin, Benin City. As part of the requirements for the award of the degree, I am conducting this study "Knowledge and compliance with preventive measures of nosocomial infection among health care workers in Edo state with implications for health Education"

I, therefore, wish to appeal for your kind cooperation in completing the attached questionnaire. Your name or identity is not required. You are required to answer a few questions by ticking the options which represent your answer to each question or statement. Your responses will be treated with utmost confidentiality.

Thank you for your anticipated co-operation

Uwadiale P. (Mrs)

Questionnaire On Knowledge And Compliance With Preventive Measures Of Nosocomial Infection Among Health Care Workers In Edo State With Implications For Health Education.

SECTION A

1. Gender**:** Male [ ] Female [ ]

2. ***Past history of Nosocomial Infection****:*

History of Nosocomial infection **[ ]**

No history of Nosocomial Infection **[ ]**

3. ***Years of working Experience****:*

Less than 5 years **[ ]**

*6-10 years***[ ]**

11-15 years **[ ]**

16-20 years **[ ]**

21-25 years **[ ]**

Above 25 years **[ ]**

4. ***Highest Educational Qualification*:**

WASC/SSCE/TcII,

OND/NCE

HND/1st Degree/Equivalent

2nd Degree and above,.

5. ***Profession****: Medical doctor ( ) Nurse ( ) community Health Officer ( ) Community Health Worker (CHEW) ( ) Sanitation Officer ( )*

SECTION B: Please read and tick the answer you fill best suit the questions below.

KNOWLEDGE OF NOSOCOMIAL INFECTION BY HEALTH CARE WORKERS

6. Which of the following best defines nosocomial infections?

a. Infections transmitted by insects

b. Infections caused by rare pathogens

c. Infections acquired in healthcare settings

d. Infections resistant to treatment

7. How are nosocomial infections primarily transmitted in healthcare settings?

a. Through airborne droplets

b. By direct contact with infected patients

c. Through contaminated food and water

d. Via genetic inheritance

8. Which of the following is a common source of nosocomial infections in healthcare facilities?

a. Air conditioning systems

b. Contaminated medical equipment

c. Patients' healthy visitors

d. None of the above

9. What is the primary purpose of proper hand hygiene in infection control?

a. Maintaining skin softness

b. Reducing the spread of infections

c. Protecting against chemical exposure

d. Enhancing one's handgrip strength

10. Which healthcare workers should use personal protective equipment (PPE) during patient care?

a. Only doctors

b. Only nurses

c. All healthcare workers

d. None of the above

11. How often should healthcare workers undergo training on nosocomial infection prevention?

a. Once in a lifetime

b. Annually

c. Only when there is an outbreak

d. Never

12. What is the role of isolation protocols in preventing nosocomial infections?

a. To segregate patients by their insurance status

b. To enhance patient comfort

c. To limit the spread of infectious diseases

d. To promote social distancing among patients

13. How should contaminated medical equipment be handled to prevent nosocomial infections?

a. Discard it immediately

b. Wash it with plain water

c. Clean and disinfect it properly

d. Pray for its purification

14. What should healthcare workers do if they suspect a patient has a nosocomial infection?

a. Keep it a secret

b. Report it to the appropriate authorities

c. Post about it on social media

d. Ignore it unless the patient's condition worsens

15. Who should healthcare workers report lapses in infection control to?

a. Their colleagues

b. The patient's family

c. The appropriate authorities or department

d. Nobody, just rectify it discreetly

16. which of the following is a common reservoir for nosocomial infections in hospitals? (a) ventilation systems (b) clean linens (c) medical equipment (d) hand sanitizers

17. What personal protective equipment (PPE) is recommended for healthcare workers during contact with patients with suspected or confirmed infectious diseases? (a) googles (b) lab coat (c) surgical mask (d) all of the above

18. which of the following is an example of nosocomial infections? (a) chickenpox (b) influenza (c) Urinary tract infection acquired in a hospital (d) common cold

19. which of the following is an example of a fomite in a healthcare setting? (a) a sick patient (b) contaminated blood (c) a contaminated doorknob (d) airborne bacteria

20. which of the following is a common source of healthcare-associated infections in surgical settings? (a) sterile surgical instruments (b) preoperative skin preparation (c) proper aseptive technique (d) air filtration systems

21. How does the use of personal protective equipment (PPE) influence the perception and compliance of healthcare workers with infection control guidelines? (a) increased job-related injuries (b) reduced adherence to hygiene protocols (c) improved staff confidence in infection prevention (d) decreased patient trust in health care providers

22. what role does environmental cleaning play in preventing the transmission of nosocomial infections? (a) improved staff morale (b) reduced patient wait times (c) decreased contamination on surfaces (d) increased hospital revenue

23. What is the impact of regular hand hygiene training on healthcare workers' compliance with infection prevention protocols? (a) increased patient satisfaction (b) decreased incidence of nosocomial infections (c) improved hospital revenue (d) higher employee turnover.

COMPLIANCE TO NOSOCOMIAL INFECTION PREVENTION BY HEALTH CARE WORKERS. Indicate F = frequently, S= Sometimes, R= Rarely and N= Never.

s/n	**Items**	**F**	**S**	**R**	**N**
24.	How frequently do you wash your hands thoroughly with soap and water before and after patient contact?				
25.	Do you always use hand sanitizers when soap and water are not readily available?				
26.	How often do you wear personal protective equipment (PPE) such as gloves, masks, and gowns during patient care activities?				
27.	Are you consistently following the proper procedures for donning and doffing PPE?				

28.	How frequently do you engage in proper respiratory hygiene, such as covering your mouth and nose when coughing or sneezing?				
29.	Do you always dispose of used needles and sharp objects in designated sharps containers?				
30	How often do you clean and disinfect medical equipment and surfaces in patient care areas?				
31	Are you compliant with the recommended vaccination schedules for healthcare workers?				
32	How frequently do you attend infection prevention and control training sessions?				
33	Do you always adhere to protocols for the safe handling and disposal of biohazardous waste?				
34	How often do you encourage patients and their families to follow infection prevention measures?				
35	Are you consistently using aseptic techniques during medical procedures and interventions?				
36	How frequently do you practice proper cough etiquette, such as using tissues and disposing of them appropriately?				
37	Do you always follow the established protocols for isolating patients with infectious diseases?				
38	How often do you report incidents of exposure to blood or bodily fluids promptly?				

APPENDIX B

SENATORIAL DISTRICTS AND WARDS SHOWING HEALTH FACILITIES DISTRIBUTION

SENATORIAL DISTRICT	LGA	WARD	HEALTH FACILITY
EDO SOUTH	UHUNMWONDE	EHOR	1. UGIAMWEN PHC 2. EHOR PHC
		IGIEDUMA	1. UKPOH PHC 2. UGHA PHC 3. UMUNA PHC
		UMUGBAE NORTH WARD	1. IGUOBVIAHIANMWEN 2. IKUENIRO 3. UGHA PHC
EDO CENTRAL	ESAN CENTRAL	UNEAH	1. IBORE PHC 2. ATUAGBO PHC 3. AFUDA PHC
		IKEKATO	1. AGUA PHC 2. EKO-IYOBHEBHE PHC 3. EIDENU PHC
		UGBEGUN	1. UGBEGUN PHC 2. EBUDIN PHC 3. MODEL PHC
EDO NORTH	AKOKO-EDO	IBILLO	1. IBILLO PHC 2. EKPESA PHC 3. IKIRAN PHC

		MAKEKE	1. MAKEKE PHC 2. OJAH PHC 3. OLOMA PHC
		OJIRAMI	1. OKPE PHC 2. IJAJA PHC 3. KALAMA PHC