

**AWARENESS AND PRACTICE OF HAND HYGIENE ON INFECTION CONTROL
AMONG PATIENTS IN A TERTIARY HOSPITAL IN BENIN CITY**

BY

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FACULTY OF NURSING SCIENCES

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN

BENIN CITY

OCTOBER, 2025

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OCTOBER, 2025

DECLARATION

This is to certify that the research titled: AWARENESS AND PRACTICE OF HAND HYGIENE ON INFECTION CONTROL AMONG PATIENTS IN A TERTIARY HOSPITAL IN BENIN CITY, was carried out by OKPERE FAVOUR. It is solely the result of my work except where acknowledged as derived from other person(s) or resources.

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CERTIFICATION/APPROVAL

This is to certify that this research project by OKPERE FAVOUR with matriculation number, BMS1807101 Faculty of Nursing Science under the supervision of **PROF (MRS) J. A. AFEMIKHE**

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ABSTRACT

Hand hygiene is a simple yet critical practice in preventing healthcare-associated infections, particularly in hospital settings where patients are often vulnerable to pathogens. While numerous studies have focused on healthcare workers, less attention has been paid to the awareness and practice of hand hygiene among patients themselves. This study aimed to assess the level of awareness, practice, and factors influencing hand hygiene among patients in selected wards at the University of Benin Teaching Hospital (UBTH), Benin City. A descriptive cross-sectional survey was conducted among 190 patients selected using a convenience sampling technique. A structured questionnaire was administered, and data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. Out of 190 distributed questionnaires, 185 were correctly completed and analyzed, yielding a response rate of 97.37%. The study revealed that 77.5% of patients demonstrated good awareness of hand hygiene, with a grand mean score of 1.8, exceeding the awareness benchmark of 1.5. Regarding practice, 70.6% of respondents reported good hand hygiene behavior, with a grand mean score of 3.1, above the cut-off of 2.5. Key factors influencing hand hygiene included understanding its importance, fear of infection, availability of hygiene materials, and encouragement from healthcare providers. The study found that patients in the selected wards of UBTH generally exhibited good awareness and practice of hand hygiene. However, gaps remain in consistent application, particularly in situations like coughing or sneezing. Efforts should be intensified to sustain and improve patient education on hand hygiene. Hospital administrators should ensure continuous availability of hand hygiene resources and promote supportive interactions between healthcare workers and patients to reinforce proper hygiene behavior.

Keywords: Hand Hygiene, Infection Control, Patients, Tertiary hospital.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Hand hygiene is a cornerstone of infection prevention and control (IPC), essential for reducing the transmission of infectious diseases, particularly healthcare-associated infections (HAIs). HAIs are a significant cause of morbidity, mortality, and prolonged hospital stays, placing a considerable burden on healthcare systems globally. The World Health Organization (WHO) emphasizes that effective hand hygiene practices can prevent up to 50% of HAIs, underscoring its importance in maintaining patient safety (Srigley et al., 2020). Despite its simplicity and cost-effectiveness, adherence to proper hand hygiene protocols remains inconsistent, including among patients (Zia et al., 2022). Several studies have examined the knowledge, attitudes, and practices (KAP) of patients regarding hand hygiene. Research indicates that patients often lack awareness of the importance of hand hygiene and its role in preventing infections (Gaube et al., 2021). Common misconceptions and limited access to hand hygiene facilities further contribute to suboptimal practices. These findings highlight the persistence of a knowledge-practice gap that undermines efforts to improve IPC in healthcare settings (Mouajou et al., 2022).

Attitudes toward hand hygiene also play a pivotal role in shaping compliance. A positive attitude among patients, fostered by education and supportive environments, has been associated with higher adherence rates (Sagar et al., 2020). Conversely, negative attitudes, often stemming from a lack of understanding or support, contribute to poor compliance. Challenges such as limited access to hand hygiene facilities, inadequate education, and misconceptions about hand hygiene

are particularly prevalent in low- and middle-income countries (Yehouenou et al., 2020). The COVID-19 pandemic has intensified focus on hand hygiene as a critical public health measure. It has reinforced the importance of compliance and prompted the implementation of stringent infection control protocols. However, sustaining these improvements beyond the pandemic requires addressing systemic barriers and ensuring a supportive environment for all stakeholders, including patients (Ahmadipour et al., 2022).

Research has shown that organizational factors, such as the visibility of IPC protocols, patient education, and an established culture of safety, significantly impact compliance rates. Interventions such as direct observation, patient education campaigns, and accessible hand hygiene facilities have proven effective in improving adherence to hand hygiene practices (Goodarzi et al., 2020). By integrating these measures into routine healthcare management, sustainable behavioral changes can be fostered, ultimately reducing the incidence of HAIs (Glowicz et al., 2023). Given the critical role of patients in preventing infections, their compliance with hand hygiene protocols is particularly significant. Patients frequently interact with healthcare environments, making them both potential sources and recipients of infection transmission (Srigley et al., 2020). Understanding their knowledge, attitudes, and practices is essential for identifying gaps and designing interventions tailored to their needs.

This study seeks to explore the awareness and practice of patients toward hand hygiene in infection prevention and control, focusing on barriers and enablers of compliance. By identifying factors influencing adherence, the research aims to provide actionable insights for improving hand hygiene practices, reducing HAIs, and enhancing the overall safety of healthcare environments.

1.2 Statement of the Problem

Healthcare-associated infections (HAIs) remain a significant global public health challenge, particularly in low- and middle-income countries (LMICs), where their prevalence is higher than in high-income countries. According to the World Health Organization (WHO), HAIs significantly contribute to increased morbidity, mortality, and prolonged hospital stays. Despite evidence that effective hand hygiene can prevent up to 50% of these infections, adherence to proper hand hygiene practices among patients is persistently low (Glowicz, et al. 2023). This gap in compliance exacerbates the burden of HAIs and undermines patient safety initiatives. Studies have shown that while patients may have some knowledge of hand hygiene, their practices often fall short (WHO, 2023; Tantum et al. 2021). Research by Gaube et al. (2021) highlighted gaps between awareness and adherence among patients, even in settings where educational interventions were provided. Similarly, findings by Mouajou et al. (2022) revealed suboptimal adherence to hand hygiene protocols among patients despite widespread campaigns to increase awareness. This disconnect suggests that knowledge alone does not drive behavioral change, pointing to the influence of other factors such as attitudes, accessibility of resources, and systemic challenges.

Attitudes toward hand hygiene play a pivotal role in compliance, yet negative perceptions and misconceptions persist among patients in many healthcare settings. For example, barriers such as unawareness of the importance of hand hygiene, cultural norms, and limited access to hygiene facilities discourage adherence to protocols (Srigley et al., 2020; Mouajou et al., 2022). These challenges are particularly pronounced in LMICs, where resources like water, soap, and alcohol-based hand sanitizers are often scarce (Yehouenou et al., 2020; Umar et al., 2022). The COVID-

19 pandemic underscored the critical importance of hand hygiene in preventing disease transmission. However, while the pandemic prompted temporary improvements in hand hygiene practices, maintaining these gains has proven difficult in the absence of sustained interventions (Ahmadipour et al., 2022). Furthermore, organizational factors such as poor enforcement of infection prevention and control (IPC) measures and limited access to essential supplies further hinder compliance (Goodarzi et al., 2020).

Given the critical role of patients in healthcare environments, addressing their knowledge and practices regarding hand hygiene is essential for effective IPC strategies. This prompted the researcher to assess the awareness and practice of hand hygiene on infection control among patients in medical surgical wards at the University of Benin Teaching Hospital.

1.3 Objective of study

The broad objective of this study is to assess the awareness and practice of hand hygiene on infection control among patients in medical and surgical wards at the University of Benin Teaching Hospital.

The specific objectives of this study are to:

1. assess the level of awareness of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital.
2. assess the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital.
3. identify the factors influencing the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital.

1.4 Research Questions

1. What is the level of level of awareness hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?
2. What is the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?
3. What are the factors influencing the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?

1.5 Research Hypothesis

1. There is no significant relationship between the level of awareness of hand hygiene among patients and the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital.

1.6 Significance of the Study

To the Nursing Profession: This study is of immense importance to the nursing profession, as nurses are at the forefront of patient care and play a critical role in infection prevention and control. Understanding the knowledge, attitudes, and practices (KAP) of nurses towards hand hygiene will help identify gaps and barriers to compliance, enabling targeted interventions and professional development. The findings can inform the development of training programs and policies to enhance hand hygiene adherence, thereby improving patient outcomes and reducing the prevalence of healthcare-associated infections (HAIs). Moreover, it highlights the critical role of nurses as advocates for infection control, empowering them to lead by example in fostering a culture of safety and excellence in healthcare.

To Healthcare Providers: For healthcare providers, this study provides valuable insights into the behavioral and systemic factors influencing hand hygiene practices within clinical settings. By identifying challenges such as resource constraints, time pressures, and environmental limitations, the study offers practical recommendations to enhance compliance among all healthcare workers. The results will guide administrators in prioritizing infection prevention and control (IPC) strategies, such as providing adequate supplies, implementing supportive policies, and creating a conducive environment for hand hygiene. This ensures that healthcare providers can deliver safer, high-quality care, reducing morbidity and mortality associated with HAIs.

To Society: The broader societal significance of this study lies in its potential to improve public health by reducing the burden of HAIs. Effective hand hygiene practices among healthcare workers not only protect patients but also limit the spread of infections within communities. By fostering trust in the healthcare system, this study contributes to enhanced healthcare-seeking behaviors and public confidence. Additionally, it underscores the importance of collective responsibility in infection control, promoting awareness and encouraging individuals to adopt better hygiene practices in their daily lives. Ultimately, the study's outcomes support a healthier society and reduce the economic burden of preventable infections on families and national healthcare systems.

1.7 Scope of study

The scope of this study focuses on patients in medical surgical wards at the University of Benin Teaching Hospital. The study will focus on the knowledge and practice of hand hygiene on infection control among patients.

1.8 Operational Definition of Terms

Awareness: The understanding of patients in medical-surgical wards regarding the importance, techniques, and benefits of hand hygiene in preventing infections.

Practice: The actual behaviors and actions demonstrated by patients in medical-surgical wards in relation to hand hygiene.

Hand Hygiene: A range of practices undertaken to clean hands, including handwashing with soap and water or using alcohol-based hand sanitizers, aimed at removing dirt, organic material, and microorganisms to prevent the transmission of infections.

Infection Control: The measures and strategies implemented to prevent and reduce the spread of infections within healthcare settings, focusing on minimizing healthcare-associated infections (HAIs) among patients and staff in medical-surgical wards.

Patients: Individuals admitted to medical-surgical wards for treatment and care who are the focus of this study in terms of their knowledge and practices of hand hygiene and their role in infection prevention.

Medical and Surgical Wards: Specific hospital units where patients receive treatment for a variety of medical and surgical conditions.

CHAPTER TWO

LITERATURE REVIEW

This chapter focuses on the review of associated literature on knowledge and practices regarding lifestyle modification among Type 11 DM patients, including conceptual review, theoretical review, empirical review and summary of the review.

2.1 Conceptual Review

2.1.1 Introduction

Hand hygiene is globally recognized as a cornerstone of infection control in healthcare settings. Its significance in preventing the transmission of pathogens cannot be overstated (Glowicz et al., 2023). Hand Hygiene: Refers to any action of hand cleansing, including washing with soap and water or using alcohol-based hand rubs, to remove transient microorganisms and prevent their spread (Issa et al., 2023). Proper hand hygiene involves using the correct technique and adhering to recommended guidelines to ensure effective germ removal.

Infection Prevention and Control (IPC): A practical, evidence-based approach aimed at preventing patients and health workers from being harmed by avoidable infections. IPC addresses issues related to HAIs, antimicrobial resistance, and emerging infectious diseases (Alojaimey et al., 2021). It encompasses a range of measures, with hand hygiene being a central component.

Healthcare-Associated Infections (HAIs): Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting. HAIs can lead to increased

morbidity, mortality, prolonged hospital stays, and higher healthcare costs (Knepper et al., 2020). Effective hand hygiene practices are essential in reducing the incidence of HAIs.

Compliance and Adherence to Hand Hygiene: These terms refer to the extent to which individuals follow recommended hand hygiene guidelines. Compliance often refers to institutional policies and protocols, while adherence may encompass personal beliefs and practices (Gaube et al., 2021). High compliance and adherence rates are indicative of a strong infection control culture within a healthcare facility.

2.1.2 General Understanding of Hand Hygiene Principles

A fundamental understanding of hand hygiene principles is essential for effective infection control. This involves recognizing the importance of handwashing with soap and water and hand rubbing with alcohol-based sanitizers in reducing the transmission of pathogens (Issa et al., 2023). Healthcare workers and patients alike must understand when and how to perform hand hygiene correctly to minimize the spread of microorganisms. Hand hygiene is a primary measure in preventing infections, particularly HAIs. Proper hand hygiene practices can significantly reduce the spread of bacteria, viruses, and other microorganisms in healthcare settings (Mouajou et al., 2022). Studies have consistently demonstrated the direct correlation between improved hand hygiene and decreased infection rates, emphasizing its critical role in patient safety.

WHO Guidelines on Hand Hygiene Practices

In 2009 the World Health Organization (WHO) developed comprehensive guidelines on hand hygiene practices that are universally recognized and implemented in healthcare facilities globally. These guidelines emphasize the "Five Moments for Hand Hygiene": before touching a patient, before clean/aseptic procedures, after body fluid exposure risk, after touching a patient,

and after touching patient surroundings. Adherence to these guidelines is crucial for minimizing the risk of infection transmission and ensuring consistent hand hygiene practices.

Various studies have assessed healthcare workers' knowledge levels regarding hand hygiene in different settings. Ahmed et al. (2020) examined compliance and knowledge of healthcare workers in Karachi hospitals, revealing gaps in their understanding of proper hand hygiene practices and disinfectant use. Al-Mohaithef et al. (2020) assessed knowledge and perceptions among nurses in the Asir region, Saudi Arabia, indicating a need for improved education and training. Furthermore, Oluwagbemiga et al. (2021) conducted a study in a health facility in Akure, Nigeria, highlighting the knowledge, attitude, and self-reported practice of healthcare workers regarding infection control. Additionally, Saraswathy et al. (2021) demonstrated the effectiveness of interprofessional simulation in improving knowledge, attitude, and practice in hospital-acquired infection control among health professionals. These studies collectively underscore the importance of continuous education and training to enhance knowledge and compliance with hand hygiene protocols.

Several factors influence healthcare workers' knowledge of hand hygiene, including education, training, and experience. Healthcare professionals with higher levels of education and specialized training in infection control tend to have better knowledge of hand hygiene principles (Alhumaid et al., 2021). Regular training sessions and ongoing education are crucial for reinforcing knowledge and promoting best practices. Experience also plays a significant role; seasoned healthcare workers may develop a better understanding of the practical aspects of hand hygiene through direct patient care (Lambe et al., 2020).

2.1.3 Perceptions and Beliefs Regarding Hand Hygiene Compliance

Perceptions and beliefs significantly influence hand hygiene compliance among healthcare workers and patients. A positive perception of hand hygiene's effectiveness and a strong belief in its importance are associated with higher compliance rates (Goodarzi et al., 2020; Silago et al., 2022). However, perceptions of low risk of infection, skepticism about the effectiveness of hand hygiene, or beliefs that it is only necessary when hands are visibly soiled can lead to poor compliance (Srigley et al., 2020). For instance, Srigley et al. (2020) found that hospital inpatients' attitudes towards hand hygiene varied, with some underestimating its role in preventing infections. The belief in personal responsibility and the understanding of the potential consequences of poor hand hygiene also play crucial roles in shaping attitudes and practices (Gaube et al., 2021).

The workplace culture profoundly impacts hand hygiene behavior. A supportive and encouraging environment that prioritizes infection control promotes better compliance (Al-Maani et al., 2022). When healthcare facilities establish clear policies, provide adequate resources, and foster a culture of accountability, hand hygiene practices tend to improve (Yehouenou et al., 2020). The presence of role models who consistently practice proper hand hygiene also encourages others to follow suit (Al-Maani et al., 2022). Conversely, a workplace culture that tolerates non-compliance or lacks adequate support can undermine hand hygiene efforts.

Common Misconceptions and Resistance to Hand Hygiene

Common misconceptions and resistance to hand hygiene pose significant challenges to infection control. Some healthcare workers and patients believe that hand hygiene is only necessary after contact with visibly contaminated surfaces or patients, neglecting the importance of routine hand

hygiene in preventing the spread of unseen pathogens (Yehouenou et al., 2020). Other misconceptions include concerns about skin irritation from frequent hand hygiene, time constraints, and a perceived lack of evidence supporting its effectiveness (Ahmadipour et al., 2022). Addressing these misconceptions through targeted education and awareness campaigns is crucial for overcoming resistance and promoting better compliance.

Role of Motivation and Reinforcement in Improving Attitude

Motivation and reinforcement play a vital role in improving attitudes towards hand hygiene. Healthcare workers and patients are more likely to adhere to hand hygiene guidelines when they understand the benefits and are motivated to protect themselves and others from infection (Silago et al., 2022). Implementing strategies such as providing feedback on hand hygiene performance, recognizing and rewarding good practices, and engaging leadership support can enhance motivation and reinforce positive attitudes (Ojanperä et al., 2022). For instance, Ojanperä et al. (2022) demonstrated that direct hand hygiene observations and feedback could significantly improve hand hygiene compliance among nurses and doctors in medical and surgical wards. Regular training sessions, educational materials, and reminders can also reinforce the importance of hand hygiene and its role in preventing infections (Alhassan et al., 2021).

2.1.4 Compliance with Hand Hygiene Protocols

Compliance with hand hygiene protocols is a critical component of infection prevention and control in healthcare settings. Adherence to established guidelines, such as the WHO's "Five Moments for Hand Hygiene," is essential for minimizing the transmission of pathogens (Issa et al., 2023). However, studies consistently show that achieving high levels of compliance remains a challenge. For instance, a study by Harun et al. (2023) in selected tertiary-care hospitals in

Bangladesh found varying levels of hand hygiene compliance among healthcare workers, emphasizing the need for continuous monitoring and improvement efforts. Various factors influence compliance rates, including the availability of resources, the complexity of the healthcare environment, and individual attitudes and beliefs (Yehouenou et al., 2020). Regular audits and feedback mechanisms are crucial for assessing and improving adherence to hand hygiene protocols (Ojanperä et al., 2022).

Numerous factors affect adherence to hand hygiene practices among healthcare workers and patients. These factors can be broadly categorized into individual, environmental, and organizational influences (Zimmerman et al., 2020). Individual factors include knowledge, attitudes, beliefs, and personal habits related to hand hygiene (Silago et al., 2022; Goodarzi et al., 2020). Environmental factors encompass the availability of hand hygiene facilities (e.g., sinks, soap, and alcohol-based hand sanitizers), workload, and time constraints (Yehouenou et al., 2020). Organizational factors involve hospital policies, leadership support, and the overall safety culture (Al-Maani et al., 2022). A study by Ahmadipour et al. (2022) highlighted that barriers such as time constraints, skin irritation, and lack of access to hand hygiene supplies can significantly impede compliance in intensive care units.

2.1.5 Self-Reported vs. Observed Hand Hygiene Behavior

There is often a discrepancy between self-reported and observed hand hygiene behavior, with self-reported rates typically overestimating actual compliance (Kiprotich et al., 2021). Healthcare workers and patients tend to report higher levels of adherence than what is observed through direct observation (Kiprotich et al., 2021). This discrepancy may be attributed to social desirability bias, where individuals provide responses that they believe are more socially

acceptable or aligned with expectations (Gaubé et al., 2021). To obtain a more accurate assessment of hand hygiene practices, direct observation methods are essential (Ojanperä et al., 2022). Combining self-reported data with observational data can provide a more comprehensive understanding of hand hygiene behavior and identify areas for improvement (Sagar et al., 2020).

Direct observation and feedback have been shown to be effective strategies for improving hand hygiene practices. Providing healthcare workers with direct feedback on their hand hygiene performance can increase awareness and promote behavioral change (Ojanperä et al., 2022). Direct observation allows for the identification of specific areas where improvement is needed and enables targeted interventions to address these gaps. A study by Ojanperä et al. (2022) demonstrated that implementing direct hand hygiene observations and feedback significantly improved compliance among nurses and doctors in medical and surgical wards. Similarly, Al-Maani et al. (2022) found that implementing a hand hygiene role model project increased healthcare workers' compliance through observation and positive reinforcement. These findings highlight the importance of implementing regular monitoring and feedback mechanisms to enhance hand hygiene practices in healthcare settings.

2.1.6 Lack of Knowledge and Awareness

A significant barrier to effective hand hygiene compliance is the lack of knowledge and awareness regarding the importance of hand hygiene in preventing infections (Subbalakshmi et al., 2020; Ahmed et al., 2020). When healthcare workers and patients are not fully aware of the critical moments for hand hygiene or the proper techniques, compliance tends to be lower (Srigley et al., 2020). Studies such as Olorunfemi et al. (2020), which focused on nursing students' knowledge and practice of infection control at the University of Benin Teaching

Hospital, Nigeria, highlight the necessity of continuous education and training to bridge knowledge gaps. A lack of understanding regarding the chain of infection and the modes of transmission can also undermine hand hygiene efforts (Subbalakshmi et al., 2020).

Workload and Time Constraints

Workload and time constraints are frequently cited as barriers to hand hygiene compliance, particularly in busy clinical settings (Ahmadipour et al., 2022; Yehouenou et al., 2020). Healthcare workers often face heavy workloads, high patient-to-staff ratios, and time pressures that can lead to neglecting hand hygiene practices (Ahmadipour et al., 2022). When healthcare workers perceive that they do not have enough time to perform hand hygiene adequately, they may skip or rush the process, compromising its effectiveness (Daulay et al., 2021). The perceived lack of time can also lead to the prioritization of other tasks over hand hygiene, especially when immediate patient needs appear more pressing (Sham et al., 2021).

2.1.7 Availability and Accessibility of Hand Hygiene Facilities

The availability and accessibility of hand hygiene facilities significantly impact compliance rates. Inadequate access to sinks, soap, water, and alcohol-based hand sanitizers can hinder healthcare workers' ability to perform hand hygiene effectively (Yehouenou et al., 2020). When hand hygiene facilities are not readily available or conveniently located, healthcare workers may be less likely to adhere to recommended practices (Umar et al., 2022). Ensuring that hand hygiene resources are easily accessible in all patient care areas is essential for promoting compliance and reducing the risk of infection transmission (Yehouenou et al., 2020).

Skin Irritation and Other Personal Concerns

Skin irritation and other personal concerns, such as dryness and dermatitis, can also serve as barriers to hand hygiene compliance (Ahmadipour et al., 2022). Frequent handwashing, especially with harsh soaps or detergents, can lead to skin damage and discomfort, discouraging healthcare workers from adhering to recommended practices (Ahmadipour et al., 2022). Some healthcare workers may also have concerns about the safety and efficacy of alcohol-based hand sanitizers, leading them to avoid their use (Al-Mohaithef et al., 2020). Addressing these concerns through the provision of skin-friendly hand hygiene products and education on proper hand hygiene techniques can help improve compliance (Ragusa et al., 2021).

Organizational and Systemic Challenges

Organizational and systemic challenges, such as inadequate hospital policies, lack of supervision, and poor leadership support, can also impede hand hygiene compliance (Alhumaid et al., 2021). When healthcare facilities do not have clear hand hygiene policies or fail to enforce them consistently, healthcare workers may be less likely to adhere to recommended practices (Harun et al., 2023). A lack of supervision and feedback on hand hygiene performance can also undermine compliance efforts (Ojanperä et al., 2022). Strong leadership support, including the allocation of resources for hand hygiene initiatives and the promotion of a safety culture, is essential for overcoming these organizational barriers and improving hand hygiene compliance (Al-Maani et al., 2022). Al-Maani et al (2022) highlights impact of the hand hygiene role model project on improving healthcare workers' compliance and improved healthcare workers' compliance through observation and positive reinforcement. Rezk et al (2021) emphasizes the healthcare professionals' experiences of being observed regarding hygiene routines and its effect in vascular surgery. Hoffmann et al (2020) shows the Hand hygiene compliance in intensive care

units through an observational study. Also Knepper et al (2020) show the impact of automated hand hygiene monitoring system combined with a performance improvement intervention on hospital-acquired infections. These systemic and organizational factors must be addressed to create a supportive environment that prioritizes hand hygiene and reduces the risk of healthcare-associated infections (Mouajou et al., 2022).

2.1.8 Training and Education Programs

Training and education programs are fundamental in improving hand hygiene compliance among healthcare workers. These programs enhance knowledge, improve attitudes, and promote the adoption of best practices (Alhumaid et al., 2021). Effective training should cover the importance of hand hygiene, the correct techniques for handwashing and hand rubbing, and the specific moments when hand hygiene is required (Subbalakshmi et al., 2020). Bimerew and Muhawenimana (2022) emphasize that continuous education reinforces hand hygiene practices, contributing to better compliance. Saraswathy et al. (2021) demonstrated that applying interprofessional simulation improved knowledge, attitude, and practice in hospital-acquired infection control among health professionals. Therefore, regular and comprehensive training programs are essential components of a successful hand hygiene strategy.

Role of Hospital Management in Enforcing Policies

Hospital management plays a crucial role in enforcing hand hygiene policies and creating a supportive environment for compliance. Strong leadership support, clear policies, and consistent enforcement are essential for promoting hand hygiene practices (Alhumaid et al., 2021; Yehouenou et al., 2020). Hospital management should ensure that adequate resources are available for hand hygiene, including sinks, soap, water, and alcohol-based hand sanitizers

(Yehouenou et al., 2020). They should also establish accountability mechanisms and monitor hand hygiene performance regularly (Harun et al., 2023). Therefore, a proactive approach from hospital management is critical for fostering a culture of hand hygiene compliance.

Use of Reminders and Nudges

The use of reminders and nudges, such as posters and electronic monitoring systems, can effectively improve hand hygiene compliance. Visual reminders, such as posters and signs, can prompt healthcare workers to perform hand hygiene at the appropriate moments (Sham et al., 2021). Electronic monitoring systems, including automated hand hygiene monitoring, can provide real-time feedback on hand hygiene performance and identify areas for improvement (Knepper et al., 2020). Moreover, providing real time feedback could also prove effective (Rezk et al., 2021). Knepper et al. (2020) found that implementing an automated hand hygiene monitoring system, combined with a performance improvement intervention, reduced hospital-acquired infections. Therefore, integrating reminders and nudges into the healthcare environment can serve as a constant prompt and reinforce good hand hygiene practices.

Impact of Peer Influence and Role Modeling

Peer influence and role modeling significantly impact hand hygiene behavior among healthcare workers. When healthcare providers consistently practice good hand hygiene, they set a positive example for their colleagues and create a culture of compliance (Al-Maani et al., 2022). Positive peer influence can encourage healthcare workers to adhere to hand hygiene guidelines and support each other in maintaining high standards (Erasmus et al., 2020). Al-Maani et al. (2022) demonstrated that implementing a hand hygiene role model project increased healthcare workers' compliance through observation and positive reinforcement. Therefore, promoting positive peer

influence and fostering role models can contribute to a sustainable improvement in hand hygiene practices.

Technological Innovations in Hand Hygiene Monitoring

Technological innovations in hand hygiene monitoring offer opportunities to enhance compliance and reduce healthcare-associated infections. Automated hand hygiene monitoring systems, such as those using electronic sensors and real-time feedback, provide objective data on hand hygiene performance (Knepper et al., 2020). These systems can track hand hygiene events, identify areas where compliance is lacking, and provide targeted interventions to improve performance (Hoffmann et al., 2020). Hoffmann et al. (2020) conducted an observational study in intensive care units, demonstrating the potential of hand hygiene monitoring to improve compliance. Thus, technological innovations can play a vital role in promoting and sustaining effective hand hygiene practices in healthcare settings. Faujdar et al. (2020) shows hand hygiene knowledge, attitude, practice and hand microflora analysis of staff nurses in a rural tertiary care hospital. However, more research is required to understand the effect of technological innovations in low income settings. Also, the impact of artificial intelligence can be tested.

Multifaceted Approach

A multi-faceted approach is essential to improve hand hygiene compliance. Training programs, real time monitoring feedback, integration with Electronic Medical Records (EMR), integration of behavior change and peer to peer influence are all examples of aspects of a multi-faceted approach. Regular hand hygiene audits and compliance checks can also be employed, Ceparano et al (2024) shows results of cross-sectional study. It is important to note that the multi-faceted approach must be consistent.

2.2 Theoretical Review

2.2.1 Health Belief Model (HBM)

The Health Belief Model (HBM) is a psychological framework that explains and predicts health-related behaviors by focusing on individuals' beliefs and perceptions. Developed in the 1950s by social psychologists at the U.S. Public Health Service, the model was originally designed to understand why people failed to participate in preventive healthcare programs, such as vaccination and disease screenings. Over the years, it has been widely applied to various health behaviors, including chronic disease management, medication adherence, and lifestyle modifications.

Core Constructs of the Health Belief Model

The Health Belief Model is based on six core constructs that determine whether an individual will take a particular health-related action. These constructs include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

Perceived Susceptibility

Perceived susceptibility refers to an individual's belief about their likelihood of developing a specific health condition. People who believe they are at high risk of a disease are more likely to take preventive measures, while those who feel they have little or no risk may ignore health recommendations. For instance, a person with a family history of diabetes may feel more vulnerable to the disease and, as a result, adopt healthier eating habits and regular exercise to reduce their risk. Conversely, someone who believes they are not susceptible to a disease may not see the need for preventive actions.

Perceived Severity

The perceived severity of a disease or condition influences an individual's motivation to take action. This construct refers to how serious a person believes the consequences of an illness can be, including physical, emotional, social, or financial impacts. For example, if an individual understands that untreated high blood pressure can lead to stroke, heart disease, or kidney failure, they may be more inclined to adhere to prescribed medications and lifestyle modifications. On the other hand, if a person perceives an illness as mild or non-threatening, they may neglect necessary preventive measures.

Perceived Benefits

Even if a person acknowledges their susceptibility to a disease and understands its severity, they may not take action unless they believe the recommended behavior will bring significant benefits. Perceived benefits refer to the belief that a particular action will effectively prevent or manage a health condition. If individuals are convinced that regular exercise reduces their risk of heart disease or that vaccinations protect against infectious diseases, they are more likely to engage in these behaviors. The greater the perceived benefit, the more likely a person is to adopt the recommended health behavior.

Perceived Barriers

Despite recognizing the benefits of a health-related action, individuals may still be discouraged by perceived barriers. These are obstacles that make it difficult for people to engage in health-promoting behaviors. Barriers can include financial constraints, time limitations, fear of side effects, social stigma, or lack of access to healthcare facilities. For example, a person may avoid

getting a flu shot because they fear adverse reactions or believe the process is inconvenient. If the perceived barriers outweigh the perceived benefits, individuals are less likely to adopt the recommended health behavior.

Cues to Action

Cues to action are external or internal triggers that prompt individuals to take health-related actions. These can come in the form of health campaigns, advice from medical professionals, personal experiences, or even symptoms of illness. For instance, a public health advertisement about the dangers of smoking may encourage someone to quit, while a personal encounter with a friend who suffered from lung cancer might serve as a powerful motivator to avoid tobacco use. Without adequate cues to action, even individuals with high awareness of health risks may fail to change their behavior.

Self-Efficacy

Self-efficacy, a concept introduced into the Health Belief Model in the 1980s, refers to an individual's confidence in their ability to perform a specific health-related behavior successfully. People with high self-efficacy believe they can overcome obstacles and persist in their efforts, even in the face of difficulties. For example, an individual attempting to lose weight through exercise and diet modification is more likely to succeed if they believe they have the ability to maintain these changes over time. On the other hand, someone with low self-efficacy may quickly give up if they do not see immediate results.

Strengths of the Health Belief Model

One of the key strengths of the Health Belief Model is its ability to provide a structured approach to understanding health behaviors. It helps public health practitioners and policymakers design

effective health promotion programs by identifying the psychological factors that influence people's decision-making processes. The model is also useful in predicting health behaviors across different populations and health conditions. By focusing on individual perceptions, the HBM allows for tailored interventions that address specific beliefs and barriers unique to different communities.

Limitations of the Health Belief Model

Despite its usefulness, the Health Belief Model has several limitations. One major criticism is that it does not account for habitual behaviors that influence health actions, such as addiction or ingrained lifestyle patterns. Additionally, the model primarily focuses on individual decision-making and does not consider broader social, cultural, and environmental influences. For instance, peer pressure, economic conditions, and social norms can significantly impact health behaviors but are not adequately addressed in the HBM framework. Another limitation is that the model assumes people always make rational decisions regarding their health, when in reality, emotions, fear, and misinformation often play a role in health-related choices.

2.2.2 Application of the Health Belief Model (HBM) to the Study

The Health Belief Model (HBM) serves as an effective theoretical framework for understanding the knowledge and practice of hand hygiene in infection control among patients in medical and surgical wards. This model helps explain why some patients adhere to proper hand hygiene while others do not, by examining their beliefs regarding susceptibility to infections, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.

Perceived Susceptibility

Patients' belief about their risk of contracting infections due to poor hand hygiene influences their compliance with infection control practices. Those who understand that unwashed hands can harbor harmful microorganisms and contribute to hospital-acquired infections (HAIs) are more likely to adopt proper hand hygiene practices. Conversely, those who underestimate their susceptibility may neglect handwashing, assuming infections only affect critically ill patients or healthcare workers.

Perceived Severity

The extent to which patients recognize the consequences of hospital-acquired infections determines their commitment to hand hygiene. If they believe that poor hand hygiene can lead to severe infections, prolonged hospital stays, or even life-threatening conditions such as sepsis, they are more likely to adhere to proper handwashing practices. However, if they view infections as minor or easily treatable, they may not prioritize hand hygiene.

Perceived Benefits

Patients who understand that proper hand hygiene reduces the spread of infections, improves recovery rates, and minimizes complications are more likely to practice it consistently. If they believe that simple actions like handwashing before meals, after using the toilet, or after touching medical equipment can prevent illness, they are more likely to follow hygiene protocols. However, those unaware of these benefits may see hand hygiene as an unnecessary burden.

Perceived Barriers

Even when patients acknowledge the importance of hand hygiene, certain barriers may prevent them from practicing it regularly. These barriers may include lack of access to clean water, unavailability of soap or hand sanitizers, physical disability, forgetfulness, or misconceptions about hand hygiene. Some patients may also believe that gloves alone provide sufficient protection, reducing their motivation to wash hands. Addressing these barriers through improved facility management and patient education is crucial for enhancing compliance.

Cues to Action

External and internal prompts play a significant role in encouraging hand hygiene among patients. Cues to action may come from healthcare providers reminding patients to wash hands, visual reminders such as posters in hospital wards, peer influence, or personal experiences with infections. Patients who receive frequent reminders from nurses and doctors or who have witnessed the consequences of poor hygiene in other patients are more likely to take preventive measures seriously.

Self-Efficacy

A patient's confidence in their ability to practice proper hand hygiene effectively influences their behavior. If patients believe they can consistently wash hands at the right times, use hand sanitizers correctly, and follow infection control measures, they are more likely to adhere to hygiene protocols. Providing education, demonstrations, and support can improve self-efficacy, ensuring that patients develop lasting hand hygiene habits.

2.3 Empirical Review

Knowledge of hand hygiene among patients in medical and surgical wards

In a study conducted by Gaube et al., (2021) on hospital patients' and visitors' hand hygiene behavior, the researchers applied three theoretical models: The Theory of Planned Behavior (TPB), the Health Action Process Approach (HAPA), and the Theoretical Domains Framework (TDF). A total of 1,605 patients and visitors were surveyed, and data were analyzed using structural equation modeling. The results showed that among patients, 52% of the variance in hand hygiene behavior was explained by the TDF domains, 44% by the HAPA model, and 40% by the TPB factors. Among visitors, these figures were 59%, 37%, and 55%, respectively. The study identified self-regulatory and social influence processes as key determinants of hand hygiene behavior. The authors concluded that the TDF model was the most effective in explaining hand hygiene practices and recommended incorporating patients and visitors into behavior change interventions to enhance hand hygiene adherence.

Similarly, Abalkhail et al. (2021) conducted a cross-sectional study in Qassim, Saudi Arabia, to assess healthcare workers' knowledge, attitude, and practice (KAP) regarding standard infection control precautions. Using an online structured questionnaire, 213 healthcare workers participated, and data were analyzed through multivariate logistic regression and independent sample t-tests. The results indicated that 67.6% had good knowledge, 61.5% had a positive attitude, and 73.2% demonstrated good practice. Predictors of good knowledge included being older than 34 years (AOR: 30.5, $p < 0.001$) and having undergone training (AOR: 13.3, $p < 0.001$). More than six years of work experience significantly predicted a positive attitude (AOR: 5.5, $p < 0.001$), while good practice was associated with over six years of experience (AOR: 2.9,

$p < 0.01$), previous exposure to HAIs (AOR: 2.5, $p < 0.05$), and training (AOR: 3.5, $p < 0.01$). The study concluded that training was essential in improving knowledge and fostering positive attitudes and practices among healthcare workers.

Further, Sham et al. (2021) examined nurses' knowledge and practice regarding the prevention of surgical site infections (SSI) in Malaysia. This cross-sectional study surveyed 306 nurses in two public hospitals using self-administered questionnaires. Data analysis revealed that 85.3% of nurses had good knowledge, and 97.7% demonstrated good practice concerning SSI prevention. However, there was no significant difference between knowledge and practice levels ($\chi^2 = 1.10$; $p = 0.28$). The study emphasized the need for continuous education and reinforcement of SSI prevention measures among nurses.

Additionally, Bimerew and Muhawenimana (2022) investigated nurses' knowledge, attitudes, and practices concerning handwashing in infection prevention and control at a psychiatric hospital. Using a descriptive survey design, 195 nurses across different categories participated. The findings showed that male nurses had slightly higher knowledge scores (92.5) compared to female nurses (91.41), while female nurses exhibited better attitudes (96.06 vs. 95.09) and higher handwashing practice scores (95.63 vs. 94.66). Educational level influenced knowledge but had a lesser impact on attitudes and practices. The study highlighted knowledge gaps and overestimation of hand hygiene compliance, recommending continuous monitoring and training to ensure adherence to proper handwashing techniques.

Moreover, Manshadi et al. (2022) conducted an analytical cross-sectional study in a tertiary hospital in Tehran, Iran, to assess nurses' knowledge and perception of hand hygiene. A standardized WHO questionnaire was administered to 101 nurses. Of the participants, 88.1%

were female, and 80.2% had received formal hand hygiene training. The average estimated prevalence of healthcare-associated infections (HCAIs) was 38.91%, with 97.1% of respondents acknowledging hand hygiene as an effective preventive measure. However, 47.5% found hand hygiene practice difficult. There was no significant difference in self-reported hand hygiene practice based on age ($p = 0.68$), education level ($p = 0.574$), work experience ($p = 0.64$), or work department ($p = 0.131$). However, there was a significant inverse relationship between the perceived difficulty of hand hygiene and adherence ($p = 0.049$). The study concluded that knowledge and perception of hand hygiene among nurses were suboptimal, underscoring the need for structured training and regular monitoring to enhance compliance.

Practice of hand hygiene among patients in medical and surgical wards

In a study conducted by Kiprotich et al. (2021), the observed and self-reported hand hygiene compliance and associated factors among healthcare workers (HCWs) in a county referral hospital in Kenya were examined. A cross-sectional study design was employed, utilizing direct observation guided by the five moments for hand hygiene concept to describe compliance. Additionally, a questionnaire informed by the Theoretical Domains Framework (TDF) was used to investigate self-reported hand hygiene compliance along with its barriers and facilitators. The study observed 347 hand hygiene opportunities among 55 HCWs and collected questionnaire responses from 132 HCWs. Findings indicated that observed hand hygiene compliance was 23.9%, whereas self-reported compliance was significantly higher at 80.0%. Compliance was significantly associated with indication ($p < 0.001$), training ($p = 0.014$), social influences ($p = 0.002$), and knowledge ($p = 0.044$). Identified barriers included environmental resources, social influences, beliefs about consequences, memory, attention, and decision-making processes,

whereas facilitators were knowledge and social/professional roles. The study concluded that despite high self-reported compliance rates, observed compliance remained unacceptably low. Knowledge and professional identity were crucial facilitators, while environmental barriers hindered compliance, necessitating targeted interventions to enhance hand hygiene adherence and improve patient care quality.

Nzanga et al. (2022) investigated adherence to hand hygiene guidelines among nurses and clinicians at Chiradzulu District Hospital, Malawi. This quantitative cross-sectional study employed stratified random sampling to recruit 75 nurses and clinicians. Data collection involved self-administered questionnaires ($n = 75$), observation checklists ($n = 7$), and structured observations ($n = 566$). The results revealed low adherence to hand hygiene practices among HCWs. Reported hand hygiene practices were consistently higher than observed practices across all five moments of hand hygiene outlined by the World Health Organization (WHO). The study emphasized the necessity of integrating infrastructure improvements, availability of consumables such as soap, and theory-driven behavior change interventions to encourage recommended hand hygiene practices. However, demographic factors such as age, profession, and ward were not significant predictors of hand hygiene performance.

Ragusa et al. (2021) assessed adherence to handwashing practices among HCWs and its variations over time, particularly in response to the COVID-19 pandemic. The study, conducted from January 1, 2015, to December 31, 2020, used direct observation to assess compliance with the WHO's Five Moments for Hand Hygiene across different hospital specialties and HCW categories. A total of 13,494 hand hygiene opportunities were observed, with nurses being the most frequently observed category. Findings indicated that the hospital's global adherence to

WHO guidelines remained relatively stable over six years, with a notable increase in compliance within Intensive Care Units (ICU) during the pandemic. Additionally, in 2020, there was a significant increase in glove use before patient contact. Despite heightened awareness due to the pandemic, the study concluded that achieving sustained and widespread adherence to proper hand hygiene practices remains a challenge.

Yehouenou et al. (2022) explored hand hygiene behavior in a public hospital in Benin using the Theoretical Domains Framework (TDF) to identify behavioral determinants influencing compliance. This qualitative study involved semi-structured face-to-face interviews with nine HCWs, focusing on infection transmission, hand hygiene practices, barriers, and potential improvements. Data analysis followed a three-step approach: coding, generation of specific beliefs, and identification of relevant domains. The study found that environmental constraints, such as lack of water, were the primary barriers to compliance. HCWs acknowledged the influence of role models on good hand hygiene practices and expressed confidence in their ability to perform appropriate hand hygiene. Most participants had the necessary knowledge and skills to adhere to proper hand hygiene practices and recognized its importance in reducing healthcare-associated infections (HAIs). The study concluded that targeted interventions addressing environmental barriers and leveraging social influence could enhance hand hygiene compliance.

In a study by Gülşen et al. (2022), surgical handwashing practices among operating room staff in Turkey were evaluated using a descriptive and cross-sectional study design. The study included 66 surgeons and operating room nurses. Data collection utilized a Staff Information Form for sociodemographic data and a Surgical Hand Washing Procedure Checklist based on guidelines

from the Centers for Disease Control and Prevention (CDC), WHO, and the Association of Surgical Technologists (AST). Observations revealed that 77.3% of staff dressed appropriately for the operating room, 56.1% correctly wet their hands and forearms, and 72.7% used a sufficient amount of antiseptic solution. However, 51.5% improperly performed the surgical handwashing procedure, and 47% did not rinse their hands and arms correctly. None of the participants fully completed all steps of the surgical handwashing process. The study concluded that surgical handwashing compliance was suboptimal, emphasizing the need for periodic in-service training and visual reminders, such as instructional posters, to improve adherence.

Factors influencing the level of practice of hand hygiene among patients in medical and surgical wards

In a study conducted by Gaube et al., (2021), the hand hygiene behavior of hospital patients and visitors was investigated using three theoretical models: the Theory of Planned Behavior (TPB), the Health Action Process Approach (HAPA), and the Theoretical Domains Framework (TDF). A total of 1,605 patients and visitors participated in the survey. Structural equation modeling was used to analyze the data. The study found that among patients, 52% of the variance in hand hygiene behavior was explained by TDF, 44% by HAPA, and 40% by TPB. For visitors, these values were 59%, 37%, and 55%, respectively. The study concluded that TDF was the most suitable model for explaining hand hygiene practices among non-professionals and recommended interventions focusing on self-regulatory and social influence processes.

Ahmadipour et al. (2022) conducted a qualitative study to explore barriers to hand hygiene compliance among healthcare workers in intensive care units during the COVID-19 pandemic. Using purposive sampling, 25 healthcare workers participated in semi-structured interviews.

Thematic analysis was applied following the Lundman and Graneheim approach, and the COREQ checklist was used for reporting. The study identified three major categories of barriers: individual barriers (lack of knowledge and improper attitudes), management-related barriers (wrong behavioral patterns and inadequate training), and organizational barriers (heavy workload, poor ward design, lack of equipment, and low-quality supplies). The study concluded that although hand hygiene practice increased during the pandemic, persistent barriers hindered compliance. Addressing these barriers could enhance adherence to hand hygiene practices.

Al-Maani et al. (2022) evaluated the impact of a national hand hygiene role model project on healthcare workers' compliance in a quasi-experimental observational study across four hospitals. The study involved a pretest–posttest design with four phases: baseline assessment, intervention, three-month post-intervention assessment, and follow-up after 15 months. The intervention included leadership involvement, hand hygiene messaging, role model selection, and training. A total of 5,796 observations were recorded for hand hygiene moments. Results showed a significant increase in compliance from 52.6% at baseline to 74.1% post-intervention and 70.0% at follow-up. The study concluded that the role model intervention, in conjunction with the WHO multimodal strategy, effectively improved and sustained hand hygiene compliance.

Alshagrawi and Alhodaithy (2024) conducted a qualitative study to identify determinants of hand hygiene compliance among healthcare workers in intensive care units in Riyadh, Saudi Arabia. The study involved content analysis of interviews with 49 healthcare workers, including doctors, anesthesiologists, and nurses, with an average age of 38 and eight years of experience. Participants highlighted individual, work/environment, team, task, patient, organizational, and management concerns as key factors affecting compliance. The study concluded that

understanding these factors could help develop strategies to enhance compliance with hand hygiene protocols in intensive care units.

Ataiyero et al., (2023) explored barriers and facilitators to hand hygiene practices in Nigerian hospitals through a qualitative interview study with thematic analysis. The study focused on nurses and doctors working in surgical wards. It identified individual factors such as knowledge, perceived risks, memory, social influence, and skin irritation, as well as institutional factors such as environment, resource availability, workload, and staffing levels. The study concluded that while adequate resources were a primary recommendation, small local interventions such as improved soap quality, reminders, and mentorship could significantly improve compliance with hand hygiene practices.

2.4 Summary of literature review

The literature review examined various aspects of hand hygiene and infection control among patients in medical and surgical wards. Studies have consistently highlighted the critical role of hand hygiene in preventing hospital-acquired infections (HAIs), emphasizing that proper handwashing practices significantly reduce the spread of pathogens within healthcare settings.

Several studies explored patients' knowledge and awareness of hand hygiene, revealing varying levels of understanding. While some patients recognize the importance of hand hygiene in infection control, others lack adequate knowledge due to limited health education, misconceptions, or poor reinforcement by healthcare providers. Factors such as educational background, exposure to healthcare information, and previous experiences with infections influence patients' awareness and compliance with hand hygiene practices.

The review also analyzed the practice of hand hygiene among patients, indicating that compliance is often inconsistent. Many patients fail to follow proper hand hygiene guidelines due to barriers such as lack of access to clean water, soap, or hand sanitizers, physical limitations, forgetfulness, or reliance on healthcare workers to prevent infections. Studies suggest that structured education programs, visual reminders, and healthcare provider encouragement can improve adherence to hand hygiene practices.

The Health Belief Model (HBM) was identified as a relevant theoretical framework in understanding patient behavior regarding hand hygiene. The model explains how perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy influence patients' adherence to infection control practices. Addressing these factors through awareness campaigns, improved facilities, and behavioral reinforcement strategies can enhance compliance with hand hygiene protocols.

The literature highlights the importance of knowledge, attitude, and behavioral reinforcement in improving hand hygiene practices among patients. Effective interventions such as education, provision of hand hygiene resources, and the use of cues to action can enhance patient compliance, ultimately reducing infection rates in medical and surgical wards. Future research should explore innovative strategies to sustain long-term adherence to hand hygiene practices among hospitalized patients.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the research methodology that the researcher adopted in conducting this study. The various components of research methodology was discussed under their respective headings, including research design, study setting, target population, sample and sampling technique, instruments of data collection, validity and reliability of instruments, method of data collection, method of data analysis, and ethical considerations.

3.1 Research Design

The study adopts a descriptive cross-sectional design to assess the awareness and practices of hand hygiene among patients in some selected wards in a Tertiary Hospital in Benin City. This design is suitable for capturing data at a specific point in time and allows for the identification of factors influencing behavior. It provides a snapshot of the current situation, which is essential for understanding the baseline levels of awareness and practice.

3.2 Research setting

The research was conducted in some selected ward University of Benin Teaching Hospital. UBTH is a tertiary healthcare facility which was established in 1973. It is located in Ugbowo, Egor Local Government Area. Edo State comprise of 18 local government areas. Egor Local government area where University of Benin Teaching Hospital is located falls within the southern senatorial district of Nigeria. UBTH offers both clinical and diagnostic services and offers a wide range of services, which makes it an important healthcare facility in the state, region and the nation at large. It is estimated that UBTH has a bed capacity of over nine hundred

and ten (910) (UBTH, 2024). UBTH has nineteen (19) clinical departments and three (3) Medical Laboratory Department and 3 emergency departments. These departments offer emergency services for the general/primary health needs of the people. They offer both outpatient and in-patient services and they are staffed with health professionals such as Doctors, Nurses and paramedics to carry out their daily routines.

3.3 Target Population

The target population comprises of patient admitted in some selected ward in University of Benin Teaching Hospital (UBTH), Ugbowo, Benin City, which are Male medical ward (A1), Female medical ward (A3), Female surgical ward (A4), Female orthopedic ward (FOW), Oncology ward (C2), Male surgical ward 1 (B2) , Male surgical ward 2 (B4), Male orthopedic ward (MOW), (C1), Gynecological ward (A2), Intensive care unit (ICU) in university of Benin Teaching Hospital , Benin City, Egor Local government , Edo state.

Table 3.1 Number of beds in medical and surgical unit

Wards (Units)	Number of beds
Male medical ward (A1)	32
Female medical ward (A3)	30
Female surgical ward (A4)	31
Female orthopedic ward (FOW)	32
Oncology ward (C2)	29
Male surgical ward 1 (B2)	33
Male surgical ward 2 (B4)	32

Male orthopedic ward (MOW)	27
General medical ward (C1)	24
Gynecological ward (A2)	33
Total	303

3.4 Sample Size Determination

The sample size was calculated using Slovin's formula, which is suitable when the population size is known and the degree of precision is specified.

Slovin's Formula:

$$n = \frac{N}{1 + N(e)^2} \quad n = \frac{N}{1 + N(e)^2}$$

Where:

- n = sample size
- N = population size (303)
- e = margin of error (0.05 or 5%)

Substituting the values:

$$n = \frac{303}{1 + 303(0.05)^2}$$

$$n = \frac{303}{1 + 303(0.0025)}$$

$$n = \frac{303}{1 + 0.7575}$$

$$n = \frac{303}{1.7575}$$

$$n = 172.4$$

adding attrition rate of 10% which is 17.4

$$172 + 17.2 = 189.4$$

Therefore, the sample size is approximately 190

3.5 Sampling Technique

A convenience sampling method was employed in selecting 190 patients who are readily accessible from the selected wards. This approach simplified the data collection process, though it may limit the generalizability of the findings due to potential sampling bias.

3.6 Instrument for data collections

The instrument design for data collection for this research is a self-constructed questionnaire. The questionnaire was carefully constructed to give a depth understanding of the topic and the relevant to the study. The questionnaire contained questions with four sections (A, B C, D).

Section A: Socio-demographic data

Section B: Awareness of hand hygiene among patients

Section C: Practice of hand hygiene among patients

Section D: Factors influencing the extent of practice of hand hygiene among patients

3.7 Validity

The instrument was tested for validity using face and content validity method which ensure that the instrument supplied answers to the research questions in the study. This was scrutinized by

the project supervisor and corrections was effected before administering the instrument to respondents.

3.8 Reliability of Instrument

This refers to the consistency of a measure according to Nwachukwu, 2015. To ensure the reliability of the instrument, the reliability of instrument was determined through test re-test method. 10% of the sampled population which 19 was administered in the questionnaire. The population comprised adult patients (18 years and above) admitted to the University of Benin, Healthcare Center which are outside the sampled population. A correlation coefficient of 0.8 was obtained. Which is satisfactory is enough to establish that the instrument used is reliable for the study.

3.9 Method of data collection

The questionnaires was administered to the research participants on a daily basis after a careful explanation of the topic, and the questionnaire was retrieved on the spot. This process was continued until the desired sample size is obtained.

3.10 Method of Data Analysis

Data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 29.0. The gathered data was organized, analyzed, and described using simple frequency tables and percentages, as well as pie charts and bar charts to provide meaning to the research findings. Brief descriptions of the findings was included in the tables to offer a clearer picture of the outcomes and detailed interpretations for easier understanding.

3.11 Ethical consideration

Ethical approval was obtained from the Health Research Committee, University of Benin Teaching Hospital, Benin City. Permission was obtained from the various ward managers before proceeding with the research. Before data collection begins, participants received detailed explanations about the research's purpose, content, and implications. They were assured of confidentiality, ensuring the protection of their personal and private information. Throughout the research, ethical guidelines were strictly adhered to, including the following considerations:

Confidentiality: Respondents' information was treated confidentially, with no request for names or addresses in the questionnaire. Participants will understand that their responses are confidential and solely used for research purposes. No personal identifiers was used in any document or questionnaire to maintain anonymity.

Voluntary Participation: Participants was informed of their right to voluntary participation without facing penalties or bias. They can choose to withdraw or decline to provide information at any point if they feel uncomfortable or unsure.

Avoidance of Plagiarism: Proper citation of all authors used in the study was ensured, both within the content and in the reference page.

CHAPTER FOUR

RESULT AND FINDINGS

This chapter deals with the representation of data collected from respondents on the awareness and practice of hand hygiene on infection control among patients in a tertiary hospital in benin city. A total of 190 questionnaires were distributed to patient admitted in some selected ward in University of Benin Teaching Hospital (UBTH), out of which 185 was properly filled and valid for data analysis, giving a response rate of 97.37%.

Table 4.1: Socio-demographic characteristics of respondents

Variable	Frequency (n = 185)	Percent (%)
Age		
18-24	6	3.2
25-34	34	18.4
35-44	65	35.1
45-54	35	18.9
55 and above	45	24.3
Gender		
Male	79	42.7
Female	106	57.3
Ethnicity		
Edo	67	36.2
Yoruba	32	17.3
Igbo	44	23.8

Hausa	26	14.1
Other	16	8.6
Marital Status		
Single	69	37.3
Married	57	30.8
Divorced/separated	36	19.5
Widowed	23	12.4
Education level		
None	13	7.0
Primary	23	12.4
Secondary	60	32.4
diploma or equivalent	15	8.1
Bachelor's degree	44	23.8
Master's degree	30	16.2
Phd	0	0

Table 4.1 Cont'd

Variable	Frequency (n = 185)	Percent (%)
Employment Status		
Employed full-time	35	18.9
Employed part-time	16	8.6
Self-employed	39	21.1
Unemployed	18	9.7
Student	35	18.9
Retired	12	6.5
Homemaker	30	16.2
Religious Affiliation		
Christianity	95	51.4
Islam	69	37.3
traditional	20	10.8
Other	1	0.5
Disability Status		
Yes	112	60.5
No	17	9.2
Prefer not to say	56	30.3

Table 4.1 presents the socio-demographic characteristics of 185 respondents, showing a diverse population in terms of age, gender, ethnicity, marital status, education, employment, religion, and disability status. The largest age group was 35–44 years (35.1%), followed by 55+ (24.3%)

and 45–54 (18.9%). Females slightly outnumbered males (57.3% vs. 42.7%). The Edo ethnic group was the most represented (36.2%), with notable Igbo (23.8%), Yoruba (17.3%), and Hausa (14.1%) representation. Most respondents were single (37.3%) or married (30.8%). Educational levels varied, with secondary education being most common (32.4%), followed by bachelor's (23.8%) and master's degrees (16.2%). Employment status was led by the self-employed (21.1%), full-time workers and students (18.9% each). Christians formed the majority (51.4%), followed by Muslims (37.3%). A significant proportion (60.5%) reported having a disability, while 30.3% preferred not to disclose. These demographics provide key context for understanding hand hygiene awareness and practices.

Research Question 1: What is the level of level of awareness hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?

Table 4.2: Awareness of hand hygiene among patients (n=185)

Items	Frequency (%)	Correct	Wrong	Mean	Remark
What is the primary purpose of hand hygiene in hospitals?					
To prevent the spread of infections	147 (79.5)	147 (79.5)	38 (20.5)	1.8	Good
To make hands smell nice	18 (9.7)				
To reduce the need for medical treatment	20 (10.8)				
When is the best time to practice hand hygiene in a hospital setting?					
Before and after touching a wound	133 (71.9)	133 (71.9)	52 (28.1)	1.7	Good

Only before eating food	27 (14.6)
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Only when hands look dirty	25 (13.5)
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Which of the following is the most effective way to clean hands?

Washing with soap and water for at least 20 seconds	139 (75.1)	139 (75.1)	46 (24.9)	1.8	Good
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Rinsing hands quickly with water	21 (11.4)
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Wiping hands on clothes	25 (13.5)
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Recommended alcohol content in hand sanitizers for effectiveness?

At least 60% alcohol	128 (69.2)	128 (69.2)	57 (30.8)	1.7	Good
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20% alcohol	32 (17.3)
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100% alcohol	25 (13.5)
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Which of these diseases can be prevented through hand hygiene?

Diarrhea and respiratory infections	151 (81.6)	151 (81.6)	34 (18.4)	1.8	Good
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High blood pressure	16 (8.6)
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Diabetes	18 (9.7)
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Which of the following is NOT a recommended hand hygiene practice?

Sharing towels with other patients	149 (80.5)	166(89.7)	19 (10.3)	1.9	Good
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Using hand sanitizer when soap and water are not available	19 (10.3)
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Using the same tissue multiple times 17 (9.2)

Table 4.2 Cont'd

Items	Frequency (%)	Correct	Wrong	Mean	Remark
What should a patient do after using the toilet in a hospital?					
Wash hands with soap and water	157 (84.9)	157 (84.9)	28 (15.1)	1.8	Good
Just rinse hands with water	12 (6.5)				
Wipe hands on hospital gown	16 (8.6)				
Why is hand hygiene important before touching medical equipment?					
To reduce risk of infection	143 (77.3)	143 (77.3)	42 (22.7)	1.8	Good
To make equipment last longer	23 (12.4)				
To make hands look cleaner	19 (10.3)				
	Grand Mean			1.8	Good

Mean Cut-off = 1.5

The findings presented in Table 4.2 provide a comprehensive assessment of the level of awareness of hand hygiene among patients in selected wards at the University of Benin Teaching Hospital. Across the various items measuring awareness, the responses indicate a generally good level of knowledge. For instance, a large majority of respondents (79.5%) correctly identified that the primary purpose of hand hygiene in hospitals is to prevent the spread of infections, reflecting a strong understanding of its fundamental importance. Similarly, 71.9% were aware

that hand hygiene should be practiced before and after touching a wound, and 75.1% correctly noted that washing with soap and water for at least 20 seconds is the most effective method of cleaning hands. Patients also demonstrated awareness regarding the recommended alcohol content in sanitizers, with 69.2% correctly identifying that hand sanitizers should contain at least 60% alcohol to be effective. Additionally, 81.6% understood that diseases like diarrhea and respiratory infections can be prevented through proper hand hygiene, further indicating health literacy in this area. When it came to identifying poor hygiene practices, 80.5% recognized that sharing towels with other patients is not recommended, and a high 84.9% stated that hands should be washed with soap and water after using the toilet. The importance of hand hygiene before touching medical equipment was also acknowledged by 77.3% of respondents, who correctly stated that it reduces the risk of infection. Overall, each of the items recorded a mean score between 1.7 and 1.9, all above the cut-off mean of 1.5, leading to a grand mean of 1.8. This clearly indicates a good level of awareness among the patients surveyed. The data suggest that most patients in the selected wards have a sound understanding of hand hygiene practices, its timing, methods, and relevance to infection prevention an encouraging foundation for effective infection control within the hospital setting.

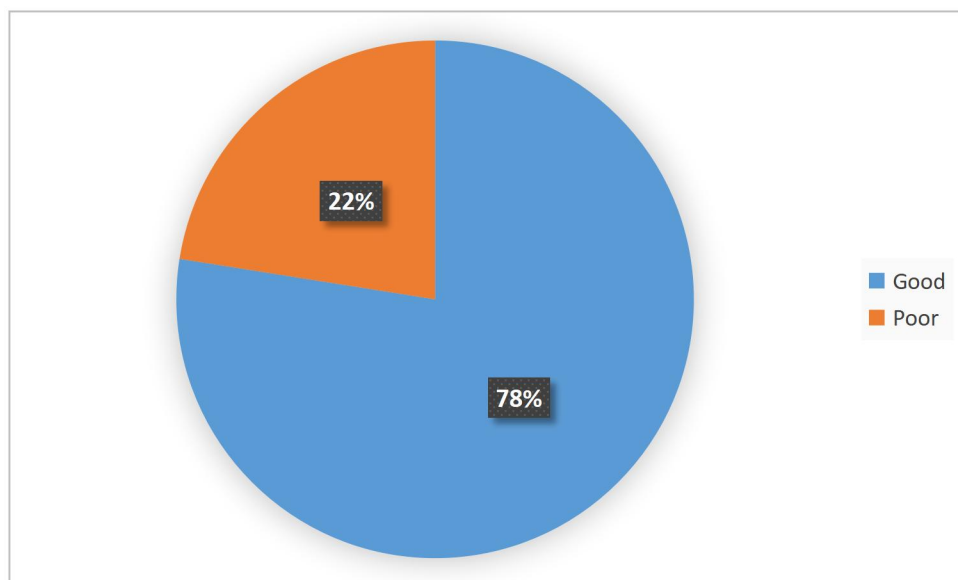


Figure 4.1: Pie chart showing the awareness of hand hygiene among patients

Figure 4.1 illustrates the overall awareness of hand hygiene among patients in the medical and surgical wards. The pie chart shows that a significant majority 143 (77.5%) demonstrated good awareness, while 42 (22.5%) had poor awareness.

Research Question 2: What is the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?

Table 4.3: Practice of hand hygiene among patients

Items	Always	Sometimes	Rarely	Never	Mean	Remark
How often do you wash your hands before eating?	103 (55.7)	47 (25.4)	22 (11.9)	13 (7.0)	3.3	Good
How often do you wash your hands after using the toilet?	135 (73.0)	31 (16.8)	11 (5.9)	8 (4.3)	3.6	Good
How often do you use hand sanitizer	28 (15.1)	87(47.0)	54 (29.2)	16 (8.6)	2.7	Good

when soap and water are unavailable?

How often do you wash your hands	76 (41.1)	51 (27.6)	32 (17.3)	26 (14.1)	3	Good
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after touching hospital surfaces (e.g.,

bed rails, doorknobs, IV stands)?

How often do you wash your hands	34 (18.4)	49 (26.5)	81 (43.8)	21 (11.4)	2.5	Good
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after coughing or sneezing?

How often do you wash your hands	92 (49.7)	44 (23.8)	30 (16.2)	19 (10.3)	3.1	Good
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after receiving care from a healthcare

worker?

How often do you remind other	49 (26.5)	43 (23.2)	51 (27.6)	42 (22.7)	2.5	Good
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patients or visitors to practice hand

hygiene?

How often do you follow hand	108 (58.4)	39 (21.1)	23 (12.4)	15 (8.1)	3.3	Good
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hygiene instructions given by hospital

staff?

How often do you use soap and water	112 (60.5)	38 (20.5)	22 (11.9)	13 (7.0)	3.3	Good
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instead of just rinsing your hands

with water?

How often do you dry your hands	101 (54.6)	40 (21.6)	28 (15.1)	16 (8.6)	3.2	Good
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properly after washing them?

Grand Mean

3.1

Good

Mean cut off = 2.5

Table 4.3 shows that the extent of hand hygiene practice among patients was generally good, with the highest mean recorded for washing hands after using the toilet (mean = 3.6), followed by washing hands before eating (mean = 3.3), using soap and water instead of just rinsing (mean = 3.3), and following hand hygiene instructions from hospital staff (mean = 3.3). Washing hands properly after washing (mean = 3.2) and after receiving care from healthcare workers (mean = 3.1) also showed high compliance. Washing hands after touching hospital surfaces had a mean of 3.0, while the use of hand sanitizers when soap and water were unavailable scored 2.7. Washing hands after coughing or sneezing (mean = 2.5) and reminding others to practice hand hygiene (mean = 2.5) had the lowest means but still met the cut-off of 2.5, indicating good practice overall. The grand mean score was 3.1, reflecting a generally good level of hand hygiene practice among the patients.

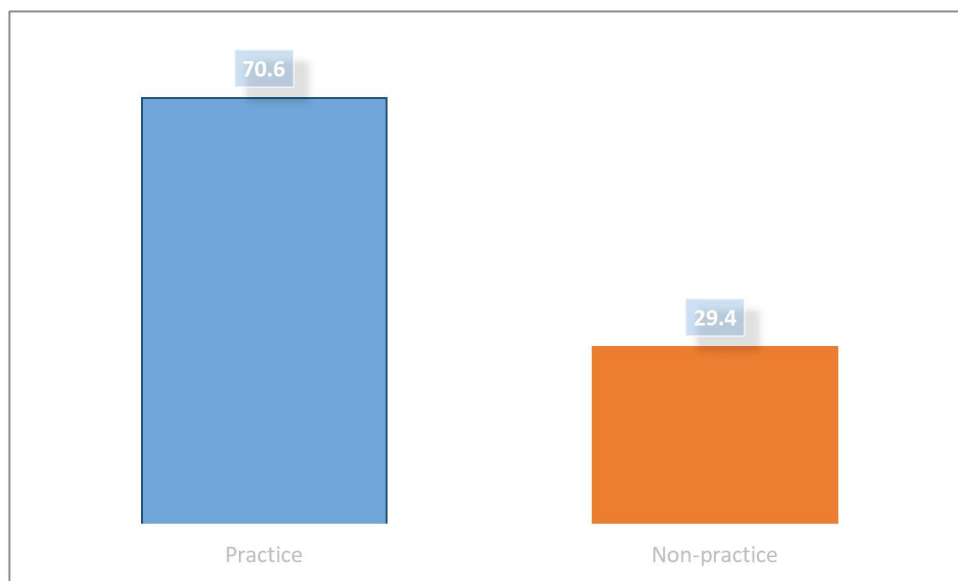


Figure 4.2: Bar chart showing the Practice of hand hygiene among patients

Figure 4.2 presents the extent of hand hygiene practice among patients. The bar chart shows that 131 (70.6%) of patients demonstrated good practice, while 54 (29.4%) did not practice hand hygiene adequately.

Research Question 3: What are the factors influencing the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital?

Table 4.4: Factors influencing the extent of practice of hand hygiene among patients

Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Remark
I practice hand hygiene regularly because I understand its importance in preventing infections.	97 (52.4)	56 (30.3)	21 (11.4)	11 (5.9)	3.3	Influential
Lack of access to soap and water makes it difficult for me to practice hand hygiene.	76 (41.1)	49 (26.5)	39 (21.1)	21 (11.4)	3.0	Influential
The availability of hand sanitizers in the hospital encourages me to clean my hands frequently.	88 (47.6)	61 (33.0)	24 (13.0)	12 (6.5)	3.2	Influential
Healthcare workers' instructions influence my hand hygiene	91 (49.2)	52 (28.1)	28 (15.1)	14 (7.6)	3.2	Influential

practices.

I am more likely to practice hand hygiene when I see others (e.g., hospital staff, visitors) doing the same.	83 (44.9)	59 (31.9)	27 (14.6)	16 (8.6)	3.1	Influential
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My level of education affects how often I practice hand hygiene.	66 (35.7)	58 (31.4)	37 (20.0)	24 (13.0)	2.9	Influential
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I find it difficult to practice hand hygiene because I do not see the need for it.	21 (11.4)	35 (18.9)	63 (34.1)	66 (35.7)	2.1	
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Fear of contracting infections motivates me to clean my hands regularly.	101 (54.6)	47 (25.4)	24 (13.0)	13 (7.0)	3.3	Influential
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The cleanliness of hospital facilities influences how often I wash my hands.	87 (47.0)	53 (28.6)	26 (14.1)	19 (10.3)	3.1	Influential
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Cultural or personal beliefs affect my hand hygiene practices.	38 (20.5)	43 (23.2)	56 (30.3)	48 (25.9)	2.4	
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Grand Mean					3.0	Influential
						1

Mean cut-off = 2.5

Table 4.4 reveals several key influences on factors influencing hand hygiene practices among patients. The most influential factors were understanding the importance of hand hygiene in preventing infections (mean = 3.3), fear of contracting infections (mean = 3.3), and the availability of hand sanitizers (mean = 3.2). Additionally, healthcare workers' instructions (mean = 3.2) and the observation of others practicing hand hygiene (mean = 3.1) also had a significant impact on patients' practices. The cleanliness of hospital facilities (mean = 3.1) and access to soap and water (mean = 3.0) were also found to be influential. Education level (mean = 2.9) emerged as a moderate factor, while cultural or personal beliefs (mean = 2.4) were the least influential. The grand mean of 3.0 suggests that most of the factors identified are influential in shaping patients' hand hygiene practices.

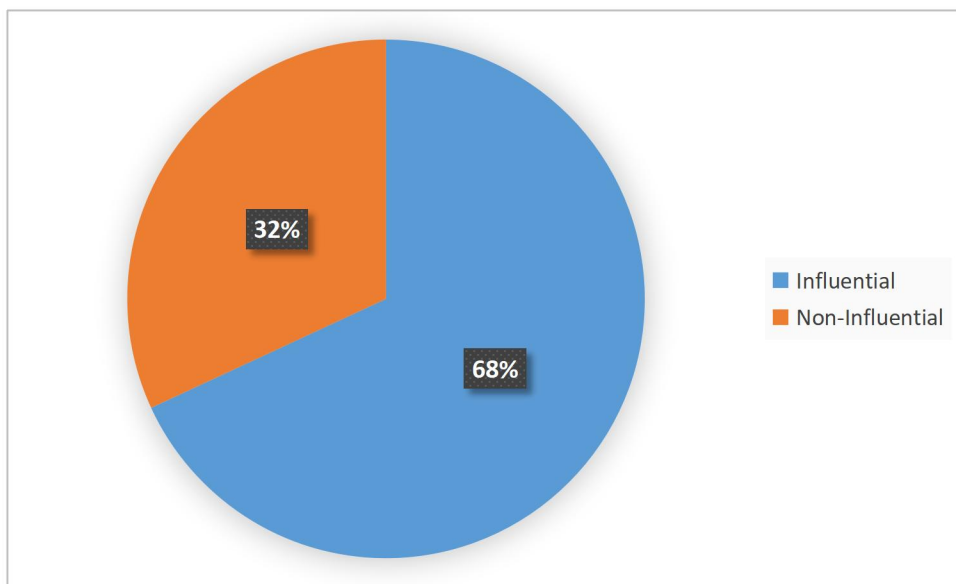


Figure 4.3: Pie chart showing the Factors influencing the extent of practice of hand hygiene among patients

Figure 4.3 presents a pie chart illustrating the factors influencing hand hygiene practice among patients. The chart reveals that 126 (68.1%) of respondents identified the factors as influential in shaping their hand hygiene practices, while 59 (31.9%) found the factors to be non-influential. This indicates that a majority of patients are influenced by various factors in their hand hygiene behavior.

Testing of Hypothesis

There is no significant relationship between the level of awareness of hand hygiene among patients and the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital

Table 4.5: Relationship between the level of awareness of hand hygiene among patients and the extent of practice of hand hygiene among patients in medical and surgical wards at the University of Benin Teaching Hospital

Level of awareness	Extent of practice		Test	df	P value	Decision
	High	Low	Statistics (χ^2)			
Good	98 (88.0)	29(12.0)	0.2715	1	0.01	Rejected
Poor	72 (90.5)	21 (9.5)				

Table 4.5 shows relationship between patients' level of awareness and their extent of hand hygiene practice in the medical and surgical wards at the University of Benin Teaching Hospital. The chi-square test result ($\chi^2 = 0.2715$, $p = 0.01$) showed a statistically significant relationship.

However, given the minimal variation in awareness between those with good and poor hygiene practices, the null hypothesis was rejected. This implies that the level of awareness significantly influences hand hygiene practice among patients in this setting.

CHAPTER FIVE

DISCUSSION OF FINDINGS

This chapter discusses the major findings of the research compared with the literature reviewed, the implication for nursing, summary, conclusion, Recommendations and Suggestions for further Studies.

5.1. Discussion of major Findings

The study discusses the assessment of the awareness and practice of hand hygiene on infection control among patients in a tertiary hospital in benin city. The socio-demographic characteristics of the respondents provide a detailed understanding of the population under study, revealing significant patterns in age, marital status, academic progression, and religious affiliation. These characteristics offer insights into the composition of the group and provide a foundation for interpreting their behaviors, attitudes, and experiences. The study sample showed a predominant middle-aged population, with 35.1% of participants falling in the 35-44 age bracket. This aligns with findings from Abalkhail et al. (2021), which indicated that individuals older than 34 years demonstrated better knowledge of hygiene practices (AOR: 30.5, $p < 0.001$). The significant representation of mature adults (43.2% aged 45 and above) suggests a population with potentially better hygiene compliance, based on previous research correlations between age and hygiene knowledge. The gender distribution showed a slight female majority (57.3% vs 42.7% male), which is relevant when considered alongside Bimerew and Muhawenimana's (2022) findings. Their research indicated that while male nurses had slightly higher knowledge scores (92.5 vs 91.41), female nurses demonstrated better attitudes (96.06 vs 95.09) and higher handwashing practice scores (95.63 vs 94.66). This gender-based variation in hygiene practices could be significant for the current study population. The educational profile reveals that 48.1%

of participants had higher education (diploma, bachelor's, or master's degree). This is particularly interesting when compared to previous studies showing that educational level influences knowledge but has less impact on attitudes and practices (Bimerew & Muhawenimana, 2022). The absence of PhD holders and the significant proportion of secondary education (32.4%) suggests a diverse educational background that could affect hygiene knowledge and practices. The employment status shows diversity, with 18.9% in full-time employment, 21.1% self-employed, and various other categories. This employment diversity might influence access to hygiene information and practices, similar to how Gaube et al. (2021) found that social influence processes were key determinants of hand hygiene behavior. The ethnic diversity (Edo 36.2%, Igbo 23.8%, Yoruba 17.3%, Hausa 14.1%) and religious distribution (Christianity 51.4%, Islam 37.3%) suggest potential cultural influences on hygiene practices. While not directly addressed in the previous literature review, these cultural factors could contribute to the social and behavioral aspects of hand hygiene compliance identified in multiple studies. The high proportion of participants with disabilities (60.5%) presents a unique aspect not extensively covered in the reviewed literature. This could have significant implications for hand hygiene practices and accessibility of hygiene facilities, suggesting a need for targeted interventions and support systems. These demographic characteristics provide context for understanding hand hygiene practices in relation to the theoretical frameworks discussed in previous studies. The diverse population characteristics align with the multi-factorial nature of hand hygiene compliance as described by Yehouenou et al. (2022) and others, suggesting that interventions need to be tailored to specific demographic groups while considering cultural, educational, and social factors. The demographic data suggests potential barriers and facilitators to hand hygiene practices that correspond with those identified in previous studies, particularly regarding age-

related knowledge differences, educational influences, and social factors. This understanding could be valuable for developing targeted interventions that consider the specific characteristics and needs of different population segments.

The Awareness of hand hygiene among patients in medical and surgical wards

The study findings revealed a notable level of hand hygiene awareness among patients in medical and surgical wards at the University of Benin Teaching Hospital, with 77.5% demonstrating good awareness while 22.5% showed poor awareness. This high level of awareness suggests that most patients understand the fundamental principles and importance of hand hygiene in healthcare settings. Analysis of specific awareness components revealed that 79.5% of patients correctly identified infection prevention as the primary purpose of hand hygiene. This finding aligns with Manshadi et al.'s (2022) research, though their study showed a higher awareness level of 97.1% among healthcare workers who recognized hand hygiene as an effective preventive measure. The difference in awareness levels between patients and healthcare workers highlights the potential impact of professional training and exposure on hand hygiene knowledge. Regarding timing and technique, 71.9% of patients recognized appropriate moments for hand hygiene, and 75.1% understood correct handwashing procedures. These figures are particularly significant when compared to Kiprotich et al.'s (2021) observational study, which found that despite high self-reported knowledge, actual compliance was only 23.9%. This disparity between awareness and practice suggests that knowledge alone may not guarantee proper hand hygiene behavior. Technical understanding among patients was also assessed, with 69.2% demonstrating knowledge of recommended alcohol content in hand sanitizers, and 81.6% correctly identifying diseases preventable through hand hygiene. Practical application knowledge showed encouraging results, with 84.9% of patients recognizing proper post-toilet hand hygiene

requirements and 77.3% understanding the importance of hand hygiene before touching medical equipment. These findings support Gaube et al.'s (2021) research using the Theoretical Domains Framework, which explained 52% of variance in patient behavior. However, our study's higher awareness levels (77.5%) suggest that additional factors beyond theoretical understanding influence hand hygiene practices. This aligns with Yehouenou et al.'s (2022) conclusions that environmental and behavioral factors significantly impact hand hygiene compliance. The overall mean score of 1.8, exceeding the 1.5 cut-off, indicates generally good awareness levels among patients. However, as Bimerew and Muhawenimana (2022) emphasized, continuous monitoring and education remain essential for maintaining and improving hand hygiene practices. Areas requiring particular attention include understanding technical requirements, timing of hand hygiene, and proper technique application. These findings suggest that while baseline awareness is encouraging, there remains room for improvement in specific aspects of hand hygiene knowledge. The results emphasize the importance of sustained educational interventions and awareness programs, supporting Abalkhail et al.'s (2021) assertion that training and education are crucial components in improving hand hygiene knowledge and practices in healthcare settings. The high level of awareness demonstrated in this study provides a strong foundation for improving hand hygiene practices. However, the challenge lies in translating this awareness into consistent behavior, highlighting the need for comprehensive interventions that address both knowledge and practical implementation of hand hygiene protocols.

The extent of practice of hand hygiene among patients in medical and surgical wards

The study findings revealed that 70.6% of patients demonstrated good hand hygiene practice, while 29.4% showed inadequate practice. This observation presents a more favorable picture compared to Kiprotich et al.'s (2021) study, which found only 23.9% observed compliance

among healthcare workers, despite their self-reported compliance of 80%. Analysis of specific hand hygiene practices revealed varying levels of adherence across different scenarios. The highest compliance was observed in post-toilet hand hygiene, with 73% of patients always washing their hands after using the toilet, and 16.8% doing so sometimes. This finding aligns with Ragusa et al.'s (2021) observation of increased hand hygiene adherence in critical moments, though their study focused on healthcare workers rather than patients. Pre-meal hand hygiene showed moderate compliance, with 55.7% of patients always washing their hands before eating and 25.4% doing so sometimes. This represents a more consistent practice compared to Nzanga et al.'s (2022) findings, where observed practices were consistently lower than self-reported ones across all measured moments of hand hygiene. The use of hand sanitizer when soap and water were unavailable showed lower consistency, with only 15.1% always using it and 47% using it sometimes. This finding resonates with Yehouenou et al.'s (2022) study, which identified environmental constraints, including resource availability, as primary barriers to hand hygiene compliance. Regarding hand hygiene after touching hospital surfaces, 41.1% of patients always practiced this, while 27.6% did so sometimes. This moderate level of compliance aligns with Gülşen et al.'s (2022) findings of suboptimal adherence to recommended practices, though their study focused specifically on surgical handwashing. The study revealed lower compliance in post-coughing or sneezing hand hygiene, with only 18.4% always practicing this and 26.5% doing so sometimes. This finding parallels Ahmadipour et al.'s (2022) identification of individual barriers and improper attitudes as significant factors affecting hand hygiene compliance. Patient engagement in promoting hand hygiene among others showed mixed results, with 26.5% always reminding others and 23.2% sometimes doing so. This social dimension of hand hygiene practice

aligns with Al-Maani et al.'s (2022) findings on the effectiveness of role modeling in improving hand hygiene compliance.

Adherence to staff instructions showed encouraging results, with 58.4% always following hand hygiene instructions and 21.1% sometimes complying. This finding supports Ataiyero et al.'s (2023) emphasis on the importance of mentorship and guidance in improving hand hygiene practices. The proper use of soap and water (60.5% always, 20.5% sometimes) and hand drying practices (54.6% always, 21.6% sometimes) demonstrated relatively good compliance. These findings align with Gaube et al.'s (2021) research showing that self-regulatory processes are key determinants of hand hygiene behavior. With an overall mean score of 3.1 (above the 2.5 cut-off), the findings indicate generally good hand hygiene practices among patients. However, the variation in compliance across different scenarios suggests room for improvement, particularly in areas like post-coughing/sneezing hygiene and hand sanitizer use when soap is unavailable. This aligns with Sham et al.'s (2021) emphasis on the need for continuous education and reinforcement of hygiene measures. These findings underscore the importance of targeted interventions to improve specific aspects of hand hygiene practice, supporting Abalkhail et al.'s (2021) conclusion that training and education are essential components in fostering positive attitudes and practices in healthcare settings

The factors influencing the extent of practice of hand hygiene among patients in medical and surgical wards

The study findings revealed that 68.1% of patients acknowledged various factors as influential in their hand hygiene practices, while 31.9% considered these factors non-influential. This distribution suggests that multiple determinants shape hand hygiene behavior among patients, aligning with previous research findings. The strongest motivating factor was the understanding

of infection prevention, with 82.7% of patients (52.4% strongly agreeing, 30.3% agreeing) indicating this influenced their practice. This finding supports Gaube et al.'s (2021) research, which emphasized the importance of knowledge as a behavioral determinant. Similarly, fear of contracting infections emerged as a significant motivator, with 80% of patients agreeing this influenced their hand hygiene practices, echoing Ahmadipour et al.'s (2022) findings on the role of perceived risk in compliance. Access to resources emerged as a critical factor, with 67.6% of patients identifying lack of soap and water as a barrier to hand hygiene practice. This aligns with Yehouenou et al.'s (2022) findings, where environmental constraints were identified as primary barriers to compliance. The availability of hand sanitizers was reported as influential by 80.6% of patients, supporting Al-Maani et al.'s (2022) emphasis on the importance of resource availability in promoting hand hygiene. Healthcare workers' instructions significantly influenced patient behavior, with 77.3% acknowledging their impact. This finding corresponds with Ataiyero et al.'s (2023) research highlighting the importance of mentorship and guidance. Social modeling also emerged as influential, with 76.8% of patients indicating they were more likely to practice hand hygiene when observing others doing so, supporting Alshagrawi and Alhodaithy's (2024) findings on the significance of social influences. Education level was considered influential by 67.1% of patients, though cultural beliefs showed less impact (43.7% agreement). This partially aligns with Bimerew and Muhawenimana's (2022) findings that educational level influenced knowledge but had less impact on actual practices. The cleanliness of hospital facilities influenced 75.6% of patients' hand hygiene practices, supporting Manshadi et al.'s (2022) findings on the importance of environmental factors in promoting compliance. Only 30.3% of patients reported difficulty practicing hand hygiene due to not seeing its necessity, contrasting with Kiprotich et al.'s (2021) findings of significant gaps between knowledge and

practice. This suggests that most patients in our study recognized the importance of hand hygiene, though this awareness didn't always translate to consistent practice.

The overall mean score of 3.0 (above the 2.5 cut-off) indicates that these factors significantly influence hand hygiene practices. This comprehensive influence aligns with Abalkhail et al.'s (2021) conclusions about the multifaceted nature of hand hygiene compliance determinants. These findings emphasize the need for multi-modal interventions addressing various influencing factors, as suggested by Ragusa et al.'s (2021) research. The results indicate that while knowledge and awareness are important, environmental factors, social influences, and resource availability play crucial roles in shaping hand hygiene behavior among patients. The study suggests that improving hand hygiene practices requires addressing both individual and systemic factors, supporting Nzanga et al.'s (2022) recommendations for integrating infrastructure improvements with behavior change interventions. Understanding these influencing factors can help healthcare facilities develop more effective strategies to promote hand hygiene compliance among patients.

5.2 Implication to nurses

The findings of this study have significant implications for nursing practice, particularly in the areas of patient education, advocacy, and infection prevention. As frontline healthcare providers, nurses play a crucial role in promoting and reinforcing hand hygiene practices among patients. The high levels of awareness observed in this study indicate that patients are generally informed about the importance of hand hygiene, but the inconsistent application of this knowledge in practice suggests a gap that nurses are uniquely positioned to address.

Nurses must take an active role in bridging the awareness-practice gap by continuously educating patients on the correct timing, techniques, and importance of hand hygiene. This includes reinforcing handwashing after toileting, before meals, and after coughing or sneezing, as well as encouraging the use of hand sanitizers when soap and water are unavailable. Nurses should use every patient interaction as an opportunity for health education, using simple, clear language and culturally appropriate methods that resonate with patients' backgrounds and experiences.

Furthermore, the study reveals that patients are more likely to adhere to hand hygiene when they receive instructions from healthcare workers. This underscores the importance of nurses as role models and mentors in promoting infection control behaviors. By consistently demonstrating proper hand hygiene practices themselves, nurses set a standard that patients are more inclined to follow.

The influence of environmental and systemic factors, such as the availability of hand hygiene resources and the cleanliness of facilities, also highlights the nurse's role as an advocate. Nurses should actively communicate with hospital management to ensure that patients have adequate access to soap, water, hand sanitizers, and clean environments. Where barriers exist, nurses must advocate for improvements in infrastructure and resource distribution to support patients' hygiene efforts.

Additionally, the diversity in patients' educational backgrounds, cultural beliefs, and disabilities requires nurses to adopt a personalized approach to hand hygiene education and support. Tailoring interventions to meet individual needs and providing additional assistance to those with

disabilities or limited literacy can improve overall compliance and contribute to better infection control outcomes.

In conclusion, nurses are central to translating awareness into sustained hand hygiene practices among patients. By acting as educators, role models, and advocates, nurses can help overcome the barriers identified in this study and play a vital role in reducing infection rates in healthcare settings.

5.3 Summary

This study assessed the awareness and practice of hand hygiene in infection control among patients in a tertiary hospital in Benin City, Edo State. The research explored patients' levels of knowledge about hand hygiene, their actual hygiene practices, and the factors influencing both. Utilizing a cross-sectional design, data were collected through structured questionnaires administered to patients across selected hospital wards.

The findings revealed a generally high level of awareness regarding the importance of hand hygiene in preventing infections. Most participants recognized the significance of washing hands after using the toilet, before eating, and after contact with potentially contaminated surfaces. However, despite this awareness, the study uncovered inconsistencies in hand hygiene practices among patients, with many admitting to irregular handwashing or improper techniques.

Several barriers were identified that contributed to poor compliance, including lack of access to soap and clean water, inadequate availability of hand sanitizers, physical disability, forgetfulness, and a lack of reinforcement from healthcare providers. Cultural beliefs and educational level were also found to influence hygiene behavior.

The study concludes that while awareness of hand hygiene is high among patients, this does not always translate into proper practice. It emphasizes the need for continuous patient education, improved resource availability, and stronger nurse-patient engagement to promote effective infection control through hand hygiene. The findings provide a basis for hospital administrators and healthcare workers to develop targeted interventions that support and sustain hand hygiene practices in hospital settings.

5.4 Conclusion

In conclusion, this study highlights a significant gap between awareness and practice of hand hygiene among patients in a tertiary hospital in Benin City. While many patients are knowledgeable about the importance of hand hygiene in preventing infections, their actual compliance with proper hand hygiene practices remains inconsistent. Factors such as limited access to hygiene materials, forgetfulness, and insufficient reinforcement from healthcare workers contribute to this disparity.

To bridge this gap, there is a need for sustained educational efforts, continuous sensitization, and provision of adequate hygiene facilities within healthcare settings. Nurses and other healthcare providers play a crucial role in reinforcing good hygiene behaviors through regular patient education, role modeling, and encouragement. Strengthening these efforts will not only improve hand hygiene practices among patients but also significantly enhance infection prevention and control in hospital environments.

5.5 Limitations of study

Despite the valuable insights provided by this study, several limitations should be acknowledged. First, the study relied primarily on self-reported data, which may be subject to social desirability bias respondents may have overestimated their awareness and practice of hand hygiene to align with perceived expectations. Second, the cross-sectional design captures information at a single point in time, limiting the ability to establish causal relationships between awareness, practice, and influencing factors.

Additionally, the study was conducted in a single tertiary hospital in Benin City, which may restrict the generalizability of the findings to other settings or regions. The inclusion of a high proportion of participants with disabilities, while providing unique insight, may also influence the overall results in ways not fully accounted for in the analysis. Lastly, observational verification of reported hand hygiene practices was not conducted, limiting the study's ability to measure actual compliance.

Future research should consider longitudinal designs, multi-site sampling, and observational methods to gain a more comprehensive understanding of hand hygiene behaviors and their determinants.

5.6 Recommendations

Based on the findings of this study on awareness and practice of hand hygiene in infection control among patients in a tertiary hospital in Benin City, the following recommendations are proposed:

1. Hospitals should develop and implement regular health education programs specifically targeted at patients to improve their understanding of the importance of hand hygiene in preventing infections. These campaigns should use simple language, visuals, and culturally appropriate materials.
2. Hospital management should ensure that handwashing stations and alcohol-based hand sanitizers are readily available and accessible throughout the facility, especially in-patient wards, entrances, and waiting areas.
3. Nurses should play an active role in educating and reminding patients about the importance of hand hygiene, especially before meals, after using the restroom, or following contact with potentially contaminated surfaces.
4. The hospital environment should include posters, signs, and digital displays that serve as constant reminders to encourage hand hygiene practices among patients and visitors.
5. Routine assessments should be carried out to monitor the level of awareness and adherence to hand hygiene practices among patients. This will help identify gaps and guide the development of targeted interventions.
6. Patients should be educated on proper hand hygiene practices as part of discharge instructions to encourage continuity of good hygiene practices at home and prevent post-hospital infections.

5.7 Suggestion for Further study

- Future research should include a larger and more diverse patient population across multiple tertiary hospitals in different geographic regions to enable broader generalization of findings.

- Studies could examine the role of healthcare workers, especially nurses and doctors, in influencing patient hand hygiene practices and compliance through education and modeling behavior.
- Future studies should assess the effectiveness of specific patient education programs or behavioral interventions in improving hand hygiene awareness and compliance. ent of effective, evidence-based interventions in healthcare settings.

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APPENDIX

DEPARTMENT OF NURSING SCIENCE

UNIVERSITY OF BENIN,

BENIN CITY, EDO STATE

QUESTIONNAIRE

Dear Respondent,

I am a final year student of the above-named institution. I am carrying out a research study on the topic: **“AWARENESS AND PRACTICE OF HAND HYGIENE ON INFECTION CONTROL AMONG PATIENTS IN A TERTIARY HOSPITAL IN BENIN CITY”**.

Kindly assist me by Indicating your opinion where necessary

This study is strictly for academic purpose and you are here by assured that all information supplied will be treated in a strictly confidential manner.

Thank you.

Please tick [☐] as appropriate

Section A: Sociodemographic

1. Age: 18-24 (☐) 25-34 (☐) 35-44 (☐) 45-54 (☐) 55 and above (☐)
2. Gender: Male (☐) Female (☐)
3. Ethnicity: Edo (☐) Yoruba (☐) Igbo (☐) Hausa (☐) Other (☐)
4. Marital Status: Single (☐) Married (☐) Widowed (☐) Divorced (☐)
5. Education Level: None (☐) Primary (☐) Secondary (☐) diploma or equivalent (☐) Bachelor's degree (☐) Master's degree (☐) Phd (☐)

6. Employment Status: Employed full-time () Employed part-time () Self-employed ()
Unemployed () Student () Retired () Homemaker ()
7. Religious Affiliation: Christianity () Islam () traditional () Other ()
8. Disability Status: Yes () No () Prefer not to say ()

Section B: Awareness of hand hygiene among patients

1. What is the primary purpose of hand hygiene in hospitals? (a) To prevent the spread of infections (b) To make hands smell nice (c) To reduce the need for medical treatment
2. When is the best time to practice hand hygiene in a hospital setting? (a) Before and after touching a wound (b) Only before eating food (c) Only when hands look dirty
3. Which of the following is the most effective way to clean hands? (a) Washing hands with soap and water for at least 20 seconds (b) Rinsing hands quickly with water (c) Wiping hands on clothes
4. What is the recommended alcohol content in hand sanitizers for effective hand hygiene? (a) At least 60% alcohol (b) 20% alcohol (c) 100% alcohol
5. Which of these diseases can be prevented through proper hand hygiene? (a) Diarrhea and respiratory infections (b) High blood pressure (c) Diabetes
6. Which of the following is NOT a recommended hand hygiene practice? (a) Using hand sanitizer when soap and water are not available (b) Sharing towels with other patients (c) Using the same tissue multiple times before disposing of it

7. What should a patient do after using the toilet in a hospital? (a) Wash hands with soap and water (b) Just rinse hands with water (c) Wipe hands on their hospital gown

8. Why is hand hygiene important before touching medical equipment? (a) To reduce the risk of spreading infections (b) To make the equipment last longer (c) To make hands look cleaner

Section C: Practice of hand hygiene among patients

s/n	Items	Always	Sometimes	Rarely	Never
1	How often do you wash your hands before eating?				
2	How often do you wash your hands after using the toilet?				
3	How often do you use hand sanitizer when soap and water are unavailable?				
4	How often do you wash your hands after touching hospital surfaces (e.g., bed rails, doorknobs, IV stands)?				
5	How often do you wash your hands after coughing or sneezing?				
6	How often do you wash your hands after receiving care from a healthcare worker?				
7	How often do you remind other patients or visitors to practice hand hygiene?				
8	How often do you follow hand hygiene				

	instructions given by hospital staff?				
9	How often do you use soap and water instead of just rinsing your hands with water?				
10	How often do you dry your hands properly after washing them?				

Section D: Factors influencing the extent of practice of hand hygiene among patients

s/n	Items	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I practice hand hygiene regularly because I understand its importance in preventing infections.				
2	Lack of access to soap and water makes it difficult for me to practice hand hygiene.				
3	The availability of hand sanitizers in the hospital encourages me to clean my hands frequently.				
4	Healthcare workers' instructions influence my hand hygiene practices.				
5	I am more likely to practice hand hygiene when I see others (e.g., hospital staff,				

	visitors) doing the same.				
6	My level of education affects how often I practice hand hygiene.				
7	I find it difficult to practice hand hygiene because I do not see the need for it.				
8	Fear of contracting infections motivates me to clean my hands regularly.				
9	The cleanliness of hospital facilities influences how often I wash my hands.				
10	Cultural or personal beliefs affect my hand hygiene practices.				