KNOWLEDGE, ATTITUDE AND PRACTICE OF STANDARD PRECAUTIONS AMONG SELECTED HEALTH CARE WORKERS IN UNIVERSITY OF PORTHACOURT TEACHING HOSPITAL, RIVERS STATE.

BY

MBENYI OLUCHI EDITH
REG NO: 20174076378

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL FEDERAL UNIVERSITY OF TECHOLOGY, OWERRI, IMO STATE, NIGERIA.

JULY, 2023

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF PUBLIC HEALTH (MPH) DEGREE.

JULY, 2023

CERTIFICATION

This thesis study on Knowledge, Attitude and Practice of Standard Precautions among Health Care Workers in University Teaching Hospital Portharcourt written by Mbenyi Oluchi Edith (Reg.No. 20174076378) has been certified as meeting the requirement for master s degree project in Public Health, in Postgraduate School, Federal University of Technology Owerri.

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DEDICATION

This work is dedicated to my husband Akindasa Paul.

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I wish to express my immense indebtedness to those who in one way or the other contributed to this project. First and foremost, my praise and gratitude goes to God Almighty for his infinite mercy, guidance, protection, direction and inspiration throughout the period of my academic pursuit in this great citadel of learning may your name alone be praised. My special thanks go to my Project Supervisors. Prof. (Mrs.) E. A. Nwoke and Dr. (Mrs.) C.O.A. Amadi who despite their busy academic commitment made out time to proofread my work and made necessary corrections. May the good lord bless you and lift you higher.

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OPERATIONAL DEFINITION OF TERMS

Knowledge: Knowledge is defined as the information, comprehension, and abilities that one acquires via education or experience by the Oxford Advanced Learners Dictionary (2011). It further defines knowledge as the condition of being aware of a specific fact or circumstance. Knowledge in this study relates to being aware of the fundamentals of standard precaution.

Attitude: A study-driven attitude is a sentiment, judgment, or style of acting toward something or someone. In this study, attitude refers to how people behave when taking precautions.

Practice: Practice is the customary or anticipated method to conduct oneself in a certain s etting or circumstance. In this study, practice refers to the extent that health care workers implement recommended strategies of standard precautions.

Universal precaution: A set of infection control techniques that are applicable to all patients, regardless of whether they are infected or not, in any location where healthcare is provided, according to the Centers for Disease Control and Prevention. It is predicated on the idea that every individual has an infection or colony of an organism that could spread in a healthcare environment, necessitating the use of infection control procedures by healthcare providers while providing patient care. In this investigation, the same definition and presumption are used.

Nurses: Nurses are those who have received the necessary training and licensing to care for the sick or injured, typically in a hospital.

Healthcare assistant: Helps medical professionals care for patients in hospitals. They are also referred to as nursing assistants and auxiliary nurses (Reda *et al*., 2010).

Medical Waste Handlers (MWHs): As part of the complete waste management process, medical waste handlers (MWHs) play a crucial role in proper waste disposal.

Doctor: A doctor is a person who has a medical license to practice as a doctor, surgeon, dentist, or veterinary (WHO, 2013).

Occupational exposure: According to the US Department of Labor's Occupational Safety and Health Administration (OSHA), exposure at work is any reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that could arise from an employee's performance of their duties. In this investigation, the same definition is applicable.

Blood-borne infections: OSHA defines blood-borne infections as illnesses contracted while performing work-related responsibilities. In this investigation, the same definition is applicable. Human blood contains dangerous bacteria that can make people sick. These pathogens include HIV and HBV, among others. In this study, infections from pathogenic microorganisms that are found in human blood, are capable of making individuals sick, and are mostly spread by contact with blood are referred to as blood-borne diseases.

ABSTRACT

This research study centered towards determining the knowledge, attitude and practice of standard precautions among selected health care workers in the University Teaching Hospital, Portharcourt, Rivers State. The specific objectives are; to assess the level of knowledge of standard precaution among health care workers, ascertain the attitude of health care workers in University of Portharcourt Teaching Hospital, Rivers State towards standard precautions and to determine the level of practice of standard precaution. Related literature reviewed. Descriptive survey design was employed in this study. Out of the 400 selected health workers, Taro Yamane sample size determination was used to sample 200. A well-structured questionnaire was used to extract information from the respondents. Descriptive statistics such as mean, and frequency distribution and percentages were used to analyze all the objectives. Chi-Square was used to analyze the hypotheses posed to the study. The result revealed that there were more females (67.5%) who participated in the studies than the male counterparts (32.5%). Majority (42.0%) of the respondents were still within their mid age of 30 – 39 years, followed by 26% who were within the age range of 40 – 49 years of age. Furthermore, the study showed that all participants (100%) had at one time or the other had previous knowledge of standard precaution as a concept in the health care system. However, their sources of information varied from formal training (65%), colleague/friend (26%) media (5.5) and other means (3.5%). Also, the respondents opined that every employer in the health care system should as a matter of utmost importance make provision for training on standard precautions. They believed that standard precaution is helpful in the protection against health hazards in workplace ($\bar{x}$ = 3.40). Some (50%) thought that recap of needle after use is a safe way to prevent needle injury and transmission of diseases. Safety measures agreed by the respondents 98% include disposal of needle and syringe immediately after use. Method of needle disposal in UPTH include the use of waste bin (50.5%) and enclose and burn (60%). The calculated value (76.23) and table value (9.48) which means that we do have sufficient evidence to reject the null hypothesis which states that there is no significant impact of knowledge of standard precaution on practice.

Keywords: Standard Precaution, Healthcare workers, Attitude, Practice, Knowledge, University Teaching Hospital Portharcourt.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

A set of guidelines aimed at protecting health care workers (HCWs) from blood-borne infections is known as universal precautions (Bennett & Mansell, 2014). The concept of "universal precautions" was first proposed by the Centers for Disease Control and Prevention (CDC) US in 1987 to protect health care workers from exposure to blood-borne pathogens. The Centers for Disease Control and Prevention (CDC) recommended in 1996 that universal precautions be renamed standard precautions, which combine the major features of universal precautions and body substance isolation (BSI). The precautions apply to all body fluids, including blood, secretions, and excretions (except sweat), regardless of whether they contain visible blood, skin that is not intact, mucous membranes, or any unfixed tissue or organ (other than intact skin) from a human (living or dead), HIV, or hepatitis containing culture medium or other solutions (Standard/Universal Precautions, 2017).

A successful Infection Prevention and Control (IPAC) plan must be initiated and implemented in any healthcare facility before an evaluation of the knowledge, attitude, and practice (KAP) of standard precautions by healthcare personnel can be conducted. According to their professional group and level of experience, among other things, HCW exhibit variable KAP of standard precautions, according to numerous studies. Improved standard precaution compliance has been linked to increased professional experience, standard precaution knowledge and training, and high risk perception among health professionals. The majority of studies from around the world have shown that healthcare workers are more likely to follow standard precautions (Okechukwu and Modteshi, 2012), but some others have not (Shuper *et al.*, 2014).

Despite research on standard precautions compliance among Nigerian healthcare professionals (Ofili, 2010), the Nigerian community lacks a clear understanding of the professional disparities in KAP of standard precautions of infection control among healthcare professionals. So, our goal was to look at how well doctors, nurses, and laboratory personnel at two tertiary hospitals in Nigeria were following some of the basic measures. In order to ascertain the knowledge, attitudes, and application of conventional precautions among health professionals at the university teaching hospital in Port Harcourt, Rivers State - a developing metropolitan area with rising HIV/AIDS and other infectious disease cases - this study was created. Therefore the following research questions were formulated to guide the study.

1.2 Problem Statement

As they carry out their clinical duties in the hospital, healthcare professionals (HCWs) run the danger of occupational risks. Roughly 12% of the working population, or about 35 million individuals, work in the health care industry, but their occupational health has been neglected (WHO, 2007). Sharps injuries and contact with deep body fluids expose them to blood-borne pathogens like HIV, hepatitis B, and hepatitis C viruses.

The Occupational Safety and Health Administration estimates that 5.6 million HCWs worldwide who handle sharp devices, are at risk of occupational exposure to blood borne pathogens. Often, these injuries go unreported for a variety of reasons, including stigma. The total HIV sero-prevalence was 4.4% according to the Nigerian sero-sentinel survey from 2005. The high incidence in the nation puts HCWs at risk for occupational disease (Shuper *et al*., 2014).

Inadequate sharps containers and disposal facilities, bad practices like bending needles, recapping needles, detaching needles, reusing needles, a lack of supply of injection equipment, and unwarranted and unsafe injection practices, which put both patients and healthcare workers

at risk, may all contribute to the rising prevalence of morbidity and mortality following exposure to blood-borne infections. In light of the aforementioned issues, the researcher made the decision to conduct a study on HCWs' knowledge, attitudes, and practices regarding standard precaution at the university of Porthacourt teaching hospital in the state of rivers.

1.3 Objective of the Study

1.3.1 General Objectives

The general objective of this research is to determine the knowledge, attitude and practice of standard precautions among selected health care workers in the University Teaching hospital, Portharcourt, Rivers State.

1.3.2 Specific Objectives

The research objectives are

i. To assess the level of Knowledge of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, Rivers State.
ii. To ascertain the attitude of selected health care workers in University of Port Harcourt Teaching hospital, Rivers State towards standard precautions.
iii. To determine the level of practice of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, Rivers State.

1.4 Research Questions

i. What is the level of knowledge of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, Rivers State?
ii. What are the attitudes towards standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, Rivers State?

iii. What is the level of practice of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, Rivers State?

1.5 Research Hypotheses

Ho_1: Knowledge of standard precautions among selected health care workers do not significantly influence practice in University of Port Harcourt Teaching hospital, Rivers State.

Ho_2: Knowledge of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, do not significantly influence their attitude.

1.6 Significance of the Study

In this study, healthcare professionals at the University of Port Harcourt Teaching Hospital in Rivers State were asked about their knowledge, attitudes, and use of common precautions. The Health and Human Services Secretariat (HHSS) of the hospital administration and other stakeholders will use the study's findings to create and target relevant measures and interventions to increase adherence to standard precautions among healthcare professionals. The final beneficiaries of interventions based on the study's findings will be the healthcare professionals. The work will serve as a resource for other researchers as well.

1.7 Scope of the Study

This study examined how well a group of carefully chosen healthcare professionals, including doctors, nurses, waste handlers, healthcare assistants, and medical laboratory scientists, knew about and applied conventional precautions. The study was conducted at the University of Port Harcourt, where 400 were the population of selected health care workers. Standard precautions are the dependent variable whereas knowledge, attitude, and practice are the independent variables. A descriptive survey was used in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Framework

2.1.1 Standard Precautions

Guidelines for Isolation Precautions in Hospital, a document first released by the CDC (Center for Disease Control) U.S in 1983, included a section on safeguards for blood and bodily fluids. (Kermode *et al*., 2015). When a patient is known to be contaminated with blood-borne diseases or is suspected of being sick, the section advised taking preventive measures (Garner, Simmons & Williams, 2009). Recommendations for Prevention of HIV Transmission in Healthcare Settings was released by the CDC in 1987. (Reda, *et al*., 2010). The Recommendations advocated using precautions consistently for all patients, regardless of their risk for blood-borne infections, in contrast to the 1983 guidelines. When delivering first aid or medical care, this expansion came to be known as the Universal Precautions, which were later described by the CDC (1996) as a set of precautions intended to stop the spread of HIV, HBV, and other blood-borne diseases. Under the universal precautions, all patients' blood and some bodily fluids were seen as having the potential to spread blood-borne diseases like HIV, HBV and others (Adim *et al*., 2009). The isolation category "blood and bodily fluid precautions" was therefore abolished and rendered unnecessary in the 1983 CDC Guidelines for Isolation Precautions in Hospitals.

Blood, various bodily fluids containing visible blood, semen, vaginal secretions, tissues, cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids were all subject to universal precautions (Allergranzi *et al*., 2011). However, unless they contained obvious blood, feces, nasal secretions, sputum, perspiration, tears, urine, and vomitus were exempt from the general restrictions (Hosoglu, *et al*., 2011). Only when blood was clearly present or in a dental situation where blood contamination of saliva is predictable (CDC, 1996). The use of protective

barriers such gloves, gowns, aprons, masks, or protective eyewear was advised by universal precautions to lessen the danger of exposing a health care worker's skin or mucous membranes to potentially infectious items (Cutter *et al*., 2012). It was advised that all healthcare professionals take steps to avoid becoming hurt by needles, scalpels, or other sharp objects (Ibeziako *et al.*, 2009). But in order to safeguard healthcare personnel from occupationally acquired pulmonary tuberculosis, severe acute respiratory syndrome (SARS), and, more recently, human influenza, extra safety measures were required for infections spread by air and droplet interactions.

Precautions against airborne infections would slow their spread. When droplet nuclei smaller than 5 microns are dispersed in the air for a protracted period of time, airborne transmission occurs (Izegbu and Amole, 2016). Active pulmonary tuberculosis, measles, chickenpox, and hemorrhagic fever are among the illnesses carried in this way. Droplet precautions prevent the spread of meningitis, pertussis, diphtheria, type B influenza, mumps, and pneumonia. When big droplets larger than 5 microns make sufficient contact with a susceptible person's conjunctivae, nose, or mouth mucous membrane, droplets transmission occurs (Weinstern, Hierhoizer & Garner, 2010).

In healthcare settings, percutaneous exposures are the most typical means of coming into contact with blood-borne infections (Kotwal *et al*., 2010). In health care environments, injection safety procedures could greatly reduce workplace dangers brought on by blood-borne viruses. For instance, using gloves as a barrier of protection can lessen the likelihood that hands will become contaminated, but it cannot shield against piercing wounds brought on by needles or other sharp objects. Out of 191 healthcare professionals in the United States who had been subjected to national surveillance, the CDC (1999) found that 55 had reported occupational exposure to HIV, with a baseline seroconversion that was documented, and that the rest had remained negative. Of

the 55 healthcare professionals, 47 suffered percutaneous injury, five experienced mucocutaneous exposure, and two had both. Injections with safety devices decreased injuries by 23% according to (CDC, 1997), whereas new HIV infections thought to be caused by reusing injection equipment were predicted to be 5% higher (WHO, 2003).

The CDC released updated recommendations for hospital isolation precautions in 1996 under the name Standard Precautions. The main components of body substance isolation and general precautions to stop the spread of a variety of organisms are combined in standard precautions (Askarian *et al*., 2007). Standard precautions were created for use in hospitals and may not be necessary in other places where general precautions are employed, such as childcare facilities and educational institutions (CDC, 1996). Standard precautions are founded on the idea that anything other than sweat, non-intact skin, and mucous membranes may contain transmissible infectious pathogens, including blood, bodily fluids, secretions, and excretions (Gershon *et al*., 2015). In any place where healthcare is provided, standard precautions are a set of infection prevention measures that are applicable to all patients, regardless of whether they have a suspected or proven infection status (Glanz *et al*., 2009.) These procedures include hand washing, the wearing of gloves, gowns, masks, eye protection, face shields, and safe injection techniques (depending on the anticipated exposure). Additionally, it is important to handle any equipment or supplies in the patient's environment that may have come into contact with infected body fluids in a way that prevents the spread of infectious organisms.

The way a health care provider and patient interact as well as the potential exposure to blood, bodily fluids, or pathogens influence the use of standard precautions during patient care. Gloves may be sufficient for some encounters, such as conducting venipuncture, but for others, such as intubations, it may be necessary to wear gloves, a gown, a face shield or mask, and goggles. By

making sure that healthcare workers do not spread infectious diseases to patients through their hands or equipment while providing patient care, standard precautions also aim to protect the patient (Siegel, Rhinehart, Jackson, Chiarelo, and the Health Infection Control Practices Advisory Committee, 2017).

Medical history and physical examination alone cannot accurately identify patients who are infected with blood-borne infections, and it is neither practical nor cost-effective to screen every patient for every pathogen before administering care. Therefore, regardless of diagnosis or treatment situation, same precautions are advised for use on all patients. The type of procedure, not the patient's actual or presumptive serological status, will determine the level of measures to be taken. It is risky to limit measures to those from so-called "high-risk groups" because many members of these groups may not actually be infected and many infected individuals may not even be members of the high-risk groups.

2.1.2 Components of the Standard Precautions

The issues with infection control that surface during outbreak investigations frequently point to the necessity for fresh advice or a reiteration of current advice to safeguard patients (Araoye *et al*., 2014). Such suggestions are typically added to the standard precautions since they are thought of as standards of care and might not be found in other recommendations (Askarine *et al*., 2007). The use of masks for the insertion of catheters or the injection of substances into spinal or epidural regions by lumbar puncture (e.g., myelogram, spinal or epidural anesthesia) are three such additions to the list of practice settings (Siegel *et al.,* 2017).

The widespread SARS outbreaks in 2003 underlined the requirement for attention and timely deployment of infection control measures at the first point of encounter within a healthcare context. The transmission of SARS-CoV in emergency rooms by patients and their family

members (e.g. reception and triage areas in emergency departments, outpatient clinics, and physician offices). The recommended approach, known as respiratory hygiene/cough etiquette, is meant to be added as an additional precautionary measure to infection control procedures. The plan is intended for patients and their accompanying family members and friends who have undiagnosed transmissible respiratory infections. It also applies to anyone entering a medical facility who has symptoms like a cough, congestion, rhinorrhea, or increased production of respiratory secretions. The components of respiratory hygiene/cough etiquette include the following:

Education of healthcare facility staff, patients, and visitors; posted signs in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends.

Source control measures (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues; using surgical masks on the coughing person when tolerated and appropriate); and hand hygienic practices. When possible, a distance between people with respiratory diseases in shared waiting spaces, ideally greater than three feet. A proven method of source containment that stops infected people from releasing respiratory secretions into the air is covering sneezes and coughs and covering coughing patients (Stein *et al*., 2013).

In some circumstances, such as pediatrics, masking may be challenging, so the appropriate way to cough may need to be stressed. It is recommended to keep infected people apart from uninfected people because of the increased risk of infection transmission through droplets, such as N. meningitidis and group A streptococcus, that has been linked to physical proximity of less than three feet. The aforementioned precautions ought to be successful in reducing the risk of transmission of pathogens such as the influenza virus, adenovirus, Bordetella pertussis, and

Mycoplasma pneumoniae that are present in large respiratory droplets. When evaluating and caring for patients who have respiratory infection symptoms, medical professionals are urged to follow droplet precautions, which include wearing a mask, and good hand cleanliness. . Healthcare personnel who have a respiratory infection are advised to avoid direct contact with patients, especially with high-risk patients. If this is not possible, then a mask should be worn while providing patient care (CDC, 2007).

2.1.3 Elements/components of the Standard Precautions

The following infection control techniques should be used by healthcare professionals while providing patient care because they should operate under the assumption that every person is possibly infected or colonized with an organism that could be transmitted in the healthcare setting (CDC, 2007).

2.1.3.1 Hand Hygiene

This is a crucial component of standard precautions and has repeatedly been mentioned as the practice that will have the biggest impact on limiting the spread of infectious pathogens in healthcare settings. In addition to using alcohol-based products (gels, foams, or rinses), which do not require the use of water, for hand hygiene, people should also wash their hands with simple or antiseptic-containing soap and water (Siegel *et al.,* 2007). In order to prevent contaminating clean hands with environmental surfaces and spreading diseases from contaminated hands to surfaces, hand hygiene comprises avoiding needless touching of surfaces that are close to the patient;

When hands are obviously filthy, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, hand washing with either non-antimicrobial soap and water or

antimicrobial soap and water is recommended. Decontaminating hands in the clinical scenarios mentioned above is recommended if hands are not visibly soiled or after removing visible material with non-antimicrobial soap and water. The use of an alcohol-based hand rub is the preferred technique of hand decontamination, but washing hands with antimicrobial soap and water is also an option. However, routine use of an alcohol-based hand sanitizer after washing your hands with a non-antimicrobial soap may raise your risk of developing dermatitis.

Hand washing should be done prior to direct patient contact, after contact with blood, bodily fluids, excretions, mucous membranes, non-intact skin, or wound dressings, after touch with intact skin of a patient, such as when monitoring their pulse or blood pressure, after raising a patient, and after contact with inanimate items (including medical equipment), and after removing gloves. Hand washing with non-antimicrobial soap and water or with antimicrobial soap and water is recommended if contact with spores, e.g. Clostridium difficile or Bacillus anthracis, is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores. Artificial fingernails or extenders should not be worn if duties include direct contact with patients at high risk for infection and associated adverse outcomes, e.g. those in intensive care units (ICUs) or operating rooms (Vaz *et al.*, 2010). Organizational policy should be developed on the wearing of non-natural nails by healthcare personnel who have direct contact with patients outside of the groups specified above

2.1.3.2 Personal Protective Equipment

The term "personal protective equipment" refers to a number of barriers that can be used singly or in combination to shield the skin, clothes, and mucous membranes of the airways from contact with infectious substances. The type of patient encounter and/or the expected transmission

mode(s) influence the use of PPE (Shuper *et al*., 2014). The following usage guidelines need to be followed:

- When the nature of the anticipated patient engagement suggests that contact with blood or bodily fluids may occur, PPE should be worn.
- PPE should be taken off and thrown away before leaving the patient's room or cubicle to prevent contamination of skin and clothing during the removal process.

For using common precautions, the following PPE is advised:

- **Gloves:** When it is reasonable to expect that contact will occur with blood or other potentially infectious materials, mucous membranes, non-intact skin, or potentially contaminated intact skin, such as the skin of a patient who is incontinent of stool or urine, gloves should be worn as a standard precaution. Gloves that fit well and are durable enough for the job should be worn. When giving direct patient care, such as treating wounds, doing phlebotomy, starting an intravenous infusion, etc., disposable medical examination gloves should be worn.

  Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment. To avoid hand contamination, gloves should be taken off after coming into touch with a patient and/or the surrounding area (including medical equipment). Given that this practice has been linked to the spread of diseases, it is not recommended to use the same pair of gloves for the care of more than one patient.

  "A stitch in time saves nine" is a proverb that promotes the idea of early prevention. It applies to the perineal area and a clean body location, such as the face (Sadol *et al*., 2012).

- **Gowns:** When it is anticipated that patient care or procedures will include contact with blood, bodily fluids, secretions, or excretions, gowns should be suitable for protecting the

skin and preventing soiling or contamination of clothing. If the patient has uncontained secretions or excretions, a gown should be worn for direct patient contact; it should be removed, and hand hygiene should be practiced, before leaving the patient's environment. Even for frequent encounter with the same patient, gowns shouldn't be reused. It is not advised to always put on a robe when entering a high-risk area, such as an intensive care unit (Reda *et al*; 2010).

- **Mouth, Nose and Eye Protection:** During operations and patient care activities that are likely to cause splashes or sprays of blood, bodily fluids, secretions, and excretions, PPE should be worn to protect the mucous membranes of the eyes, nose, and mouth. Choose masks, goggles, face shields, and combos of each based on the requirements of the task at hand.

  During aerosol-generating procedures, such as bronchoscopy, suctioning of the respiratory tract (if not using in-line suction catheters), and endotracheal intubation in patients who are not suspected of being infected with an agent for which respiratory protection is otherwise recommended, a face shield that completely covers the front and sides of the face or a mask and goggles (along with gloves and a gown) should be worn.

2.1.3.3 Respiratory Hygiene/Cough Etiquette

Especially during seasonal outbreaks of viral respiratory tract infections in communities, such as influenza, adenovirus, and parainfluenza virus, healthcare personnel should be trained on the importance of source control measures in containing respiratory secretions to prevent droplet and fomite transmission of respiratory pathogens.

Beginning at the first point of contact in a healthcare setting, such as the triage, reception, and waiting areas in emergency departments, outpatient clinics, and doctor's offices, the following

actions should be taken to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection:

- In ambulatory and in-patient settings, post notices at entrances and in key locations, such as elevators and cafeterias, reminding patients and other people with respiratory infection symptoms to cover their mouths or noses when coughing or sneezing, use tissues and throw them away, and wash their hands after coming into contact with respiratory secretions.
- Provide tissues and no-touch trash cans, such as open cans with plastic liners or lids operated by a foot pedal, for disposing of used tissues.
- In outpatient and in-patient settings, provide materials and instructions for conducting hand hygiene in or near waiting rooms; place dispensers of alcohol-based hand rubs in handy locations, and where sinks are accessible, provide supplies for hand washing.
- Provide masks to coughing patients and other symptomatic people upon entering the facility or medical office during periods of increased prevalence of respiratory infections in the community, as indicated by increased school absenteeism and increased number of patients seeking care for a respiratory infection. In addition, encourage them to maintain special separation, ideally a distance of at least 3 feet from others in common waiting areas. Some facilities might discover that implementing this suggestion as a regular practice year-round is logistically simpler (Siegel *et al*., 2015).

2.1.3.4 Patient Placement

Making judgments about where to place patients should take into account the risk of transmitting infectious diseases. Infants with suspected viral respiratory or gastrointestinal illnesses and patients who have uncontained secretions, excretions, or wound drainage should be placed in single-patient rooms when they are available.

The following guidelines ought to guide patient placement:

Availability of single-patient rooms; Patient options for room sharing, such as cohort patients with the same infection; Routes of transmission of the known or suspected infectious agent; Risk factors for transmission in the infected patient; Risk factors for adverse outcomes resulting from a hospital acquired infection (HAI) in other patients in the area or room being considered for patient placement; (Nathadex *et al*., 2009).

2.1.4 Transmission-based Precautions

Patients with highly contagious or epidemiologically significant pathogen infections, for which additional precautions above the basic precautions are required to stop transmission in hospitals, are subject to transmission-based precautions. Airborne precautions, droplet precautions, and contact precautions are the three different categories of transmission-based safety measures. When used alone or in combination, they should be utilized in addition to the standard precautions for diseases that have numerous modes of transmission. Precautions based on the danger of transmission only last as long as that risk exists or as long as the sickness lasts, after which they are withdrawn. . The duration for most infectious diseases reflects known patterns of persistence and shedding of infectious agents associated with the natural history of the infectious process and treatment (Siegel *et al.*, 2017).

Precautions against airborne transmission of infectious pathogens are meant to lower the danger. Airborne droplet nuclei, which are microscopic leftovers of evaporated droplets that may float in the air for a very long time, or dust particles harboring the infectious agent are what cause airborne transmission. Depending on the environment, microorganisms spread widely by air currents and may be breathed by or deposited on a vulnerable host within the same room or over

a greater distance from the source patient. To stop air transmission, proper air handling and ventilation are needed.

Patients who are known or suspected to have an airborne pathogen infection, such as *M. tuberculosis*, measles, chickenpox, or disseminated herpes zoster, are subject to airborne precautions. The patient is placed in an airborne infection isolation chamber in both acute care hospitals and long-term care facilities (AIIR). A single-patient room known as an AIIR is outfitted with specialized air handling and ventilation capacity that satisfies the necessary standards, including monitored negative pressure in relation to the immediate environment, 12 air exchanges per hour for new construction and renovation projects, and 6 air exchanges per hour for existing facilities, as well as air exhausted directly to the outside. Patients who are believed to have the same infection are grouped together (cohorted) in areas of the facility that are away from other patients, especially those who are at higher risk for infection. This is done in the event of an outbreak or exposure involving a large number of patients who require airborne precautions (e.g. immunocompromised patients). Using temporary portable solutions, such as an exhaust fan, to create a negative pressure condition in the facility's converted area and discharging air directly to the outside, away from people and air intakes, is another option to apply airborne precautions in this situation (Okechukwu *et al.*, 2012).

In ambulatory settings, implementing methods, such as triage and signage, to identify patients with known or suspected infections who require airborne precautions upon admission into ambulatory settings is a part of airborne precautions. As soon as possible, place the patient in an AIIR. The patient should be placed in an examining room with a surgical mask on if an AIIR is not accessible. The room should be left empty after the patient leaves for the necessary amount of time, usually an hour, to allow for a complete air exchange. Instruct patients who have an

airborne infection to use a surgical mask and practice good respiratory hygiene and coughing manners. The mask should be worn unless the patient is in an AIIR, at which point it may be withdrawn (Lawoyin *et al.*, 2009).

Droplet precautions are designed to lower the possibility of infectious agent transmission by droplets. When a large-particle droplet (larger than 5 m) containing microorganisms produced from a person who has a clinical disease or who is a carrier of the microorganism comes into contact with the conjunctivae or the mucous membranes of a susceptible person's nose or mouth, the susceptible person becomes infected. Droplets are primarily produced by the source person while they are talking, coughing, or sneezing as well as when suctioning or doing bronchoscopies. Because large-particle droplets do not stay suspended in the air and often only travel short distances through the air - about 3 feet or less - their transmission needs close contact between the source and recipient individuals Special air handling and ventilation are not necessary to stop the spread of droplets because they do not stay suspended in the air.

Any patient known or believed to be infected with epidemiologically significant pathogens that can be spread by infectious droplets, such as *B. pertussis*, influenza virus, adenovirus, rhinovirus, *N. meningitides*, etc., must take droplet precautions. Patients who need to take droplet precautions are best accommodated in a single patient room. When a single-patient room is not readily accessible, infection control staff should be consulted to assess the hazards of other patient placement choices, such as cohorting or keeping the patient with an existing roommate. For patients in multi-bed rooms with diseases transmitted, it's especially crucial to keep them separated by at least three feet and close the curtains between their beds. When entering the room, medical workers should put on a mask for close contact with contagious patients. Patients

who need to be transferred outside the room while under droplet precautions should wear a mask if tolerated and follow respiratory hygiene and coughing protocol.

By using contact precautions, you might lessen the chance that you'll come into contact with bacteria that are crucial for epidemiology. Skin-to-skin contact and a physical transfer of microbes from an infected or colonized person to a susceptible host are considered to be direct contact transmission. When staff members turn, bathe, or carry out other patient care tasks that demand physical touch with patients, this happens. Two patients may also be directly infected by one another, for example, by hand contact, when one patient acts as the source of the infectious microbes and the other as the susceptible host (Siegel *et al.*, 2017).

Indirect contact transmission occurs when a susceptible host comes into contact with an intermediate, typically inanimate, contaminated object in the patient's environment. Contact precautions are used for specific individuals who are known to be infected or colonized (microorganisms present in or on the patient but no clinical signs and symptoms of infection) with epidemiologically significant microorganisms that can be spread through direct or indirect contact). Additionally, contact precautions are necessary when a person has profuse wound drainage, fecal incontinence, or other bodily discharges that point to a higher risk of transmission and a possibility for widespread environmental contamination.

Patients who require contact precautions are best accommodated in a single patient room. Place patients who are colonized or infected with the same pathogen in the same room (cohort) in multi-patient facilities. To prevent direct touch and accidental sharing of objects between the infected/colonized patient and other patients, make sure there is more than 3 feet of space between beds and draw the privacy curtain between them. For all interactions that might involve

contact with the patient or possibly contaminated locations in the patient's environment, medical workers taking care of patients under contact precautions should wear a gown and gloves.

Specific infection control measure

The healthcare employees must understand specific guidelines in prevention of infection transmission through isolation and other good health care habits. The guidelines that are essential for the healthcare workers are specified as.

Hand washing: Though simple this measure is one of the most effective methods in prevention of the spread of nosocomial infection. When caring for patients who are already suffering infection hands must be washed with antiseptic soap for at least one minutes or hands can be disinfected by rubbing the alcohol solution (WHO, 2016).

Barriers: Caps, masks, gloves

The use of barriers like caps, masks, and gloves is another essential measure to stop the spread of illnesses. Caps are generally advised while doing invasive procedures in aseptic units, operating rooms, or other places. Synthetic material masks that can filter the air are regarded as effective barriers against microorganisms. Masks manufactured from different materials, such paper, gauze, or wool, are not thought to be effective.

Another barrier that is required when working with people who have a contagious disease is a pair of gloves. When caring for patients of this sort, staff should use non-sterile gloves; however, when working on surgical or immune-compromised patients, gloves should be used sterilely. Once more, gloves are utilized to safeguard both the patient and the healthcare provider.

Equipment safety: Equipment and environmental factors are another frequent means of infection spread. The hospital setting must be meticulously cleaned frequently, despite the fact

that it may seem basic sense. Disinfecting with substances other than those used for cleaning is a crucial part of maintaining the equipment and environment's safety. High, midrange, or low levels of disinfection are possible. All microorganisms, with the exception of those with large bacterium spore counts, should be removed during high-level disinfection. The majority of bacteria, viruses, and spores are eliminated during intermediate disinfection, but not all of them. Only a few microorganisms exist at low levels and can be eliminated during equipment serilization.

Uniforms and good hygiene: Healthcare professionals should be careful about their personal cleanliness and the clothes they wear to work because these things could contribute to the transmission of infection within the hospital. Clothing should be replaced as soon as practicable after any exposure to a potential infection. Employees should wear specially designated work shoes that have been well cleaned.

Procedures for injection: Inappropriate injection techniques frequently lead to the transmission of blood-borne infections. The use of sterile needles and syringes is advised at all times, and it is advised that used ones be disposed of properly to prevent the spread of unwanted diseases.

Isolation: While many infection control techniques focus on physical items, isolation of the patient also plays a key role in infection control. The isolation of a sick person can frequently stop the disease from spreading and guard against the patient acquiring additional infections.

Behavioral Perspectives: The adherence of healthcare professionals to infection control procedures is one of the crucial factors that limits the spread of illnesses. As a result, the social cognitive models can be used to assess how healthcare providers behave in relation to accepted precautions and practices and, consequently, how quickly nosocomial infections spread.

Findings in the literature also point to a significant role for institutional priority, lack of participation in SP promotion at the individual and institutional levels, lack of institutional guidelines, lack of awards or encouragement, lack of role models from peers or superiors, lack of knowledge, experience, and education, as well as low compliance with hand hygiene practices among healthcare professionals (Sreedharan *et al*., 2011).

Again, given that nurses are among healthcare professionals that have the greatest patient contact, figuring out how organizational support affects their knowledge, attitude, and practices surrounding nosocomial infections may be the best course of action for filling the clear vacuum in the literature.

2.1.5 Knowledge of Standard Precautions

Knowledge is the recollection of information and is a requirement for effective behavioral change. It is the most crucial instrument for changing behavior (Gbefwi, 2014). The cognitive behavior hypothesis asserts the relationship between knowledge and behavior, arguing that knowledge is required but insufficient to modify behavior since cognition mediates behavior (Glanz & Rimer 2009; National Cancer Institute, 2015). This section reviews the body of research on the familiarity of healthcare professionals with common safety measures. The results of a research in Ibadan that examined workers' perceptions of the danger of infection at work and their understanding and adherence to general precautions revealed that neither were very good. Approximately 77.5% of respondents knew about the universal precautions, but only 24% knew them correctly. The knowledge level was highest (36.9%) among medical and surgical residents, followed by laboratory medicine residents (10.8%) and interns (15.4%). Significantly, senior registrars knew more than young doctors did (Kolude, Omokhodion & Owoaje, 2014). A comparable study on the understanding and use of general precautions among qualified medical

and nursing students was carried out in Ile-Ife, Nigeria. Out of 129 students, 83 (64.3%) were familiar with the idea of universal precautions, including 103 medical students and 26 nursing students. Students studying nursing had a greater degree of knowledge (77%) than students studying medicine (61%). The kids have little understanding of what the universal precautions are. Only 38.8% of people had good understanding of the safety precautions. The study population had a significant prevalence of needle stick injuries (41.8% of the population overall, 39.8% among medical students, and 50% among nursing students) (Bamigboye & Adesanya, 2008). This high rate of needle stick injuries is a sign that basic safety procedures are not being followed.

A second study on the knowledge, attitudes, and practices of healthcare professionals (nurses and paramedics) in Sharourah, Kingdom of Saudi Arabia, found that 21% of nurses and 30% of paramedics were not aware that HIV and hepatitis C can be transmitted through needle stick injury. Only 7% of those who experienced needle stick injuries in the past reported them to a doctor for post-exposure prophylaxis, out of the 74% of respondents who had a history of needle stick injuries. In phlebotomy procedures, 27% always wear gloves, while 29% believe that used needles can be recapped. The common precautions were only known by 61% of the respondents (Alam, 2012). In a separate investigation, it was shown that only the tertiary hospital in Ibadan, Nigeria, has a safety policy, as opposed to the two state government-owned secondary health care facilities. Inadequate equipment, a weak reporting system, and insufficient financing for the workforce were among the infection control challenges identified. According to the same study, 89.1% of health care workers (HCWs) regularly come into contact with blood and bodily fluids at work, and 82.5% of them admitted to ever accidentally splashing themselves with bodily fluids, most frequently blood (69.3%) and urine (50.0%). Next to surgeons, those working in laboratories were most likely to come into contact. In 59.8% of cases, people experienced needle

sticks, whereas 22.2% of cases involved drug vials. Majority of surgeons suffered from sharp injuries. Although up to 90.8% of the workers had heard of conventional measures, they were unable to put them into practice due to a lack of funding and equipment (Lawoyin, Stringer, Taines & Oluwatosin, 2009).

2.1.6 Attitude to Standard Precaution

Despite having equal training, health care providers' conduct can vary depending on how much risk they perceive. An abridged Likert scale with the options "agree," "disagree," and "uncertain" was used to score a set of 14 positive and negative attitude items. A score of 1 was awarded for either the word "Agree" or the word "Disagree" in answer to an attitude-related question. Three responses "Uncertain," "Disagree" in answer to a question about a good attitude, and "Agree" in response to a question about a bad attitude - were given a score of zero. As a result, attitude ratings ranged from 0 to 14.

2.1.7 Practice of Standard Precautions

Despite having similar training, the conduct of healthcare professionals can vary depending on how they perceive risk. Health care workers have cited a number of excuses for not taking all necessary precautions, including habit, a lack of time, interference with procedures, discomfort with protective gear, a lack of supplies, carelessness, cost-consciousness, unexpected body fluid contact, and the potential to cause patients to become anxious. The universal safeguards have been in place since 1987, but there is a wealth of evidence showing that they are not being followed, particularly in developing nations. However, non-compliance by healthcare professionals may differ depending on the job environment, whether it be rural or urban.

In rural north India, a study of healthcare professionals revealed insufficient practice in eye protection. Needlestick recapping safety procedures were not being followed by a significant majority of healthcare professionals. The study also shown a relationship between following basic precautions and having a longer tenure at a job, understanding the transmission of blood-borne pathogens, and having a strong commitment to workplace safety. The study recommended addressing knowledge and awareness as well as safety measures by the employee's organizations in interventions to enhance compliance with recommended safeguards among healthcare professionals in rural north India (Kermode *et al*., 2015). A comparable survey of healthcare professionals in both public and private healthcare facilities in the Nigerian metropolis of Abeokuta revealed that around one-third of all respondents always capped used needles. Doctors were more likely than trained nurses to use re-capped needles. More than half of respondents (56.5%) had never worn goggles during deliveries or surgeries, but less than two-thirds (63%) always utilized personal protection equipment. Nearly all (94.5%) of the healthcare professionals observed hand washing after treating patients (Sadoh, Fawole, Sadoh, Oladimeji & Sotiloye, 2010).

In 2003, Ogoina *et al* conducted a study at an emergency medical service in Lagos, Nigeria, on awareness and compliance with universal precautions among health workers. She discovered that while the group of health workers had good knowledge about exposure risks at work, they did not apply that knowledge to safe work practices. Only 42% of the responders followed the general safety recommendations.

2.2 Theoretical Framework

It was proposed that two ideas serve as the study's pivot points. This theory will be looked at in the context of this research. The theories include the O'Boyle hypothesis of planned behavior and

the Environmental Theory of Florence Nightingale. According to Florence Nightingale, it is the responsibility of the healthcare provider to position the patient so that nature might work on him and promote healing. According to the notion, HCWs must give patients a clean atmosphere (in the case of infection prevention and control). According to Florence Nightingale, hygiene and illness transmission are related, showing a connection between common sense precaution and a decline in infection rates**.**

Proper personal and environmental hygiene is the primary method for reducing infection. Knowledge, attitude and practices in infection prevention and control can affect the health environment of the patient.

Application of the theory

Health Care Personnel: The HCWs are crucial in the process of converting information about infection prevention and control into attitudes and practices. In order to prevent the spread of nosocomial infection, HCW in UPTH should put their knowledge into practice by using standard precautions, wearing personal protective equipment, and maintaining aseptic technique while caring for patients. Nightingale acted out prevention and control practices through her knowledge and attitude about being in the best possible position for healing (Hegge, 2013 and Gurler, 2014).

Environment: The knowledge, attitude, and practice of the HCWs have an impact on the clinical setting. Nightingale emphasized that infection control procedures and sanitation and hygiene standards in the clinical setting improve patient care. Therefore, in order to improve the patient's health, health care professionals in UPTH should maintain appropriate environmental hygiene and sanitation, making sure the atmosphere is free from infection and conducive for patients.

Patient: Nightingale focused on caring for the sick and placed emphasis on the importance of hygiene and patient care in infection prevention and control, so healthcare professionals in UPTH should teach the patient about the importance of environmental and personal hygiene in order to reduce the incidence of infection-related disease.

O'Boyle, Henly, and Ducket (2018) created a model of the internal reasons that motivate standard precaution, including belief in the efficiency of SP in lowering hospital acquired infections, using the theory of planned behavior. The intention to practice hand washing hygiene and the organizational effect that affects behavior are influenced by the impression of social pressure to conduct SP and the perceived ease of adding variables. It has to do with the mindset of whether the activity is advantageous to themselves or not, perception of outside pressure, and perceived control over how easy or difficult the behavior is to accomplish.

These perceptions are also influenced by how strongly an individual believes in the importance of the behavior's outcome. This belief is based on how that individual evaluates peer exceptions and develops control beliefs, which are based on how well they believe they can complete the behavior despite facing challenges.

In this study, the health care providers need to meet their basic needs for survival and productive labor. When health care employees correctly execute universal safety, including hand washing hygiene, through the supply of the essential equipment, human functioning will be maintained, which will lead to proper care of the patient client and boost work production.

2.3 Empirical Studies

In Yenagoa Bayelsa State, Nigeria's Federal Medical Center, Agufure and Perewari (2017) looked at the knowledge, attitudes, and practices of HCWs about standard precautions. They

chose to conduct their research using a cross-sectional design. Utilizing a stratified selection technique, 200 healthcare professionals from the Federal Medical Centre Yenagoa in Bayelsa State were chosen as a sample. A semi-structured questionnaire was employed as the data collecting tool to gauge participants' level of familiarity with common safety procedures as well as their attitudes toward them. The researchers' findings indicated that the respondents' ages ranged from 22 to 60 years old, with a mean age of 38.3 years. The majority of respondents had positive attitudes toward conventional precautions (70%), good awareness of them (79%), and practiced them (91.5%). Less than half of the respondents 87 (43.5%) said they always recap needles after use, 52 (26.0%) said they always remove needles from syringes, and 105 (52.5%) said they had sustained needle stick wounds in the previous year. Only 40.0% of respondents had had a vaccination against the hepatitis B virus, further demonstrating the poor immunization status.

The study recommended training and re-training of staffs regularly on standard precautions; The study said hepatitis B vaccination should be made mandatory, needle recapping should be outlawed, hazardous and unnecessary usage of injections should be limited, and a post exposure prophylactic regimen should be in place with a well-known designated focal person. The study recommended training and re-training of staffs regularly on standard precautions;

In Ikeja, Lagos State, Nigeria, at the Lagos State University Teaching Hospital, Julius *et al.* (2021) evaluated the variables impacting routine precaution measures among nurses. They used a descriptive cross-sectional study in their research, which involved 305 nurses at the Lagos State University Teaching Hospital in Ikeja. Data were collected from willing participants using a self-structured instrument for this investigation. Statistical Package for the Social Sciences (SPSS) version 25 was used to examine the information they gathered. Using descriptive statistics for

mean, frequency, and percentage, the study questions were answered. Following their investigations, they discovered that the average age of the respondents was 41.64 10.1 years and that many (68.5%) had more than ten years of professional experience. Nearly two-thirds (59.7%) of respondents had a favorable attitude toward common precautionary measures, and their level of knowledge was above average (24.69 2.16). According to their study, the most often mentioned barriers to the use of standard precautions were the lack of personal protective equipment (PPE), a regular lack of training on standard precautions (91.1%), and a lack of appropriate standard precautions policy (81.5%). The majority of respondents had knowledge levels above average and a favorable attitude toward standard precaution. At the conclusion of the study, they recommended that in order to maintain the high performance, nurses should continue to sensitize patients and check conventional precautions. Additionally, healthcare facilities should make sure that PPE is readily available for standard precautions and that nurses get ongoing in-service instruction on these procedures.

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CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Design

A study's design is a road map that outlines how information about a particular issue should be gathered and analyzed (Sekaran, 2000). The descriptive survey method was utilized in this investigation. A descriptive survey study aims to give information on a situation's nature and status as it is at the time of the study.

3.2 Area of Study

East West Road is where you'll find the University of Port Harcourt Teaching Hospital (UPTH) in Port Harcourt, Nigeria. In Rivers State, it is a significant center for tertiary care teaching and research. It has experienced a tremendous journey in terms of the growth of its physical and human resources during the course of its 38 (thirty-eight) years of existence. Emohua General Hospital, which had a 60-bed capacity in 1981, served as the hospital's original location. But by September 1983, it was clear that the hospital was too tiny to function as a teaching hospital. Consequently, the 180-bed hospital in Port Harcourt became the new location of the University of Port Harcourt Teaching Hospital. To meet the accreditation requirements of the Nigerian Medical and Dental Council (NMDC) and the two Post-graduate Medical Colleges, National/West Africa for the training of both graduate and postgraduate Doctors, this Hospital has undergone a tremendous physical, equipment, and infrastructure expansion between 1983 and the present. It now has 800 beds. So far, the hospital's main clinical and pathology departments have all received full accreditation and reaccreditation.

The University Teaching Hospitals (reconstitution of Board etc.) Decree No. 10 of 1985 served as the foundation for the Hospital's mission. The hospital's mission is to "provide excellent

medical services, manpower training, and research, using a well-trained and well-motivated workforce and the best affordable modern technology with a culture of courtesy, humanness, and patient friendliness." The hospital's vision is to "be a first-rate world-class hospital." The hospital has 20 departments, including an emergency room, a medical office, a radiology department, an intensive care unit, a laboratory, an account and audit department, a pharmacy, an ophthalmology department, an ear, nose, and throat department, an outpatient department, male and female medical wards, a new born special care unit, a paediatric ward, a surgical theater ward, male and female surgical wards, a dietetics department, waste handling department, statistics department, health recorder department and obstetric department.

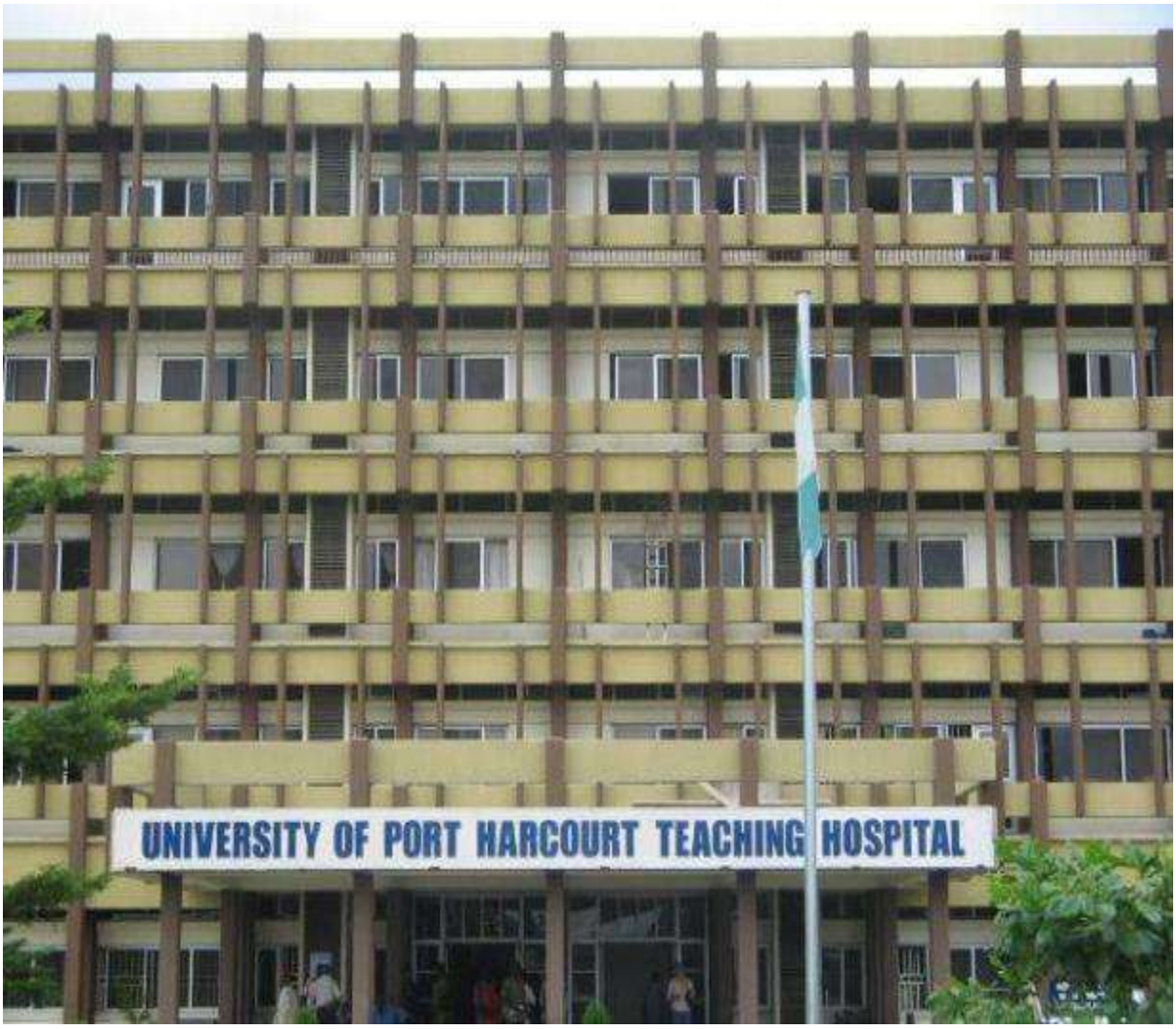

Fig 3.1: University of Port Harcourt teaching hospital (Okeke, 2019)

UPTH policy on standard precaution and procedure on universal precautions and sanitary policy practices

i. **Purpose:**

This policy's objectives are infection control, communicable disease prevention, and the establishment of rules for universal safety precautions and hygienic behaviors, such as hand washing.

ii. **Policy:**

The UPTH has a policy of using and practising good hygiene. All UPTH employees will get training on hygienic practices, general infection control methods, and universal safeguards to stop the transmission of bloodborne infections. This includes proactive measures to reduce the possibility of catching an infection or disease from another person or from contact with a contaminated surface. Blood, bodily fluids that may clearly be seen to have blood contamination, semen, and vaginal secretions are all infectious materials that should be handled with universal caution. All employees must adhere to standardized safety measures and hygienic standards, including:

1. Use of appropriate hand washing.
2. Putting on gloves when handling contagious materials
3. When exposed to potentially dirty or infectious objects, wear a gown or an apron.
4. If splashing is likely, wear a mask and goggles.
5. Put on gloves and wipe affected surfaces with disinfectant
6. Handling sharps properly
7. Put on gloves and wash contaminated laundry with correct bagging techniques.

iii. **Procedure:**

A. Universal Precautions and Infection Prevention and Control.

1. The idea of universal precautions assumes that all bodily fluids are infectious, hence all medical professionals must handle blood and/or bodily fluids as though they are infected. This not only safeguards caregivers but also eliminates any stigma connected with using gloves and masks around patients who are very contagious by following the same protocols for everyone.
2. The single most crucial behavior for halting the spread of infection and disease is hand washing. Regardless of the existence or absence of any known diseases and infections, proper hand washing will be performed as part of regular work practices and routines. Additionally, staff members are expected to help customers wash their hands frequently. Every employee will wash their hands at the start and conclusion of every shift, before and after handling food, before and after helping someone with personal care, after any contact with blood or bodily fluids, and after any potential contamination. Examples include managing dirty clothing or dishes, taking out the trash, etc. The following procedure must be followed when washing your hands.
    a. Use warm water on your hands and wrists.
    b. Use sufficient soap to produce lather.
    c. Make lather by rubbing your hands together.
    d. Lather up your hands and vigorously rub them for at least 10 to 15 seconds (palms backs of hands, fingers, spaces between fingers, around and under nails, and wrists). Wash your hands for three to five minutes if you've come into contact with blood or other potentially infectious items.
    e. Completely rinse with warm water.

f. Using a fresh paper towel, pat the skin dry.

g. Use a dry paper towel to turn off the faucet.

h. Get rid of trash.

3. Employees will make sure that their coughs and sneezes are properly covered. Coughing or sneezing into a tissue or paper towel is considered to be appropriately covered. Staff members will cough or sneeze into their elbows if these things are not accessible. Additionally, staff members are expected to help clients understand and employ proper cough- and sneeze-coverage techniques.
4. Gloves will be worn to crate a barrier between hands and any potential infection sources. When contact with high risk bodily fluids is reasonably anticipated, gloves must be used. For each circumstance and each individual serviced, new gloves shall be utilized. To ensure safety, gloves should be removed from "skin to skin" and "glove to glove".

3.3 Population for the Study

Doctors, nurses, medical laboratory scientists, health aides, and waste handlers at the teaching hospital run by the University of Port Harcourt make up the study's population. There are 400 people working as health care providers who have been employed for at least 6 months and are actively involved in handling garbage, needles, sharp items, and bodily fluids.

3.4 Sample and Sampling Technique

3.4.1 Sample size determination:

Using Taro Yamane formula for the sample size.

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

Where, N = population of study

n = sample size

e = level of significance or margin of error

1 = unit (a constant)

Therefore,

N = 400\

e = 0.05

n = ?

(The choice of 0.05 level of significance is purely an exclusive decision of researcher).

Replacing the values above with the above formulae, we have

$$n = \frac{400}{1+400(0.05)^2}$$

$$n = \frac{400}{1+400(0.0025)}$$

$$n = \frac{400}{1+1}$$

$$n = \frac{400}{2}$$

$$n = 200$$

3.4.2 Sampling method

Multistage sampling technique was used. First stage was the sampling of 30% of the departments in the university of Portharcourt teaching hospital which should be representative of all the twenty departments. 30% of it was 6 departments.

Second stage was purposeful selection of the six departments who were more involved in handling patient blood, bodily fluids, sharp objects, needles and waste. Who also have been

employed for at least 6 months. The selected departments were Male and Female medical wards, Male and Female surgical wards, Theatres, medical laboratories, obstetrics and Waste handlers.

Third stage is the sampling of the health care workers from the selected departments where they work using simple random sampling. 14 doctors, 19 nurses, and 11 health assistants were randomly sampled from male and female medical wards. Same number respectively sample from male and female surgical wards .In the theatre, 12 doctors, 18 nurses, and 11 health assistants were sample. From the laboratories 33 medical laboratory scientists and 11 health assistants sampled. Also 27 waste handlers were sampled in waste handling department.

3.5 Instrument for Data Collection

The descriptive survey research employs the use of structured questionnaires, which was thought to be the most effective method for reaching the study's population, particularly when the instrument can be used to collect the necessary data. A questionnaire with both open-ended and closed-ended questions was the research tool employed for the study. Based on the research topics put forth for the study, the questionnaire was created from the review of the literature. The questionnaire's Section "A" contained information about the respondents' backgrounds. Section B investigated standard precaution knowledge, Section C studied standard precaution attitudes, and Section D examined standard precaution practices.

3.6 Validity of the Instrument

The characteristics of tests and measurements are what are referred to as validity. Validity is the degree to which a measuring device measures what it is designed to measure. The researcher created the questionnaire as the tool for gathering data, and the project supervisor reviewed it critically before making suggestions. Two experts validated the updated version of the survey for relevance to the objectives, material coverage, and language usage.

3.7 Reliability of the Instrument

Using the test-retest procedure, the instrument's dependability was evaluated. In order to conduct the test, copies of the questionnaire were distributed to twenty (20) respondents similar to those in target population. The same procedure was repeated a week later in order to evaluate the veracity of the respondents' responses. The Crombach Alpha test was used to determine whether the results were consistent, and a coefficient of 0.7 was obtained, indicating that the instrument was reliable.

3.8 Method of Data Collection

The respondents were given instructions on how to complete the questionnaire as well as the study's goal. Data collection for the project took a few weeks, and during that time the researcher was available to respond to questions that bothered on this study instrument. The questionnaire was used to gather data. After receiving informed consent, the questionnaire was given to the respondents in each selected department. The completed .copies of the questionnaire were collected on the spot.

3.9 Method of Data Analysis

Data was collected, entered into the computer and analyzed using SPSS Version 21(Statistical Package for Social Science) In order to analyze the data, descriptive statistics (frequencies, tables, percentages, mean score and chi-square test were used.

3.10 Ethical clearance /Informed consent.

The Federal University of Technology, Owerri, School of Health Technology Ethical Review Board granted ethical approval. Before giving out the questionnaire, informed consent was obtained from the respondents.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics of the Respondents in UPTH

Table 4.1a: Socio-demographic distribution of health workers (n=200)

Demographic variables	Frequency	Percentages (%)
Gender		
Female	135	67.5
Male	65	32.5
Total	**200**	**100**
Age range		
20-29	45	22.5
30 – 39	84	42.0
40 – 49	52	26.0
50 – above	19	9.5
Total	**200**	**100**
Years of service		
1 – 10	116	58.0
11 – 20	45	22.5
21 – 30	36	18.0
31 – 35	3	1.5
Total	**200**	**100**

The socio-demographic distribution of health workers in UPTH is shown in table 4.1a above. The findings showed that 67.5% of the participants were female, and 32.5% were males. The majority (42.0%) of respondents were between the ages of 30 and 39, with 26% of respondents being between the ages of 40 and 49 while 9.5% of the population were over 50 and represents a tiny percentage of the older population. Additionally, the bulk of respondents were still in their first one to ten years of employment, with another 22.5% staying for eleven to twenty years.

Table 4.1b: Socio-demographic distribution of health workers (n=200)

Demographic variables	Frequency	Percentages
Marital status		
Married	11452	57.0
Single	62	31.0
Widow/widower	13	6.5
Divorced/separated	11	5.5
Religion		
Christianity	177	88.5
Islam	14	7.0
Traditional	9	4.5
Total	**200**	**100**
Occupation		
Nursing	56	28.0
Doctor	40	20.0
Laboratory Sci.	33	16..5
Waste handlers	27	13.5
Health assistants	44	22
Total	**200**	**100**

Results of analyses on marital status, religion, and occupation are shown in Table 4.1b above. The majority (57.0%) of the responding health professionals were married; 31% were single, and the remaining 12% had marital issues ranging from separation to the loss of a spouse. The majority of respondents (85.5%) practiced Christianity, 7% practiced Islam, and only 4.5% stated traditional religion. In this activity, nurses make up the majority (28%) of participants, followed by health assistants (22%) and physicians of medicine (20%). Lab scientists (16.5%) and Waste handlers (13.5%) round out the list.

4.2 Level of Knowledge of the Respondents in UPTH on Standard Precaution

Table 4.2a: Knowledge and source of information on Standard Precaution

Demographic variables	Frequency	Percentages	SA	A	Indifferent	SD	Mean
Awareness							
Previous knowledge of standard precaution as a concept in the health system	200	100					
Source of information							
Formal training	130	70					
Colleague/friend	52	26.0					
Media	11	5.5					
Others	7	3.5					
Total	**200**	**100**					
Components of standard precaution							
Hand hygiene is a component of standard precaution			84	11	-		3.42
Use of personal protective equipment			128	72	-		3.64
Safe injection practices			72	10	20		3.26
Safe handling of potentially contaminated equipment surfaces			126	74	-		3.63
Respiratory hygiene etiquette			81	10	10		3.36
Anal/perineal hygiene			44	13	17		3.14

Mean response > Likert mean (2.5) = significant

Table 4.2b: Knowledge and source of information on Standard Precaution

Items	Strongly Agree (SA)	Agree (A)	Indifferent	Mean
Advantages of standard precaution				
Protects both health workers and patients	121	74	5	3.56
Reduced spread of communicable disease	48	93	49	2.85
Not associated with stigma and discrimination	56	122	22	3.17

Results on the respondents' knowledge of standard precaution and the sources from which they learned about it are shown in Tables 4.2a and 4.2b. The investigation reveals that everyone (100%) had some prior understanding of conventional precaution as a concept in the healthcare system. Their informational sources, however, ranged from formal education (65%), colleagues/friends (26%) to the media (5.5) and other sources (3.5%). There is strong evidence that standard precaution knowledge and practices are subjected to deliberate training for health professionals.

The respondents agreed very well that components of standard precaution include hand hygiene ($\bar{x}$ = 3.42), use of personal protective equipment (PPE) ($\bar{x}$ = 3.64), safe injection practices ($\bar{x}$ = 3.26), safe handling of potentially contaminated equipment surfaces ($\bar{x}$ = 3.63), respiratory hygiene etiquette ($\bar{x}$ = 3.36) and annal/perineal hygiene ($\bar{x}$ = 3.14). The response means of items raised under the advantages of standard precaution also revealed that the respondents agreed that practice of standard precaution has immense benefit of which some of it include protection of both health workers and patients ($\bar{x}$ = 3.56), reduced spread of communicable disease ($\bar{x}$ = 2.85), dealing with the issue of stigmatization and discrimination ($\bar{x}$ = 3.17).

4.3 Attitude of Medical Workers in UPTH towards Standard Precaution

Table 4.3a: Attitude of the respondents towards standard precaution

Variable	**Strongly agree**	**Agree**	**Indifferent**	**Disagree**	Mean
Attitude towards standard precaution					
Employers should always provide training on standard precautions	27	172	1		3.14
Standard precaution are useful in protecting against hazards in workplace	86	107	7		3.40
Standard precaution are not really necessary in hospitals	-	2	16	182	1.1
They are only necessary for theatre workers	-	28	72	100	1.64
Standard precaution can prevent spread of infections so should be observed always	58	93	49		2.8
Standard precaution requires one to recap needles after use to avoid needle injury and infection	80	120			3.4

n = 200, mean response > 2.5 = significant

The study of the respondents' attitudes about typical precaution techniques was displayed in Table 4.3a. The respondents believed that it was crucial for every employer in the healthcare system to provide training on common precautions, as evidenced by the mean response of 3.14, which was greater than the likert mean (cut-off). They believed that standard precaution is helpful in the protection against health hazards in workplace ($\bar{x}$ = 3.40). The low response mean of 1.1 and 1.6 is an indication that the health workers in UPTH do not believe standard precaution is not really necessary or that it is mainly for those working in the theatre respectively. On the contrary they believed that standard precaution helps to prevent infections ($\bar{x}$ = 2.80) and therefore should always be observed while carrying out any form activity in the hospital.

Table 4.3b: Attitude of the respondents towards standard precaution n(%)

Items	Strongly agree	Agree	Indifferent	Disagree
Management of HIV and HBV positive patients: the following precautionary measures should be adopted while handling patients with the above viruses:				
Wearing double hand gloves	178(89.0)	22(11.0)		
Wearing googles/face mask	67(33.5)	130(65.0)	3(1.5)	
Wearing gowns/aprons	180(90.0)	20(10.0)		
Wearing boot/wear	170(85.0)	27(13.5)	3(1.5)	

Similar to table 4.3a, respondents in table 4. 3b responded that it is essential to use double hand gloves (89%), goggles or a face mask (65%), a gown (90%), and boots (85%) when working with patients who have HIV or HBV. The aforementioned evidence amply demonstrates the positive attitude the UPTH personnel has toward routine precaution.

4.4 Practice of Standard Precaution

Table 4.4: Practice of standard precaution by the respondents

Items	Strongly agree	Agree	Indifferent	Disagree
Ways to handle spill of blood and body fluid. They among others include:				
Clean the floor during and after any medical activity.	109(54.5)	91(45.5)		
Clean with an antiseptic immediately	58(29.0)	88(44.0)	54(27.0)	
Use soap and water to clean affected surface	192(96.0)	8(4.0)		
Use 0.5% chlorine bleach	67(33.5)	94(47.0)	39(19.5)	
Injection safety practices				
Recap needle after use	100(50)	66(33.0)	34(17.0)	
Detach needles from syringe immediately after use	-	56(28.0)	69(34.5)	75(37.5)
Dispose needle and syringe immediately after use	196(98.0)	4(2.0)		
Methods of needle disposal				
Use of waste bin	90(45.0)	101(50.5)	9(4.5)	
Enclose and burn	78(39.0)	120(60)	2(1)	
Bury them underground	9(4.5)	37(18.5)	34(17.0)	120(60)
Methods of handling re-usable instruments				
Boil beyond 100^{o}C	77(38.5)	89(44.5)	13(6.5)	21(10.5)
Soak in a disinfectant after washing with soap and water	121(60.5)	66(33.0)	13(6.5)	
Putting in an autoclave	187(93.5)	9(4.5)	4(2.0)	
Sterilize before and after use	188(94)	8(4.0)	4(2.0)	

Results on respondents' use of standard precaution are shown in Table 4.4. The outcome showed that the personnel had adopted some procedures for dealing with blood and bodily fluid spills. The majority (54.5%) clean their floors before and after medical procedures. 44% of people promptly wipe infected goods with an antiseptic. In order to maintain the hospital rooms free of infections, the medical staff at University of Portharcourt Teaching Hospital also utilizes soap and water to clean infected surfaces (96%) and 0.5% chlorine bleach (94%) were also some ways to disinfect rooms.

Some (50%) thought that recap of needle after use is a safe way to prevent needle injury and transmission of diseases. Safety measures agreed by the respondents include disposal of needles and syringes immediately after use (98%). Method of needle disposal in UPTH include the use of waste bin (50.5%) and enclose and burn (60%).

4.5 Test of Hypothesis

Statement of hypothesis: knowledge of standard precautions among health care workers do not significantly influence practices in University of Port Harcourt Teaching hospital, Rivers State.

Table 4.5a: Chi-square Hypothesis one

n=200		**Practice of standard precaution**			**Total**
		D	**A**	**SA**	
Knowledge of standard precaution	D	0(0)	0(0)	11(3.14)	11
	A	0(0)	59(46.73)	46(29.93)	105
	SA	54(22.68)	30(37.38)	0(0)	84
Total		54	89	57	200

Chi-square is given by:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Chi square = 43.25+3.22+1.46+19.67+8.63 = 76.23

Table value = 9.488

Since the calculated value is higher than the table value, we have sufficient evidence to reject the null hypothesis

Table 4.5b: Chi-square of Hypothesis two

		Attitude to standard precaution			Total
		D	**A**	**SA**	
Knowledge of standard precaution	A	0(0)	107(62.06)	9(51.62)	116
	SA	7(2.94)	0(0)	77(36.12)	84
Total		7	107	86	200

Chi-square is given by:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Chi square (χ^2) = 5.66 + 32.54 + 35.18 + 46.42 = 199.80

Table value = 10.597

Since the calculated value is higher than the table value, we have sufficient evidence to reject the null hypothesis

4.6 Discussion of Findings

According to the study, more women (67.5%) than men (32.5%) participated in the study. These women were mostly between the ages of 40 and 49 and had between one and ten years of work experience. Additionally, the analysis revealed that there were more nurses than doctors. This finding is comparable to that of the study of Arinze-Onyia, *et al*. (2018) which found that the majority of health workers were nurses working in the wards. This claim is plain given the fact that more nurses were employed to help doctors and other healthcare professionals to care for the increasing number of people who were admitted in hospitals. This study is comparable to one that was done in France where nurses made up 44% of the group of HCWs analyzed, and another one that was done in Nigeria where nurses made up 50.7% of all the hospital workers studied. This looks to be an indication of the proportion of nurses among HCWs in general (Atif *et al*., 2013).

Given how long ago the policy on SP was created, it is not surprising that there was a high level of knowledge about Standard Precaution (SP). None of the health care professionals claimed to be unaware that safety measures should be used throughout any type of medical procedure. Everybody (100%) agreed that they had heard of the idea at some point, whether it was through training (school or a workshop), a friend or coworker, the media, or another source. This is in line with the research conducted in the United Arab Emirates, where 97% of respondents were conversant in the idea (Sreedharan, 2011). (Amoran and Onwube, 2013) both claimed to possess a comparable level of knowledge. This demonstrated the level of interest of HCWs in SP, which is most likely related to their belief that Standard precaution is essential for infection control in contexts involving the public health. The majority of the respondents (82.5%) in the current survey had favorable attitudes toward universal precaution, which is consistent with other findings (Parmeggiani *et al*., 2010).

Once more, the demonstrated favorable attitude may be the result of their trust in standard precaution (SP), as the SP policy is a solid package intended to stop the spread of nosocomial diseases and guarantee the safety of HCWs while at work. Wearing of PPE was optimally practiced, which is positive because it is essential for infection management in addition to being a key element of SP. This is consistent with a prior study (Punia *et al*., 2014). It might be assumed that the respondents' great familiarity with standard precautions prompted them to view them favorably.

In this survey, the respondents (82.5%) have a good attitude toward wearing gloves, a mask, aprons, and boots although in an another study, only 34% of respondents reported wearing gloves and coveralls on a regular basis. The primary explanations for this poor PPE use included sporadic access to PPEs, a lack of time to wear them, and the fact that doing so interferes with clinical duties (Mukherjee *et al*., 2016). This demonstrated the need for management and HCWs to work together as closely as possible to implement Standard precaution completely. Secondly, the management should establish an enabling atmosphere by routinely providing PPEs and other necessary resources and supervising their use, while the HCWs should guarantee complete compliance by adhering to established protocols and constantly utilizing resources.

This study shows that standard precaution is highly practiced in UPTH. Majority 54.5% of the respondents asserted that whenever there is spill of blood or body fluid, such is cleaned immediately with either of antiseptic, use of soap and water or 0.5% chlorine bleach.

Majority (60%) do not detach needles from syringe after use. This is a better standard precaution as detaching and capping after use may dispose a health worker to infections. This practice is in line with research conducted by Tobin *et al*., (2013) where some of the respondents confirmed that they do not recap and detach needles from syringe after use. Abubakar *et al*. (2015) in their

work; assessment of knowledge and practice of standard precautions among nurses working at Federal Medical Centre Gombe also opined that trying to detach or recap needles is not a good practice as it is dangerous and may lead to body injury

The hypothesis test in the work showed that the influence of knowledge on practice is significant since the calculated chi square value of 76.23 is greater than the table value of 9.48, we have sufficient evidence to reject the null hypothesis. Knowledge is the recollection of information and is a requirement for effective behavioral change. It is the most crucial instrument for changing behavior (Gbefwi, 2014). Under the universal precautions, all patients' blood and some bodily fluids were seen as having the potential to spread blood-borne diseases like HIV, HBV, and others (Adim *et al*., 2009). Knowledge in infection control has been reported as a major factor influencing the practice of IPAC in health facilities in Nigeria (Adinma *et al.* 2009; Okechukwu and Modteshi, 2012) and other countries of the world. Also knowledge may be gotten through seminar, media, training etc. The second research hypothesis test was also significant as the calculated chi square value of 199.8 was greater than table value of 10.597 thus we have sufficient evidence to reject the null hypothesis and accept that Knowledge of standard precautions among selected health care workers in University of Port Harcourt Teaching hospital, do significantly influence their attitude. This is line with the study of Luo *et al.* (2010) where Success in the implementation of SP guidelines depends on the factors such as optimal awareness and a positive attitude in all health care staff and of receiving continuing education by the employees.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

There has always been a problem with basic precautionary measures, particularly in the Nigerian system. Either there aren't enough safety measures in place, or the medical staff lack the self-control to always use them. This study was carried out to ascertain the level of knowledge, attitude, and standard precaution practice in UPTH. The evidence demonstrated that the medical staff was not at all ignorant of common safety measures. Most of them had formerly taken part in training that taught them the value of following SP standards in order to protect themselves or others. Some people were informed about it through a colleague, media outlet, etc.

While principles of standard precaution should be strictly adhered by surgeons and physicians for their own safety as well as setting leadership roles for their co-workers, success in the implementation of SP guidelines depends on the factors such as optimal awareness and a positive attitude in all health care staff, these goals are not reached without qualified employee receiving continuing education. This study revealed that the health care workers in UPTH has positive attitude towards standard precaution. Bodily fluid or blood spillage were being cleaned immediately they occur with disinfectants to avoid possible infectious contamination. Use of personal protective equipment such as gloves and face masks, and injection safety were some of the safety measures taken by respondents.

Frequent cleaning with antiseptic is been practiced in the hospital. Soap and water were been used for hand hygiene, sometimes chlorine bleach is used to disinfect contaminated surfaces. Even though some healthcare professionals are unawares that recapping needle can be injurious, however needle and syringe were being disposed immediately after use. Method of disposal

include use of waste bin, incinerator burning and burying in the ground. In all, all the objective set out for this work were realized.

5.2 Recommendations

In order to promote good standard precaution and mitigate the risk of hospital acquired infections, it is necessary for health authorities in Nigeria to institute policies that make it compulsory to establish IPAC (infection control and prevention) committees in all hospitals. Such policies should also outline measures that ensure that IPAC resources are made routinely available and that knowledge and practice of standard precautions are improved through regular **IPAC** training of hospital staff, with special emphasis on newly qualified health workers such as house officers and staff nurses.

5.3 Contribution to knowledge

This study has contributed or added to the existing knowledge, attitude and practice of standard precaution. The study has shown that UPTH needs regular training to improve standard precaution in the practice of health care. It has also shown that there is need to encourage the use of available PPE by health workers.

5.4 Suggestion for further studies

A comparative study of the knowledge and practice of standard precaution among health care workers in other health facilities.

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APPENDIX

Department of Public Health

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Imo State

Dear Respondents

I am **……**, from Federal University of Science and Technology, pursuing a Masters Degree in Public Health. I'm interested in learning more about the "**Knowledge, Attitude and Practice of Standard Precautions among Health Care Workers in UPTH"**. I will ask you several questions. The information you provide will be used to develop better health education programs for young people like yourself. DO NOT write your name on this questionnaire. The answers you give will be kept strictly confidential; they will only be used for statistical analysis. No one will know what you write. Answer the questions based on what you really do and to the best of your ability. Completing the survey is voluntary. If you don't want to answer a question, just leave it blank.

Yours faithfully

Questionnaire on Knowledge, Attitude and Practice of Standard Precaution in UPTH

Please tick as appropriate

Socio-Demographic variables	
Gender	
Female	
Male	
Age range	
20-29	
30 – 39	
40 – 49	
50 – above	
Total	
Years of service	
1 – 10	
11 – 20	
21 – 30	
31 – 35	
Marital status	
Married	
Single	
Widow/widower	
Divorced/separated	
Religion	
Christianity	
Islam	

Traditional	
Total	
Occupation	
Nursing	
Doctor	
Laboratory Sci.	
Waste handlers	
Health assistants	
Knowledge and source of information on Standard Precaution	
Awareness	
Previous knowledge of standard precaution as a concept in the health system	
Source of information	
Formal training	
Colleague/friend	
Media	
Others	

Components of standard precaution	**Strongly agree**	**Agree**	**Indifferent**	**Strongly disagree**
Hand hygiene				
Use of personal protective equipment				
Safe injection practices				
Safe handling of potentially contaminated equipment surfaces				
Respiratory hygiene etiquette				

Anal/perineal hygiene				
Advantages of standard precaution				
Protects both health workers and patients				
Reduced spread of communicable disease				
Not associated with stigma and discrimination				
Attitude towards standard precaution				
Employers should always provide training on standard precautions				
Standard precaution are useful in protecting against hazards in workplace				
Standard precaution are not really necessary in hospitals				
They are only necessary for theatre workers				
Standard precaution can prevent spread of infections so should be observed always				
Standard precaution requires one to recap needles after use to avoid needle injury and infection				
Management of HIV and HBV positive patients: the following precautionary measures should adopted while handling patients with the above viruses:				
Wearing double hand gloves				
Wearing googles/face mask				
Wearing gowns/aprons				
Wearing boot/wear				
Practice of Standard Precaution				
Ways to handle spill of blood and body fluid. They among others include:				
Clean the floor during and after any medical activity.				

Clean with an antiseptic immediately				
Use soap and water to clean affected surface				
Use 0.5% chlorine bleach				
Injection safety practices				
Recap needle after use				
Detach needles from syringe immediately after use				
Dispose needle and syringe immediately after use				
Methods of needle disposal				
Use of waste bin				
Enclose and burn				
Bury them underground				
Methods of handling re-usable instruments				
Boil beyond 100^{o}C				
Soak in a disinfectant after washing with soap and water				
Putting in an autoclave				
Sterilize before and after use				