International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 9 Issue 5, May 2022

ISSN: 2394-4404

Awareness And Practices Of Standard Safety Precaution Amongst Nurses Toward Prevention Of Nosocomial Infections In Selected Hospital In Osun State

K.A. ADESINA
Osun State University Osogbo

Olamide AFOLALU, RN, RM, BSc.
Department of Nursing Osun State University Osogbo

Mercy ASELEBE, RN, RPON, MSc.
UNIOSUN Teaching Hospital Osogbo

Rahmat OYEKALE, RN, RM, RPHN, MSc.
Department of Nursing Osun State University Osogbo

Abstract: ***Standard precautions (SPs) in the hospital are very important in the reduction of health care workers' exposure to occupational health hazards but most hospitals are used to reactive rather than proactive safety practices. The effect of reactive safety practices is overwhelming to health care workers, hospitals and the society, hence it is pertinent to assess Awareness and Practice of Standard Safety Precautions amongst Nurses towards Prevention of Nosocomial Infection, At LAUTECH Teaching Hospital, Osogbo.***

A descriptive cross-sectional design was used to select 186 respondents using simple random technique by Taro Yamane formula. Self-developed questionnaire was used to collect data. The data collected were analyzed using table and percentage, the research questions were answered and the hypotheses were tested using chi square for some variables and chi square at 0.05 level of significance.

Chi square analysis revealed no significant association between awareness and practice of standard safety precaution and also between sociodemographic variables and compliance with standard safety precaution.

A significant (72%) of the respondent had high level of awareness on standard safety precaution, more than half of the respondents complied and practice standard safety precaution while majority reported absence of regular training on infection control.

There is great need for strong advocacy on knowledge of SPs and compliance with SPs in the hospitals to curb increasing occupational health hazards. The Nigeria government and hospital managements should develop an all-encompassing integrated SPs policies, strategies and procedures consistent with global best practices.

Keywords: Awareness, Practice, Standard safety precaution, Nurses, Nosocomial Infection

I. INTRODUCTION

Nosocomial or hospital acquired infection (hospital acquired infection) is a serious public health issue, about 1.4 million people across the world are infected at any given time (WHO, 2017). It has been estimated that almost 10% of all hospitalized patients would develop one form of infection or the other during the course of their stay in the hospital (Humphreys *et al*., 2018).

Most nosocomial infections are transmitted by health-care personnel who failed to put into practice standard infection prevention measures such as hand-washing procedures or change of gloves between client contacts (Sahar *et al* ;2019). Compliance on the part of health care workers (HCWs) with standard precautions has been recognized as being an efficient means to prevent and control Hospital acquired infections. (Yakob *et al*, 2015). Such measures not only protect the patient but also the HCWs and the environment. Among the standard precautions advocated, hand hygiene is considered, in itself, the most important one (WHO, 2018). Other measures include adequate use of gloves, adoption of safe practices for handling needle sticks and other sharp objects (CDC, 2019).

Compliance with these standard precautions has been shown to reduce the risk of hospital acquired infections. However, in spite of the effectiveness of these standard precautions, what we observed was very low compliance with these measures; poor hospital hygiene has been widely publicized including patients' concerns about safety in hospitals the main reason for infection control is to reduce the occurrence and transmission of infectious diseases. (Sahar et al., 2019). The prevalence of nosocomial infections in developed countries is much lower than the developing countries. Studies have shown it is 15.5 per 100 patients in Europe and USA. In the Intensive care units, prevalence rate was 47.9 per 1000 patients. The commonest infection was surgical site infection which was 5.6 per 100 surgical procedures (Allegranzi, 2019). Nosocomial infections have a great effect on the health of millions of people and it is considered as a major issue around the globe by all the stakeholders. In developing countries, it affects more than 25% to 30% patients admitted in health care settings (World Health Organization, 2019)

As reported by Trampuz et al, (2015) an infection control program in Geneva hospitals, evidence showed that overall hand hygiene practices when increased from 48% to 66% compliance, hospital acquired infections reduced to 9.9% from 16.9%. Furthermore, several studies done to assess the knowledge, attitudes and compliance and reasons for non-adherence to standard precautions guidelines revealed that compliance with standard precautions protocols by health care workers is poor due to several constraints, including heavy work load, high number of clinical procedures and skin conditions of health care worker (Humphreys, 2019).

STATEMENT OF PROBLEM

Nosocomial infections have been reported to be a serious problem in the health care services as they are common causes of illness and mortality among hospitalized patients including healthcare workers (Amoran, *et al*., 2013). Nosocomial infections have a great effect on the health of millions of people and it is considered as a major issue around the globe by all the stakeholders. In developing countries, it affects more than 25% to 30% patients admitted in health care facilities (World Health Organization, 2019). Several studies conducted in this part of the world have shown a higher level of poor knowledge and lack of compliance among nurses.

The experience of the researcher during her clinical positing in which she observed some nurses and student nurses showed symptoms of infection which is traceable to hospital acquired infections. Therefore, to improve our knowledge, this study becomes imperative to assess awareness and practice of standard safety precautions amongst nurses towards prevention of nosocomial infection, at LAUTECH teaching hospital, Osogbo.

II. LITERATURE REVIEW

As reported by Siegel et al. (2017) the concept of Standard Precautions was first introduced as Universal Precautions in 1985 with the emergence of HIV/AIDS, the Center for Disease Control [CDC] introduced the term Standard Precautions in 1996 with the view that all patients are infectious regardless of suspected or confirmed infections. In 2017, additional elements were added to the Standard Precautions to protect patients and healthcare workers during health care delivery. The aim of Standard Precautions is to reduce the risk of transmitting microorganisms from known or unknown sources of infection (e.g., respiratory droplets, contaminated objects, used needles and syringes, and multi-dose vials) within health care settings. Applying Standard Precautions while providing patient care is based on the anticipated interactions health care workers will have with blood, body fluid, or potential pathogen exposure from patients. (Siegel *et al*. 2017).

A. COMPONENTS OF STANDARD PRECAUTIONS

As cited by World health organization in Sadoh *et al* (2016) identifies six components of standard safety precautions which are;

- ✓ hand washing and antisepsis (hand hygiene)
- ✓ use of personal protective equipment when handling blood, body substances, excretions and secretions
- ✓ appropriate handling of patient care equipment and soiled linen
- ✓ prevention of needle stick /sharp injuries
- ✓ environmental cleaning and spills-management and
- ✓ appropriate handling of waste

a. HAND WASHING AND HYGIENE

The hands are the most common vehicle for microbial transmission therefore hand washing reduces the number of potential infectious agents on the hands (Towey, 2015; Huang, Cunrui, Wenjun & Susan, 2019). It also an important means of reducing the incidence of infectious agents in healthcare facilities (Huang *et al* 2019). Proven Hand Washing comes with stepwise techniques, which involve using antiseptic soap or detergent, wash for 10-15 seconds all part of the hands with running water and soap (WHO, 2015). In resource constraint environment, the hands should be washed while assistant pour water. This is a less standard practice. Alternatively alcohol based agent can be used to disinfect the hands although should not be used on hands with dirt. After washing hands, usage of disposable towel or napkins if no automated electric drier. Other essential guides include washing of hands immediately when contaminated with blood and body fluids. Such does not preclude washing hands even if worn gloves are removed and was intact. It is not proven that hand sanitizer does not replace regular hand washing. Hand washing includes before touching a patient, even if gloves will be worn. It is essential before exiting the patient's care area after touching the patient or the patient's immediate environment to also wash the hands with or without contact with blood, body fluids or excretions, or wound dressings. In additional it is an essential act prior to performing an aseptic task (e.g., placing an IV, preparing an injection). If hands will be moving from a contaminated-body site to a clean-body site during patient care. It is also recommended after glove removal (Towey, 2015).

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b. USE OF PROTECTIVE BARRIERS/PERSONAL PROTECTIVE DEVICE (PPE)

The usage of protective barriers/Personal Protective Device (PPE) reduces the risk of exposure of healthcare workers' skin or mucous membrane to blood and body fluid by creating a physical barrier (WHO, 2015). These devices decrease the risk of exposure of the HCW's skin or mucous membrane to potential infective materials. Such protective barriers include barriers (e.g., gloves, gown, cap, mask, protective eye wears, and face shields); equipment and clothing used during care. It is however not adequate to merely use the protective barrier, it is also important to take care to prevent injuries when using needles, scalpels and other sharp instruments (Moyo, 2018). Always deploy such protective barrier as appropriate when there is a potential exposure and immediate thorough washing of hand & skin if contaminated with blood or body fluids. If there is exposure, standard post exposure prophylaxis (PEP) protocol should be followed. The glove that can be used to achieve standard precaution maybe intact latex or intact vinyl glove and this is necessary during phlebotomy, procedures involving direct contact with blood or body fluids and direct contact with non-intact skin and mucosal membrane which must be for single usage. Specifically, CDC guideline recommends the use of sterile gloves for procedures involving contact with normally sterile areas of the body and use of sterile gloves for procedures involving contact with mucous membrane, unless otherwise indicated and for patients care or diagnostic procedures that require the use of sterile gloves (CDC, 2019). Aprons made of plastic should be worn during surgical procedure, cleaning and generally when body fluid or blood is anticipated. A well-fitting goggle is essentially to safeguard the conjunctiva and this should be worn when there is risk of splash or spilling of blood or body fluids. Mask is meant to protect the nostrils and mouth. It is not out of place for cuts and abrasions on healthcare professional to be covered with waterproof dressing. Where to wear PPE

PPE is designed and issued for a particular purpose in a protected environment and should not be worn outside that area. Protective clothing provided for staff in areas where there is high risk of contamination (e.g. operating suite/room) must be removed before leaving the area. Even where there is a lower risk of contamination, clothing that has been in contact with patients should not be worn outside the patient-care area. Inappropriate wearing of PPE (e.g. wearing operating suite/room attire in the public areas of a hospital or wearing such attire outside the facility) may also lead to a public perception of poor practice within the facility.

Using personal protective equipment provides a physical barrier between micro-organisms and the wearer. It offers protection by helping to prevent micro-organisms from contaminating hands, eyes, clothing, hair and shoes and being transmitted to other patients and staff (WHO, 2018).

c. PROPER HANDLING AND ADEQUATE DISCARDING OF SHARP INSTRUMENTS INCLUDING NEEDLES

Managing sharp instruments like hypodermic needles, scalpels, blades and biopsy needles is essential for standard precautions (US Food and Drug Administration, 2015). The use of safer devices like retractable lancets is being advocated (Moyo, 2018). Other advocated disposition during sharps usage include not recapping needles after usage, disposal of sharps in containers (closable, puncture proof, leak proof, labeled color coded to indicate biohazard and generally, minimize invasive procedure to avoid accidental injury. The risk of needle pricks commonly occurs during recapping, disassembly and inappropriate disposal. Standard recommendations for finger-stick injury should be followed. In case of accidental needle prick immediate effort is to make to follow Post Exposure Prophylaxis (PEP) protocol (CDC, 2017).

d. ENVIRONMENTAL CONTROL

Environmental control involves surface processing protocols and health service waste handling and cleaning (WHO, 2018). The surface processing protocol involves assumption that work surfaces including bed, bed railings, patient examination tables and bedside tables are contaminated therefore routinely cleaned. It is also necessary that work surface should be disinfected before procedure, when contamination is suspected and after procedures or test. The health service waste handling is also very important and it includes cleaning and disinfecting soiled linen and avoidances of contact with soiled linen with bare hands. Furthermore contagious patient should be preferably kept in isolation area or room especially in cases of Viral Haemorrhagic Diseases (CDC, 2019).

e. RESPIRATORY HYGIENE AND COUGH ETIQUETTE

This involves covering mouth and nose when coughing or sneezing, hand hygiene after contact with respiratory secretions and spatial separation of persons with acute febrile respiratory symptoms. Generally, standard precautions must be taken consistently with all patients – regardless of their diagnosis in all work practices at all times involving basic hand hygiene, respiratory hygiene ,usage of personal protective equipment (according to risk of splashes or other contact with infected materials) and safe injection practices (CDC, 2019).

f. WASTE DISPOSAL

Dispose of sharps into leak-proof, puncture-resistant sharps containers, Segregate infectious waste at the place where waste is generated and maintain segregation as waste moves through the facility to final disposal, Treat waste contaminated with blood, body fluids, secretions, and excretions as infectious waste, in accordance with local regulations, Follow national guidelines and manufacturers' instructions for disposing of hazardous waste Follow national guidelines on final disposal of health care waste (e.g., incineration, burying, and autoclaving).

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B. FACTORS INFLUENCING USE OF STANDARD SAFETY PRECAUTION

Factors that may influence standard safety precautions include those factors reported by HCWs as being reasons for lack of adherence to standard safety precaution. Risk factors for poor adherence to standard safety precaution have been determined objectively in several studies Noble (2019) which includes; Lack of time, busy schedule, male nurses, healthcare provider attitudes, understaffing, lack of knowledge about standard safety precautions etc.

C. HOSPITAL ACQUIRED INFECTIONS

Hospital-acquired infections also known as healthcare-associated infections are nosocomially acquired infections that are typically not present or incubating at the time of admission (CDC, 2019). These infections include central line-associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections, hospital-acquired pneumonia, ventilator-associated pneumonia, and Clostridium difficile infections (Bassetti *et al*, 2018; Parkins, Somayaji, Waters & Danna, 2018). The risk of hospital-acquired infection is dependent on the patient's immune status, infection control practices, and the prevalence of the various pathogens in the local community. As reported by Moyo (2018) risk factors for hospital-acquired infections include older age, immunosuppression, longer hospital stays, multiple underlying chronic illnesses, frequent encounters with healthcare facilities, recent invasive procedures, mechanical ventilator support, indwelling devices and stay in a critical care unit with an increased risk of hospital-acquired infections. While hospitalizations play a role in the management of acute illness, they also place susceptible patients in contact with multiple nosocomial and often antimicrobial-resistant pathogens and those from other patients, hospital staff, or the hospital facility. Not surprisingly, about 20% of all nosocomial infections occur in the intensive care unit (ICU) (Habboush & Guzman, 2019; Martin-Loeches, Rodriguez & Torres, 2018).

Healthcare-associated infections (HCAIs) originate in patients while admitted to hospital, denoting a new disorder that was not present/incubating at the time of admission or the residual of an infection acquired during a previous admission (Park, 2015). The terms 'hospital-acquired' and 'nosocomial' are often used interchangeably, but in essence refer to infections that present for the first time in hospitalized patients at least 48 hours after admission (Rothe, Schlaich & Thompson, 2013). Healthcare-associated infections have numerous repercussions such as an increase in disability and morbidity, and eventually have the potential to result in death. Patients who develop nosocomial infections increase healthcare costs by longer length of stay and, as a result, the need for more diagnostic tests and treatment (WHO, 2018). According to World health organization as cited by Moyo (2018) it was reported that the overall increase in the length of stay for patients with surgical wound infections was 8.2 days, ranging from 3 days for gynaecology to 9.9 days for general surgery and 19.8 days for orthopaedic surgery. There are also indirect costs to the patient secondary to possible loss of income and inability to provide for the needs of the family. Legal costs cannot be ignored in the present environment of litigation, especially when nosocomial infections are often attributed to negligence or substandard health care (Kilgore *et al*, 2018). Pediatric and geriatric patients are especially prone to infection, patients with chronic diseases, such as malignant tumors, diabetes mellitus, renal failure or AIDS are vulnerable to infections, especially to opportunistic organisms (WHO, 2012). Modern diagnostic and therapeutic procedures (biopsies, endoscopic examinations, catheterisation, intubation/ventilation and surgical procedures) also increase the risk of contracting HCAIs (Moyo, 2018). Other contributing risk factors are crowded conditions within the hospital, frequent transfers of patients from one unit to another, and concentration of patients highly susceptible to infection, such as neonates, burn patients and patients in intensive care units (ICU), in one area (Kilgore *et al*, 2018) Infections caused by antimicrobial-resistant pathogens are a major concern and HCAIs are therefore becoming more difficult and costly to manage and treat. Yet, it has been noted that 15–30% of HCAIs may be avoidable through standard safety precautions and infection control (Bourn, 2017).

D. COMMON TYPES OF NOSOCOMIAL INFECTIONS

As reported by Humphreys (2019) the following are common types of hospital acquired infections;

WOUND INFECTION This may range in severity from delayed wound healing or stitch abscess caused by S. epidermidis or other resident skin flora, to severe spreading infections due to exogenous pathogens. Most wound infections manifest within a week of surgery. S. pyogenes and clostridial infections appear within a day or two. While staphylococcal infections typically take four or five days, those due to Gram-negative bacilli take six or seven days to appear. In special cases where antibiotic cover is indicated, it should be given parenterally immediately before, during and following surgery. Nonsurgical sites of wound infections include infection 'cut-downs', umbilical stumps, ulcers and burns. P. aeruginosa is the most important cause of infection in burns patients.

URINARY TRACT INFECTIONS: Even with adequate precautions, catheterisation in hospitals leads to urinary tract infections; with indwelling catheters, the rate is significantly increased. E coli, Proteus, P. aeruginosa and other Gram-negative bacilli are the causative agents. Mixed infection is also common.

RESPIRATORY INFECTIONS: Aspiration in unconscious patients and pulmonary ventilation or instrumentation may lead to nosocomial pneumonia (ventilator associated pneumonia: VAP), particularly in those with pre-existing cardiopulmonary disease. Multidrug-resistant S aureus and Gram-negative bacilli like P. aeruginosa and Acinetobacter baumannii are the common pathogens. Postural drainage is useful in the prevention and management of such cases.

BACTERAEMIA AND SEPTICAEMIA: These may occur as a consequence of infections at any site, but are commonly caused by infected intravenous cannulae. The longer the cannulae are kept in situ, the greater the risk of infection. Gram-negative bacilli are the common pathogens.

E. DISEASES TRANSMISSION CYCLE

It is divided into six phases which are cyclical as in figure 2.1 below, it includes;

The infectious agent: is the disease-producing microorganism

The reservoir of pathogenic microorganisms may be a human source (i.e., patients, HCWs, or visitors), animals, plants, the soil, air or water.

The mode of escape, how the pathogenic microorganism leaves the reservoir could be via coughing, sneezing, contamination of hands and surfaces with blood and body fluids.

Mode of transmission is how the agent travels from person to person, this usually occurs via HCWs' hands, contaminated equipment, instruments, devices, and the environment (including air and water).

Place of entry is where pathogenic microorganism can enter to infect susceptible host. Common places of entry include the mucus membrane, blood, surgical site, and urinary tract.

Susceptible hosts are patients, HCWs, and visitors who may become infected by the infecting microorganisms. Resistance to infection will depend on the individual's immune system, with some individuals becoming infected but remaining asymptomatic carriers while others become infected and develop a clinical disease. Factors such as age, underlying diseases, and use of certain treatments (e.g., antimicrobials, corticosteroids, chemotherapy, and other agents that decrease immunity) play a role in the infection process.

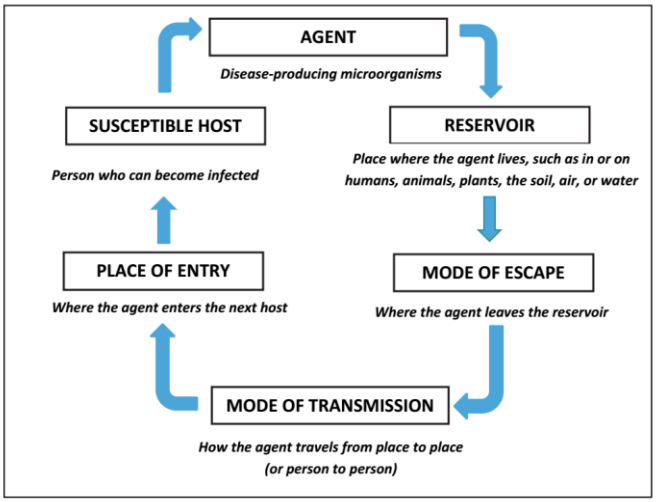


Figure 1: The Disease Transmission Cycle (CDC, 2019)

F. FACTORS ASSOCIATED WITH OCCURRENCE OF HAIS

There are many factors associated with the occurrence of HAIs at a health care facility, including the infrastructure, available resources staff compliance with standards precaution, and the type of patients treated. Factors found to contribute to HAIs include:

- ✓ High patient-to-nurse ratio
- ✓ Bed space less than 1 meter (3 feet) apart
- ✓ Low compliance with hand hygiene practices and other standard safety precautions
- ✓ Lack of resources including rooms for isolation or cohorting (grouping together patients with the same infection)
- ✓ Lack of trained IPC practitioners and limited opportunities for staff training
- ✓ Increasing use of complex medical and surgical procedures
- ✓ Increasing use of invasive medical devices (e.g., mechanical ventilators, urinary catheters, central intravenous lines) without proper IPC training or laboratory support
- ✓ Inadvertent contamination of prepared supplies/pharmaceuticals (e.g., IV fluid, infant formula, general medications)
- ✓ Suboptimal cleaning, disinfection, and sterilization practices
- ✓ Antibiotic resistance due to overuse of broad-spectrum antibiotics (Allegranzi et al. 2018)

G. INTERVENTIONS TO PREVENT HEALTH CARE-ASSOCIATED INFECTIONS

Understanding the disease transmission cycle is a cornerstone in the prevention and control of infections (CDC, 2019). Knowledge about ways to break the disease transmission cycle can assist health care facilities in putting together prevention strategies to stop the spread of infections (Allegranzi *et al*., 2019).

Key interventions for prevention of HAIs include:

- ✓ Establishing systems to track targeted HAIs in a health care facility and sharing data with the staff and program managers
- ✓ Having dedicated staff for IPC and tracking of HAIs
- ✓ Fully adhering to recommended general IPC practices, including Standard Precautions, Transmission Based Precautions, and hand hygiene (which protect staff and prevent all types of HAIs)
- ✓ Implementing interventions targeting specific HAIs (WHO, 2019)

H. COMPLIANCE

Compliance is the extent to which certain behaviour (for example, following physician's orders or implementing healthier lifestyles) is in accordance with the physicians' instructions or health care advice (Sax, Perneger, Hugonnet, Herrault, Chraiti & Pittet, 2018). Compliance can be influenced or controlled by a variety of factors like culture, economic and social factors, self-efficacy, and lack of knowledge or means.

a. COMPLIANCE OF STANDARD PRECAUTION AMONG NURSES

Studies have shown that compliance with precautions among nurses in order to avoid exposure to microorganisms is low (Stein, Makarawo & Ahmad 2013). More specifically, compliance was found inadequate concerning hand hygiene

guidelines, use of gloves when exposure to body fluids was anticipated, eye protection, mouth and nose protection (mask use), wearing a gown when required, avoid recapping the needle after it was used for a patient, and provision of care considering all patients as potentially infectious (Pan et al 2018).

b. FACTORS INFLUENCING COMPLIANCE OF STANDARD PRECAUTION AMONG NURSES

Many researchers focused on the factors that contribute to non-compliance with Standard Precautions. Reported factors were lack of knowledge, lack of time, forgetfulness, lack of means, negative influence of the equipment on nursing skills, uncomfortable equipment, skin irritation, lack of training, and conflict between the need to provide care and self-protection and distance to necessary equipment or facility (Oliveira, Cardoso & Mascarenhas, 2016). Compliance with precautions has been studied by using a variety of methods, including questionnaire distribution. In many cases, there was no theoretical framework behind these questionnaires and mostly factors that led to noncompliance were studied. Only few studies incorporated a theoretical framework, however, most of them studied only one or limited aspects of Standard Precautions, mainly hand hygiene (Osborne, 2015)

I. EMPIRICAL STUDIES

Awareness of standard safety precautions among nurses

According to a study conducted by Osuala & Oluwatosin (2018) on Nurses' infection control practices, it was reported that The results of the current study showed that the majority (87%) of the participants had a fair level of knowledge on the different standard precaution measures. However, 9% of them had a poor level of knowledge, and only 4% of them had a good level of knowledge on the different standard precaution measures. In contrast to that study, a related study conducted by Gamil et el (2017) among nurses in Yemen, it was revealed that Regarding the level of nurses' knowledge on different preventive measures of person-to-person infection transmission, the study showed that the majority (72.9%) of the participants had a fair level of knowledge of Hand hygiene. Almost two thirds of the participants were found to have fair (27.1%) and good (35.3%) levels of knowledge on personal protective equipment. The results also demonstrated that there were above half (67.1%) of the participants which had a poor level of knowledge and 32.9% of them had a fair level of knowledge; none of the participants had good knowledge on safe injection practices. For the nurses' knowledge on different preventive measures of transmission from hospital environment, it was found that above half (52.9%) of the participants had a good level of knowledge of routine hospital cleaning and the majority (81.1 and 82.8%) had a fair level of knowledge on safe waste handling and disposal and patient care equipment reprocessing, respectively. However, above half of the Yemeni nurses (60%) had a poor level of knowledge of safe linen handling. In general, regarding the overall nurses' knowledge on the different infection prevention and control measures, it was found to be fair (87%).

Practice of standard precaution among nurses

As reported by Gamil et al (2017) on knowledge and practice of nurses in Yemen on standard precautions, the present study indicated that the majority (71.8%) of the Yemeni nurses had a fair level of practices in regard with precautions to prevent standard precautions, while nearly a third of them had a good level of practices on these precautions. However, the study demonstrates that almost two thirds (74.1) of the nurses had a good level of practices on actual actions to prevent NIs. In general, the study revealed that the majority (71%) of the participants had a fair overall level of practices, whereas 26% of them had good overall practices regarding different NI prevention and control. This discrepancy in results could be due to the difference in participants' attitudes towards utilizing infection control measure methods. It could also be either due to the difference in the operational definition of the good practice from one study to another study or due to the difference in knowledge of the nurses regarding infection prevention and control.#

Compliance and factors influencing compliance to standard safety precautions

Few studies have been conducted on compliance and factors influencing compliance. According to a study conducted by Powers et al (2016) on compliance to standard precaution among nurses it was reported by the average age of the nurses in our study was 50 " 10 years (range, 24-70 years). Average years practicing as registered nurses was 25 "12 years (range, 1-45 years). Forty-four percent of participants had a bachelor's degree in nursing, 24% had a master's degree in nursing, and 12% graduated from a diploma program. Nearly 97% were women and predominantly white (69.8%). In this study less than one-fifth (17.4%) of nurses reported that they are "always compliant" with all 9 SP behaviors, 92% reported always wearing gloves, and 70% reported always using a face mask. More than 16% of respondents in this study reported that they sometimes or seldom avoid placing foreign objects on their hands. The highest score attainable for knowledge was 17. The mean score for knowledge was 13.8 " 1.936 (81%) (Range, 8 [47%]-17 [100%]). This study showed that knowledge of HCV was variable. Although HCV is not efficiently transmitted by sexual activity, 26% of respondents believed that sexual transmission is a common way that HCV is spread. Fourteen percent believed incorrectly that most people with HCV will die prematurely because of the infection, 12% did not know that people can have HCV antibodies without currently being infected with the virus, and 11% did not know that there are multiple HCV genotypes. Analysis of variance revealed a statistically significant difference by medical group practice (P ¼ .034) with cardiology, medicine, and dialysis achieving higher scores.

J. THEORETICAL FRAMEWORK

HEALTH BELIEF MODEL: The health belief model is a psychosocial model Proposed by Rosenstock (1966) in Stanhope & Lancaster (1996) for studying and promoting the uptake of preventive health behaviours. The model explains preventive behaviour. The model assumes that belief and attitudes of people are critical determinants of their health-related actions. It holds that when cues to actions are present,

ISSN: 2394-4404

the variations in uptake behaviour can be accounted for by beliefs concerning four sets of variables. These include:

- ✓ The individual's view of own vulnerability to illness. If an individual does not see him or herself as being at risk of any problem, he or she will not seek care
- ✓ Belief about severity of the illness. The associated problem could be seen as little; therefore little attention will be required.
- ✓ The person's perception of the benefits associated with action to reduce the level of threat or vulnerability.
- ✓ The individual's evaluation of the potential barrier associated with the proposed action, this could be physical, psychological, financial and social.

a. FRAMEWORK OF THE THREE MAJOR COMPONENTS OF HEALTH BELIEF MODEL

Figure 2.1 below is used to illustrate the framework of the three major components of Health Belief Model as it relates to awareness and practice of standard safety precautions amongst nurses towards prevention of nosocomial infection, at Lautech teaching hospital, Osogbo.

The three major components of the health belief model are: individual perception; modifying factors; and variables affecting likelihood of action:

- ✓ *Individual perception:* perception is the process of becoming aware of objects, qualities or relation by the way of sense organ. The individual's perception of being at risk of nosocomial infection will motivate the person to preventive services.
- ✓ *Modifying factors:* these are variables that change or improve likelihood of action. They include demographic variables, level of education, location of health facility, mass media etc. They affect perception of threat; increased knowledge will result in correct perception of threat based on scientific knowledge on nosocomial infection.
- ✓ *Likelihood of action:* an individual will take action if he or she understands that there
- ✓ Is a need and that the particular action will help in meeting the need.

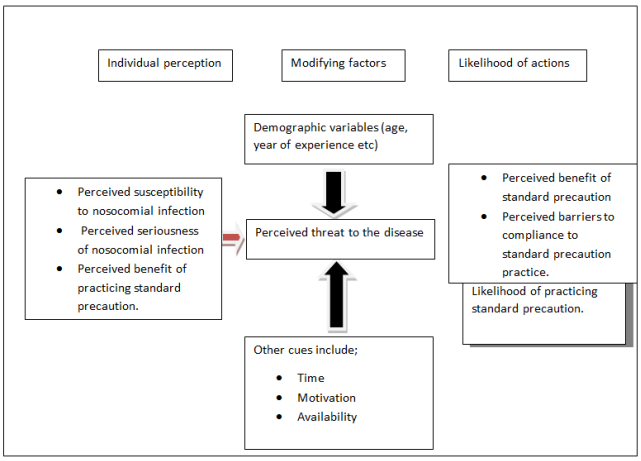


Figure 2: Theoretical framework of the three major components of health belief model

Health Belief Model is a psychological model which attempts to explain and predict health behaviors. It has six constructs as follows: perceived threat (possibility of facing the disease), perceived severity (beliefs about the disease outcomes), cues to action (including internal and external stimuli), perceived barriers (cost and obstacles which prevent us from doing a behavior), perceived benefits (of understand the benefits of adapting a new behavior), and self-efficacy (one's ability to perform successfully the recommended behavior

The model has been tested on different populations to clarify different types of health behavior. For example, it has been employed in studies that focused on predicting the participation rate of populations in vaccination programs and screening individuals for flu and high blood pressure, quitting smoking, and doing and improving behaviors related to exercise and nutrition. This model is very good for prevention-based programs and is more suitable than the other models in this field. Therefore, the Health Belief Model has been used in this study as a framework.

III. RESEARCH METHODS

A descriptive cross-sectional design was adopted to determine awareness and practice of standard safety precautions amongst Nurses towards Prevention of Nosocomial Infection at LAUTECH teaching hospital Osogbo.

A. RESEARCH SETTING

The research was carried out in LAUTECH Teaching Hospital Osogbo, Osun state Nigeria. LAUTECH Teaching Hospital is a tertiary health institution in Nigeria. The hospital covers a large landmass and is located along Idi-seke, Osogbo. The Hospital started as Africa Hospital Osogbo and was renamed "General Hospital" like other sister institutions throughout the country then. By the late 1960's, specialist medical care was already being carried out by specialist staffs that were already working in the hospital. With the creation of Osun State in 1991, the hospital was upgraded to a State Hospital. In 1993, Osun State Government acquired a private medical facility i.e. Mercy land Hospital, located some three kilometers away from the State Hospital, in Egbedore Local Government, to become an annex of the state Hospital, Osogbo.

The State and Mercy land Hospitals were released to Lautech for establishing a Teaching Hospital in June 1996.

The edict was gazette on the 25th September, 1997 (No. 8, Vol. 2, Osun State Notice No. 24) which was amended by Edict No. 2 of 1999 Osun State dated 25th March, 1999. The Hospital Management Board was inaugurated on 29th July, 1999 by the Executive Governors of Oyo and Osun States, Alhaji Lam Adesina and Chief Adebisi Akande respectively in Osogbo. However, it became a Teaching Hospital by an edict promulgated by the Osun State Military Administrator, Lt. Col. Anthony Obi, the visitor to the University. This specialist status of the hospital has so remained till April, 1998.

The hospital consists of different departments: It also consist administration, clinical, medical laboratory, supportive services, training schools, it also consists of different wards,

among which are the accident and emergency unit, the obstetrics and gynecology emergency unit, the emergency pediatric unit and the general outpatient department to mention but a few. The total staff list is 1,120 in which 350 works as nurses at the facility and the department of nursing in the hospital is directed by the Head of Nursing services. The facility has 23 units and 400 beds in both male and female and children's wards. The institution serves as a teaching hospital for medical students, nursing students, and other health related courses and as referral Centre for neighboring communities.

B. TARGET POPULATION

The target populations for this study were nurses who were voluntarily ready to participate in this study in all unit of LAUTECH Teaching Hospital Osogbo, Osun state including; the pediatric, medical, surgical, perioperative, anesthetics, accident and emergency unit and the emergency pediatric unit of the hospital.

C. SAMPLE SIZE DETERMINATION

Sample size was determined with the use of *Yamane's formula* since the total population was known.

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

Where;
n = sample size
N = Total population (350)
e = level of precision = 0.05

$$n = \frac{350}{1+350(0.05)^2}$$

$$n = \frac{350}{1.8775}$$

n= 186.41
Approximately 186 respondents

D. SAMPLING TECHNIQUE

This research was carried out primarily with one eighty six respondents which was selected based on literature search and previous studies. A simple random sampling technique was employed in selecting the one eighty six respondents needed for this research.

INCLUSION CRITERIA

- ✓ Nurses that currently work at Lautech teaching hospital, Osogbo.
- ✓ Nurses who consented to participate and ready to give their consent

EXCLUSION CRITERIA

- ✓ Nurses who are not available as at time of data collection
- ✓ Female health workers who doesn't give her consent to participate in the study

E. INSTRUMENT FOR DATA COLLECTION

The instrument for data collection was a structured questionnaire that was developed by the researcher to suit the purpose of the study. The questionnaires was in accord with the research objectives and questions. The questionnaires was divided into five sections "A, B, C, D, and E"

Section A: containing information about the demographic data of the respondents;

Section B: awareness and practice of standard safety precautions among nurses

Section C: containing questions to assess level of compliance of standard safety precaution among nurses

Section D: level of practice of standard safety precaution among nurses

Section E: factors influencing compliance to standard safety precaution among nurses

F. VALIDITY

This refers to the accuracy of the test results and that the data will represents the true picture of the phenomenon that will be measured. In an effort to ensure that the research instrument measures what it was intended to measure, the face and content validity was determined by the researcher's supervisor, an expert in health research who scrutinized and ascertain its validity. His/her observations and suggestions were used to revise the instrument.

G. RELIABILITY

This is the degree to which the administered questionnaires will produce stable and consistent results/data. In order to ensure that the research instrument maintains consistency in measuring what it intends to measure. The questionnaire was pretested in a pilot study of 10% of the sample size which was carried out by administering 18 questionnaires to 18 respondents in Asubiaro state hospital, Osogbo. These were not part of the sample size in other to identify ambiguity in the questions before the whole questionnaire were administered. The result of the pilot study on analysis yielded a cronbach alpha scores of 0.86 which depicted internal consistency among the question items in each section.

H. METHOD OF DATA COLLECTION

The questionnaires to be administered was structured to be close ended in nature. The researcher went to the study settings personally to administer the questionnaire which has been pretested. This was given to the respondents to fill on the site and retrieved back after completely filled.

I. METHOD OF DATA ANALYSIS

After the questionnaires had been filled by the respondents and returned and after all the needed data for the research had been obtained, all the data were carefully assessed for statistical clarity, consistency, coverage and relevance to the research. The data obtained were analyzed statistically with the Statistical Package for Social Sciences (SPSS) version 25. This method helped to ascertain statistical accuracy and reliability of the information provided by the respondents. Descriptive statistics of mean, frequencies, percentages and standard deviation were used to describe the

study population in relation to relevant variables. Beyond descriptive statistics, inferential statistical tools of chi square were used to identify variables.

J. ETHICAL CONSIDERATIONS

A letter of permission to collect data for the study were obtained from the department of Nursing, Osun State University Osogbo and was submitted to the ethical committee at Lautech teaching hospital Osogbo for ethical clearance. A formal introduction was written as a written opening statement at the beginning of the questionnaire and also verbally at the point of administration of the questionnaire. The importance of the study was explained verbally to the participants and written informed consent was obtained before the commencement of the study. Every attempt was made to maintain the confidentiality of the participants and they were reassured of non-maleficence. Force were not applied on the respondent during the research work. Information were kept confidential and anonymity was be maintained.

IV. RESULTS

Demographic Characteristics

Variables	Categories	Frequency (n=186)	Percent (%)
Age	25-35	27	14.5
	36-45	89	47.8
	46-55	50	26.9
	56 and above	20	10.8
Sex	Female	134	72.0
	Male	52	28.0
Marital Status	Single	71	38.2
	Married	107	57.5
	Divorced	8	4.3
Tribe	Yoruba	95	51.1
	Igbo	79	42.5
	Hausa	12	6.5
Religion	Islam	75	40.4
	Christianity	106	56.9
	Traditional	5	2.7
Qualifications	RN	62	33.3
	RN/RM	60	32.3
	B.N.Sc.	50	26.9
	Postgraduate	13	7.0
	M.Sc	1	0.5
Total(n)=186			

Table 1: Shows the Sociodemographic data of the respondent

From table 1 above revealed that the and majority 89(47.8%) between 36-45 years, majority 134(72%) were females, more than half 107(57.5%) were married, more than half 95(51.1%) were Yoruba, more than half 106(56.9%) were Christians, 62(33.3%) has RN alone, 60(32.4%) has RN/RM/, 50(26.9%) has B.N.Sc, 13(7.0%) has postgraduate and 1(0.5%) has M.Sc.

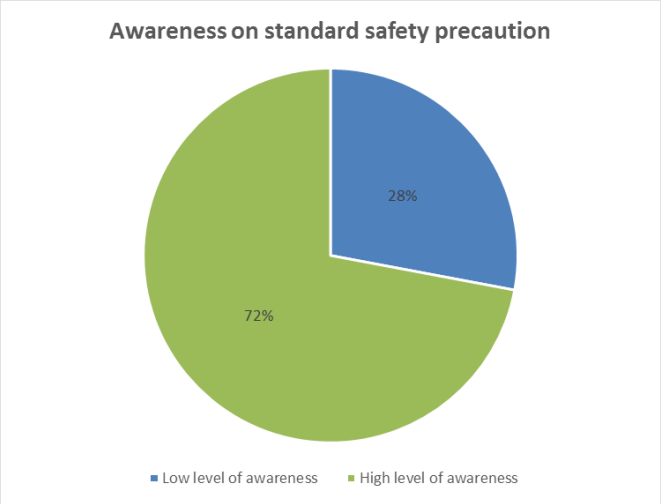
Awareness of Standard Safety Precautions

Variables	Categories	Frequency (n=186)	Percent (%)
Hospital infections is transmitted through needles etc	Strongly agree	55	29.6
	Agree	95	51.1
	Disagree	31	16.7
	Strongly disagree	5	2.7
Patients with any communicable disease like tuberculosis etc should be kept in a separate room	Strongly agree	52	28.0
	Agree	81	43.5
	Disagree	48	25.8
	Strongly disagree	5	2.7
Hands should be disinfected properly, before and after wearing gloves	Strongly agree	64	34.4
	Agree	68	36.6
	Disagree	44	23.7
	Strongly disagree	10	5.4
Nosocomial infections are mainly due to pathogens brought into the hospital by hospital staff	Strongly agree	48	25.8
	Agree	72	38.7
	Disagree	54	29.0
	Strongly disagree	12	6.5
Hands should be properly disinfected before and after touching a patient	Strongly agree	48	25.8
	Agree	67	36.0

	Disagree	64	34.4
	Strongly disagree	7	3.8
Hand washing prevent infection	Strongly agree	30	16.1
	Agree	60	32.3
	Disagree	85	45.7
	Strongly disagree	11	5.9
	Total(n)=186		

Table 2: Shows Awareness of Standard Safety Precautions

Table 2 revealed that majority 150(70.7%) agreed Hospital infections is transmitted through needles, majority 133(71.5%) agreed Patients with any communicable disease like tuberculosis etc should be kept in a separate room, majority 132(71%) agreed Hands should be disinfected properly, before and after wearing gloves, more than half 120(64.5%) agreed Nosocomial infections are mainly due to pathogens brought into the hospital by hospital staff, more than half 115(61.8%) agreed Hands should be properly disinfected before and after touching a patient, less than half 90(48.4%) accepted that Hand washing prevent infection



Figuire 2: A pie chart showing awareness on standard safety precaution

From Fig. 2 above, Majority (72%) had high level of awareness on standard safety precaution while 28% had low level of awareness on standard safety precaution.

Level of Compliance to Standard Precaution

Variables	Categories	Frequency (n=186)	Percent (%)
I wash my hand to prevent infection	Rarely	30	16.1
	Often	60	32.3
	Mostly	85	45.7
	Always	11	5.9
provided nursing care considering all patients as potentially contagious	Rarely	44	23.7
	Often	47	25.3
	Mostly	77	41.4
	Always	18	9.7
washed my hands after the removal of gloves	Rarely	49	26.3
	Often	70	37.6
	Mostly	51	27.4
	Always	16	8.6
avoided placing foreign objects on my hands	Rarely	61	32.8
	Often	63	33.9
	Mostly	50	26.9
	Always	12	6.5
Wear gloves when exposure of my hands to body fluids is anticipated	Rarely	47	25.3
	Often	57	30.6
	Mostly	69	37.1
	Always	13	7.0
avoided needle recapping	Rarely	40	21.5
	Often	64	34.4
	Mostly	70	37.6
	Always	12	6.5
avoided the disassembling of a used needle from a syringe	Rarely	46	24.7
	Often	55	29.6
	Mostly	74	39.8
	Always	10	5.4
Used face mask	Rarely	45	24.2
	Often	51	27.4
	Mostly	80	43.0
	Always	10	5.4
washed my hands after the provision of	Rarely	43	23.1
	Often	61	32.8

care	Mostly	69	37.1
	Rarely	13	7.0
discarded used sharp materials into sharps containers	Rarely	61	32.8
	Often	45	24.2
	Mostly	64	34.4
	Always	16	8.6
	Total(n)=186		

Table 3: Level of Compliance to Standard Precaution

Table 3 revealed that Less than half 85(45.7%) often wash hand to prevent infection and 11(5.9%) wash their hand every time, 41.4% mostly provided nursing care considering all patients as potentially contagious and 9.7% always provided nursing care considering all patients as potentially contagious, 27.4% mostly and 16% always washed my hands after the removal of gloves, 50% mostly and 12% always avoid placing foreign objects on hands, 37.1% mostly and 7% always Wear gloves when exposure of hands to body fluids is anticipated, 37.6% mostly and 6.5% always avoid the disassembling of a used needle from a syringe, 43% mostly and 5.4% always use face mask, 37.1% mostly and 7% always washed hands after the provision of care, 34.4% mostly and 8.6% always discarded used sharp materials into sharps containers

Figure 3: Pie chart showing overall level of compliance to standard safety precaution

From Fig. 3 More than half 54% had high level of compliance to standard safety precaution while 46% had low level of compliance to standard safety precaution

Practice Of Standard Safety Precaution			
Variables	Categories	Frequency (n=186)	Percent (%)
wear personal protective equipment	Rarely	50	26.9
	Often	32	17.2
anytime I'm attending to patient	Mostly	82	44.1
	Everytime	22	11.8
wash my hand before and after every procedure	Rarely	40	21.5
	Often	55	29.6
	mostly	70	37.6
	Everytime	21	11.3
Reused needle or syringe	Rarely	49	26.3
	Often	39	21.0
	Mostly	77	41.4
	Everytime	21	11.3
Discarded, used material as per standard precaution guideline	Rarely	54	29.0
	Often	31	16.7
	Mostly	79	42.5
	Everytime	22	11.8
wear a gown to protect mucous membranes	Rarely	52	28.0
	Often	63	33.9
	Mostly	64	34.4
	Everytime	7	3.8
wash hands when unwanted touching of blood	Rarely	31	16.7
	Often	60	32.3
	Mostly	84	45.2
	Everytime	11	5.9
wear gloves before touching mucous membranes	Rarely	45	24.2
	Often	47	25.3
	Mostly	75	40.3
	Everytime	19	10.2
wear goggles to protect mucous membranes	Rarely	50	26.9
	Often	68	36.6
	mostly	52	28.0
	Everytime	16	8.6
	Total(N)=186		

Table 4: Practice Of Standard Safety Precaution

Table 4 above revealed that 44.1% most often and 11.8% everytime wear personal protective equipment anytime they are attending to patient, 37.6% mostly and 11.3% everytime wash hand before and after every procedure, 41.4% mostly and 11.3% every time Reused needle or syringe, 42.5% mostly and 11.8% every time Discarded used material as per standard precaution guideline, 34.4% mostly and 3.8% every time wear a gown to protect mucous membranes, 45.2% often and 5.9% everytime wash hands when unwanted touching of blood, 40.3% often and 10.2% everytime wear gloves before touching mucous membranes,28% often and 8.6% everytime wear goggles to protect mucous membranes.

Figure 4: Pie chart showing overall level of practice to standard safety precaution

From Fig. 4. More than half 56% had good practice of standard safety precaution while 44% had poor practice of standard safety precaution

factors influencing compliance to standard safety precautions

Variable	Categories	Frequency(n=186)	Percent (n)
I don't have enough knowledge on standard precautions	Yes	119	64.0
	No	67	36.0
Belief that you will not acquire infection in the hospital	Yes	37	19.9
	No	149	90.1
Lack of functional infection control committee	Yes	134	72.0
	No	52	28.0
Absence of regular training on infection control	Yes	158	84.9
	No	28	15.1
Lack of adequate facilities/resources for practice of standard precautions	Yes	109	58.6
	No	77	41.4
Patients feel stigmatized when PPEs are used	Yes	137	73.7
	No	49	26.3
PPE are uncomfortable	Yes	69	37.1
	No	117	62.9
Time constraints	Yes	126	67.7
	No	60	32.3
Excess workload	Yes	136	73.1
	No	50	26.9
	Total(n)=186		

Table 5: Factors influencing compliance to standard safety precautions

Table 5 above revealed that 119(64%) agreed they don't have enough knowledge on standard precautions, 37(19.9%) agreed belief that they will not acquire infection in the hospital, 134(72%) accepted that Lack of functional infection control committee, 158(84.9%) accepted Absence of regular training on infection control, 109(58.6%) reported Lack of adequate facilities/resources for practice of standard precautions, 137(73.7%) reported Patients feel stigmatized when PPEs are used, 69(37.1%) reported PPE are uncomfortable, 126(67.7%) reported Time constraints and 136(73.1%) reported excess workload.

Relationship between awareness and practice of standard safety precaution

Variables	Categories	Practice Of Standard Safety Precaution					
		Poor practice	Good practice	Total	X^2	df	*p*-value
Awareness of standard precaution	Low awareness	6	42	60s	.035[a]	1	0.852
	High awareness	14	108	124			

x²=pearsons' Chi square
df=degree of freedom

Table 6: Relationship between awareness and practice of standard safety precaution

Inference: from table 6 is no statistical significant relationship between awareness and practice of standard safety precaution (p>0.05) tested at p<0.05

variables	Categories								
	good practice			poor practice			total		
	mean	N	SD	mean	N	SD	mean	N	SD
Age	1.36	58	0.693	1.19	42	0.484	1.31	100	0.615
Marital status	1.43	58	0.797	42	42	0.505	1.33	100	0.697
Religion	1.86	58	0.511	1.83	42	0.581	100	100	0.539
Marital status	1.88	58	0.751	2.19	42	0.862	2.01	100	0.810
Qualification	1.90	58	0.583	2.19	42	0.671	2.02	100	0.635

SD= standard deviation
N= frequency

Table 4.6.2: Relationship between sociodemographic characteristics and the practice of universal safety precautions and the prevention of nosocomial infections

This study revealed majority knew that hospital infections is transmitted through needles prick injury, more than half accepted patients with any communicable disease like tuberculosis etc should be kept in a separate room which is in line with World health organization (2019) guideline of managing infectious patients. Center for disease and control (2019) also started that infectious patient should be isolated and treated separately. More than half agreed nosocomial infections are mainly due to pathogens brought into the hospital by hospital staff this corroborates with what was

reported by CDC. Hospital-acquired infections also known as healthcare-associated infections are nosocomial acquired infections that are typically not present or incubating at the time of admission (CDC, 2019). These infections include central line-associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections, hospital-acquired pneumonia, ventilator-associated pneumonia, and Clostridium difficile infections (Bassetti et al**.,** 2018). Majority agreed Hands should be properly disinfected before and after touching a patient, CDC reported that hand hygiene should be carried out with every contact with patient to reduce spread of infection.

In general, majority (72%) had high level of awareness on standard safety precaution, this finding is lesser to what was reported by Osuala & Oluwatosin (2018) in study conducted in south west Nigeria, it showed that the majority (87%) of the participants had a fair level of awareness on the different standard precaution measures. Findings from this study is higher than what was in a study in Yemen Gamiel et al (2017) about half of the Yemeni nurses (60%) had a poor level of awareness.

This overall level of compliance to standard safety precaution is 54%. As for as the nurse's compliance to SPs is concern, the mean score related to nurse's compliance to standard precaution is 33.83¬+10.84. Nurses from different part of the world have different level of compliance to SPs. Report of the French audit general on compliance to SPs shows that HCWs have good compliance up to 94% to hand hygiene (Girad et al., 2016). Finding from this study is lower to what has been reported worldwide. However, these findings are contrary to the findings of study by Power (2017) conducted in New York where the mean knowledge was 81%. Study in a large teaching hospital in Geneva Switzerland shows that 55.9% participants given correct answers to 10 or more of the 13-item questionnaires (Khan et al 2018). 95.3% nurses in current study feel that they need formal training on infection control and SPs as compared to study in a university affiliated hospital Shiraz Iran showed that 90.0% of the nurses need a formal training on SPs and infection control. Finding from this work is far better than what was reported in a study in Ethiopia were overall compliance was 13% (Haiele et al., 2017).

This present study revealed that majority of nurses use standard precaution components when attending to patient. This is similar to what was reported in a study in Nigeria, where practice of standard precaution was high.

Conclusively, the overall practice to standard safety precaution is 56% in this finding, nurses had good standard precautions practice against blood borne pathogens which accounted for 74% as compared to doctors (21.8%). This result is slightly higher than a study conducted in Southeast Nigeria among nurses and doctors, which has 75% good practices for nurses and only 15% for doctors (Adinma et al., 2018). This difference might be due to the difference in sample size and sampling methods. Finding from this study is better than that of by Gamil et al (2017) on knowledge and practice of nurses in Yemen on standard precautions, the study indicated that the majority (71.8%) of the Yemeni nurses had a fair level of practices with regard to prevent nosocomial infections, while nearly a third of them had a good level of practices on these precautions.

On factors affecting compliance to standard safety precaution majority agreed they don't have enough knowledge on standard precautions this is similar with what was reported by Brint et al (2018) 53% of the respondents reported not having any basic exposure or training in infection control practices ,majority believed that they will not acquire infection in the hospital, 84.9% reported Absence of regular training on infection control, more than half reported Lack of adequate facilities/resources for practice of standard precautions, reported Patients feel stigmatized when PPEs are used, many reported Time constraints and majority reported excess workload. This were similar to what was reported by Girad et al., (2016) unavailability of resources like personal protective equipment (PPEs) by 73.6%, 55.7% Participants highlighted workload due to shortage of staff 75.8% elaborated unavailability and dissemination of infection control policies. Study conducted by Efstathiou (2017) shows that workload, unavailability of equipment and patient's discomfort are the factors affecting Nurses compliance to SPs. Lack of facilities provision and maintenance, heavy workload and lack of good role models were factors determined by Hedayati (2018) in a dental School Iran. Susceptibility to HCV and barriers to SPs were factors highlighted by Power (2016). Unavailability of protective modalities were factors affecting HCWs' compliance to SPs in Civil hospital Karachi.

V. CONCLUSION

From the study carried out, awareness and practice of standard safety precautions amongst nurses towards prevention of nosocomial infection, at Lautech teaching hospital, Osogbo was examined and some research questions (4) were asked and answered and the two hypothesis set was also tested using chi-square at 0.05 level of significance. Awareness on standard safety precaution was found to be high, more than of the respondent practice and complied with standard safety precaution. On chi square analysis, none of the variables tested were statistical significant.

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