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Assessment of Knowledge and Attitudes among Nurses toward Infection Control Measures at Al- Hilla Teaching Hospitals

A Thesis Submitted

By

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To

The Council of College of Nursing, University of Babylon in Partial Fulfillment of The Requirements for The Degree of Master in Nursing Sciences

Supervised by

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

((قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ))

صَدَقَ اللَّهُ الْعَلِيُّ الْعَظِيمُ

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الآية (٣٢)

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Dedication

I dedicate this humble work to

My dearest parents, who were ready to sacrifice everything to support my progress.

My brothers and sisters for their morally support.
My children Hassen and Zainab who are source of happiness

My lovely wife for her full support, understanding, and tolerance of my busy academic schedule during the whole course of my Masters' study.

To the soul of the late father, prof. DR. Hussein Jassem Al-Ebrahimi for his efforts in assisting all nursing students at Babylon university at the level of undergraduate and postgraduate studies.

All sophisticated nurses who face the impossible to do their best in caring for patients

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Abstract

Infection is one of the major problems in the operating rooms. Many studies showed that nurses are dangerously exposed to many hazards, such as needle stick and sharps injuries, with high incidence in the operating room due to many factors, such as lack of experience, cross infection, and work overload. Nurses need more attention to ensure effective compliance with universal precautions. The study aims to assess knowledge and attitudes among nurses toward infection control measures and determine the relationship with some socio-demographic variables.

A descriptive cross-sectional study was conducted in operating rooms at AL-Hilla teaching hospitals, a purposive non-probability sample of (N=200) Nurses. This sample is distributed in 3 Hospitals (AL-Hilla surgical teaching hospital, AL-Imam AL-Sadiq teaching hospital, and Babil teaching Hospital for obstetric and pediatrics hospital .Data were collected through a questionnaire and self-report technique. The questionnaire includes a total of seven items of socio-demographic characteristics,45 knowledge items, and 25 attitudes items. Data were collected from (12 th February to 17 th march 2022) through the self-report questionnaire and analyzed through the descriptive and inferential statistical (SPSS) method.

The finding revealed that more than half of the studied sample were female nurses (n=114; 57%), and (44.5%) did not receive training sessions. (60.5%) of nurses had moderate Knowledge regarding (ICMs) and (66%) of nurses had a neutral attitude toward infection control measures .there were significant differences in nurses' knowledge toward infection control measures with some socio-demographic variables at $p \leq 0.05$ (gender, educational attainment, training courses, years of experience in workplace) also there were significant differences in attitudes with educational attainment at $p \leq 0.05$.

Nurses' overall knowledge and attitudes were moderate toward infection control measures. There was a positive correlation between

knowledge and attitude at $p \leq 0.05$. The study recommended that the continuous nursing education unit continue its current job of providing instructional courses on infection control measures in all hospital departments, particularly for operating room staff, posting written instructions and hanging them on the walls of operating rooms to improve the knowledge of nurses.

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List of Abbreviations

Abbreviations	Meanings
AIDS	acquired Immune Deficiency Syndrome
APIC	the Association of Practitioners in Infection Control
B.C	Before Christ
Ca.	Circa (About)
CCU	Coronary Care Unit

CDC	Center for Disease Control and Prevention
CHP	Center for Health Protection
ECG	The Electrocardiogram.
ECDC	European Center for Disease Control and Prevention
OR	Operating Room
F	Frequency
HAIs	Hospital-Acquired Infections
HBV	Hepatitis B Virus.
HCAIs	Health Care-Associated Infections
HCV	Hepatitis C Virus.
HCWs	Healthcare Workers
HIV	Human Immunodeficiency Virus.
H1N1	Hemagglutinin Type 1 and Neuraminidase Type 1
H. S	Highly Significant
ICMs	Infection Control Measures
ICRC	International Committee of the Red Cross
ICNs	Infection Control Nurses
IPC	Infection Control and Prevention
IV	Intravenous
MOH	Ministry of Health
MRC	the British Medical Research Council
M.S	Mean of Scores
WHO	World Health Organization
PPE	Personal Protective Equipment
NHMRC	National Health & Medical Research Council
NCDC	National Centre for Disease Control
NIPCG	National Infection Prevention and Control Guidelines
N	Sample Size (number of participants).
N.S	No significant
PAHO	Pan American Health Organization
PEP	Post-Exposure Prevention
PPMCC	The Pearson product-Moment Correlation Coefficient
P. value	Probability Value
SD	Standard Deviation
Sig (S)	Significant
SQU	Sultan Qaboos University
SPSS	Statistical Package for the Social Sciences
SSI	Surgical Site Infection
TB	Tuberculosis
TBIC	Tuberculosis Infection Control

UK	United Kingdom
UTI	Urinary Tract Infection
&	And

List of Statistical Symbols

Symbols	Meanings
$\sum$	Summation of
X	The value in the data set
σ_{ij}	Estimated covariance between items i and j.
σ_{ii}	Variance (not standard deviation) of item i
%	Percentage
ANOVA	Analysis of variance
d.f	Degree of freedom

Chapter one

Introduction

Chapter One

Introduction

1.1 Background

A hospital-acquired illness (HAI) or healthcare-associated infection (HCAI) is an infection acquired after 48 to 72 hours of a patient's hospitalization, three days after a patient leaves the hospital, and 30 days after surgery, where the infectious agents are incubated during this period. It is the most significant global problem confronting healthcare systems (Nasiri et al., 2019).

Infection is a term related to a disease condition that infects people because of the presence of infectious agents from internal sources inside the body) Alternatively, external sources (outside the body), Previously (HAI) is called (nosocomial or hospital) infection (AL-Salih et al, 2018).

Globally, the estimation of patients affected by HCAIs is hundreds of millions in developed and developing countries. In some general hospitals in Australia, about one of each 74 hospitalized patients are affected by HCAIs. The total number of patients who had HAIs in 2011–2012 was about 3.2 million. In the US, about 100000 of these patients die annually. In Europe is (6%) (Sahiledengle.,2019).

Healthcare-associated infection is a significant public health issue that affects countries all over the globe, including Iraq. It's dangerous and may even be fatal. The longer patients are in the hospital, the greater the difficulties and losses on the patient and his family and the healthcare system's impact. To protect themselves, their families, and their patients against infectious illnesses, healthcare workers need to use all of the available strategies. So it is possible to restrict the spread of infection (Kerity & Naji, 2017; Shitemo, 2020).

Nurses are often exposed to a wide range of pathogens. When caring for patients, infections caused by infectious pathogens may be life-threatening or even lethal. Because of this, employees must undergo training and be monitored to improve their behavior and implement infection control measures (such as hand washing and using standard precautions during invasive operations) (Fashafsheh et al., 2015).

However, infection prevention is putting barriers between infectious agents and susceptible hosts. Infection control is the procedures and activities that target decreasing or preventing contagious diseases at hospitals. According to the World Health Organization (WHO), many factors that could cause (HAIs) include risky and complicated procedures, lengthy and inconvenient use of devices and antibiotics, immunosuppression, and other severe conditions of patients with no application of standard precautions sufficiently (Hussein et al.,2017).

Standard precautions (SPs), according to the Center for Disease Control and Prevention (CDC), are the precautions followed by healthcare workers to decrease the spread of infections during providing of care. The transmission of infection can be decreased by using personal protective equipment (PPE) (gloves, masks, face shields, eye shields, and gowns), hand hygiene, disposing of the syringe and needle as one unit after use, waste management, sterilization, and disinfection of the instruments and equipment (Ronak, 2016).

In addition, nurses' hands play a crucial role in transmitting infection during patient care. Improving nurses' knowledge and positive attitudes about infection control procedures will enhance their performances, functions, and the health and safety of patients and the community (Kalantarzadeh et al., 2014).

Infection control measures are essential infection control and prevention strategies that apply to everyone, regardless of their potential or actual infectious condition. These strategies include "hand hygiene; personal protective equipment (PPE) (e.g., gloves, gowns, facemasks); respiratory hygiene and cough etiquette; safe injection practices; medical waste management; cleaning, disinfection, and sterilization of patient care equipment." These measures are the first-line way to prevent infection in healthcare facilities and are applied as an essential strategy for reducing the spread of infections. Infection control measures reduce the danger of transfer of pathogens from one individual or place to another, even in high-risk conditions, and maintain objects and areas as accessible as possible from contagious agents (National Health & Medical Research Council (NHMRC),2019).

In hospitals, the operating rooms are one the most dangerous places because of the high infection and mortality rates. As a result, lowering operating room risk requires the cooperation and understanding of theater personnel. Workers in the medical field (HCW) This risk is closely related to compliance and awareness of the methods to reduce this risk (Nsekambabaye, 2017)

Nurses' responsibilities throughout operating surgery include providing the safety of the patient, performing the scrub role, performing hand hygiene, setting up the sterile equipment, tables, and sterile field, preparing sutures, ligatures, and special equipment and circulating activities, and protecting themselves from injury as use of preventive measures and wearing double gloves may also help protect the surgical team from the viral transmission. Gloves should be changed immediately after any accidental puncture and given post-exposure prophylaxis (Woodhead & Taylor, 2015; Susan et al., 2017).

1.2 Importance of study

Hospital-acquired infection (HAI) or healthcare-associated infection (HCAI) are the most common complications of hospitalization and a significant problem worldwide and pretend to be a severe threat to the lives and integrity of patients. Continuous fighting processes have great importance due to the high economic value and high morbidity and mortality rates related to these infections (Kenetra, 2013).

Control of infection and prevention affects the safety and health of the nurses and the patients who receive care in all healthcare systems. Nosocomial infections are the most common problem that causes burdens to healthcare systems and patients; according to WHO in 2011 notified that patients who suffered from at least one infection in developed countries are estimated at (7%), in low and middle-income is (15%), and the mortality rate is estimated about (10%) (Storr et al., 2017).

According to studies by the CDC and (WHO) put out from 1995 to the prevalence of hospital-acquired infections (HAIs) in advanced 2008 countries is estimated between (5.1% and 11.6%), and about the same ratio of patients who stay in hospital acquire at least an infection According. to European Centre for Disease Prevention and Control, ECDC informed prevalence of 7.1% in European countries and rated that 4 131 000 patients are affected by about 4 544 100 infections of (HCAIs) in Europe annually (WHO,2010).

HCAIs lead to severe and factual threats to the life of nurses and patients. Infections include hepatitis B, C, and AIDs. The estimation of healthcare workers exposed to these infections is 35 million globally. Millions of them suffer from infections transmitted by the blood annually 300.000 HIV, 900.000 HCV, and two million HBV. Contagious agents are transmitted by the hands of HCWs, instruments, and equipment. The HCWs must use standard precautions to prevent blood and body fluids (Gawad, 2017).

Surgical site infections cause a mortality rate of 3%, and 75% of SSIs associated deaths are directly related to SSIs (CDC, 2016). 11% of clients who undergo surgery are infected in low- and middle-income countries. In Africa, more than 20% of women who undergo cesarean section develop wound infections, affecting their health and the health of their babies (WHO, 2016).

Occupational hazards, including hepatitis B and C, AIDs (HIV) and tuberculosis, needle sticks and sharp objects, splashes, and non-intact skin. The prevalence of occupational hazards among nurses is highest than in others; the risks of infected blood are about (0.1–0.3%) for 47.4%) HIV, (2%) for HCV, and (6-60)% for HBV; these hazards occur to nurses during their work on patients due to patients hospitalization for long periods and contact with blood, fluids of the body, tissue membranes and non-intact skin (Donati et al., 2019; Yazie et al., 2019).

Recently, coronavirus COVID-19 emerged globally, firstly appearing in China Wuhan in December 2019, where patients who have the virus can transmit infections to others by droplets, or others receive infection from touching contaminated objects and surfaces. The disease ranges from mild to severe cases; few patients experience acute respiratory distress syndrome, which leads to death; if healthcare workers comply with infection control measures will reduce the transmission of infections (Houghton et al, 2020).

The nursing staff plays a significant role in implementing the strategies of infection control and prevention strategies. So, educating nursing staff, other health care providers, and patients about infection control measures is the cornerstone in preventing or reducing HCAIs. Using appropriate infection control measures such as hand hygiene, PPE, using an aseptic technique (disinfection and sterilization) of the tubing circuit of the ventilator, intravenous (IV) catheters, urinary catheters, and surgical instruments assist in lowering and preventing of HCAIs (Smeltzer et al., 2010).

Infection control measures such as good hand hygiene, appropriate PPE, and correct aseptic techniques are inexpensive and straight forward strategies. However, it needs to be applied and followed up continuously and improving monitoring systems and enhance the knowledge of HCWs about these strategies through implementing continuous education programs regarding infection control (Bouallègue et al., 2013).

Nurses working in the operating room should be trained to prevent cross-infection transmission of nosocomial infections by using infection control measures and demonstrate sound knowledge and attitude in maintaining a sterile field at all times to minimize the spread of potential pathogens to other sites, wounds, or self and help patients in having a safe operation. There is advancement in infection control practices, such as improved operating room ventilation, sterilization methods, barriers, surgical techniques, and availability of antimicrobial prophylaxis, but surgical site infections are still a substantial cause of morbidity and mortality among hospitalized patients (Woodhead & Taylor, 2015).

Nurses should implement infection control principles and apply it in the operating room (Abraham et al., 2016).

1.3. Statement of problem

It is estimated that 4.5 to 5.7 billion people are affected with SSI per year due to lack of knowledge of infection control measures in hospitals, according to Infection Control and Hospital Epidemiology (2013). Approximately 9% of Indian hospital patients acquire healthcare-associated infections, especially post-operative infections, and as a result, 5000-15,000 die yearly. Fry and Fry (2007) recommended that it is necessary to improve the knowledge and practice of infection control measures among operating room nurses. National surveillance service (2002) surveyed healthcare workers in the UK and reported 2,351 cases of wound infection. Out of these, 44% of infections occur due to a lack of knowledge of infection control measures, 29% due to lack of time, and 28% due to a staff shortage.

The operating room nurses play a big role in preventing and diffusing HAIs, including SSIs, in the operating room environment. DeLaune and Ladner (2008) stated that HAIs could be transmitted by nurses who fail to practice or adhere to the principles of infection control measures. Poor infection control techniques can lead to contamination of surgical wounds. By having the right knowledge, attitude, and high level of practice standards, precaution can be maintained.

Despite nurses' educational background, training, and continuous efforts to promote infection control measures, SSIs continue to be observed in the Iraq clinical setting. On this premise, the researcher carried out this study on the knowledge and attitudes of infection control measures among nurses in the operating room to provide insight into the problem.

1.4. Objectives of the study

1- To assess Knowledge and Attitudes among Nurses toward Infection Control Measures at Al -Hilla Teaching Hospitals.

2-To investigate the differences in nurses' knowledge and attitudes with regard to socio-demographic characteristics such as (age, gender, educational level, etc.).

3-To find the relationship between nurses' knowledge and attitudes toward infection control measures.

1.5. Definitions of Terms

1.5.1. Assessment

1.5.1. a. Theoretical Definition

Are the first step of the nursing process and a systematic gathering data of discussion information from the physical, mental, spiritual, socioeconomic, and cultural status of the individual that allow the nurse and health care provided to help the patient (Trueman, 2014).

1.5.1. b. Operational Definition:

Is a process for gathering data or procedure about commonality data concerning a status or individual and work judgments about knowledge, ability, skills etc

1.5.2 Knowledge

1.5.2. a. Theoretical Definition

Are the information, fact, and proficiency gained by nurses through their education and experiments (English Oxford Living Dictionaries,2018)

1.5.2. b. Operational Definition:

Are the facts or the ideas acquired by studies, investigations, observations, or experiences that an individual can know

1.5.3. Attitudes

1.5.3. a. Theoretical Definition

Mean nurses' sensation of affection toward someone or fact or condition is reflected in the behavior of the individual (Oxford, 2020)

1.5.3. b. Operational Definition:

Are the nurses' viewpoints about activities of nurses toward infection control measures in operating rooms

1.5.4. Infection Control Measures

1.5.4. a. Theoretical Definition

It is a group of strategies that are prepared and applied to prevent or reduce healthcare-associated infections among patients, HCWs, and society, such as "handwashing; personal protective equipment; medical waste management; disinfection and sterilization; safe injection and handling of sharp tools, etc..." (Center for Health Protection [CHP], 2018).

1.5.4. b. Operational Definition:

It refers to implementing the principles of standard precautions that can prevent or reduce the spread of infection in operating rooms.

Chapter Two

Review of Literature

Chapter Two

Review of Literature

2.1. Historical Background of Infection

The earliest records of hospital-acquired infections were pointed out in the Egyptian sedge, written about 3000 BC. In India, they found a similar record of hospital-acquired infections in the literature of ancient Ayurvedic medicine around 600 BC. The Hindu physicians Charaka and Sushruta (ca. 400 BC.) asserted the need to prevent infection while providing healthcare. Several evidences confirm the prevalence and documentation of hospital infections in ancient eras worldwide. According to Herodotus, the prevailing conditions in Roman and Greek hospitals in 600–1000 BC. were described in his records. The Hippocratic article (400 BC) confirmed the presence of infection (Prakash, 2001).

Contagious diseases are a significant concern globally and are the second most common cause of mortality. Throughout history, communicable infectious diseases posed threats and challenges to humans; observers documented the epidemics that resulted from such diseases. In the past, infections attributed to different conditions included "environmental changes, asters, the act of God, and spiritual causes." Transmissible diseases emerged first, followed by infectious diseases much later. Diseases had a tremendous negative effect on public health in Europe (the fifth and the fifteenth) centuries. In Europe, from (1346–1453), the mortality was about 75–200 million from plagues, including the Bubonic plague (Black Death), which killed 300–400,000 individuals in Britain in a single outbreak in (1471). (Haque et al., 2020). There were continued plague epidemics until 1650.

Ignaz Semmelweis, a (Hungarian obstetrician at the Maternity Hospital in Vienna, Austria) was detailing the transmission mode of puerperal sepsis when he made the initial discovery (a healthcare worker's hand might spread the illness). In 1847, he remarked on the high cost of living, obstetricians' patients had a higher maternal death rate than non-obstetricians' patients. Medical students, as well as midwives, were present. Then Semmelweis underlined the importance of handwashing in preventing illness spread, and the maternal mortality rate decreased when handwashing was implemented diminished. (McFee, 2009; Sydnor& Perl., 2011).

In October 1854 and April 1855, Florence Nightingale analyzed the mortality data, identified the underlying cause of poor sanitation, and made new statistical schemas that satisfied the government's repair of health. Florence's work has had a significant impact on hospitals' design and management, poor ventilation, environmental sanitation, and changes in inpatient mortality rates (Pearson, 2009).

Infectious diseases at the beginning of the (20th) Century were the leading global cause of high levels of diseases and death. The average male and female life expectancy were below 50 years because of antibiotics for an extended period. Treating contagious diseases worldwide causes high success in developed countries, including the United States. The average life expectancy became more than 78 years, and the leading cause of mortality altered from infectious diseases to non - infectious diseases. The average of older people changed from (4% to 13%) of the entire United States (Adedeji, 2016).

The British Medical Research Council (MRC.) recommended that full-time special officers be recruited to manage infection control to prevent surgical sepsis in 1941, the first formal step. In 1944, the MR.C. advised that all hospitals establish an infection control committee comprised of healthcare professionals and administrators. The first infection control nurses (ICNs) were employed in the United Kingdom (UK) in 1959. (Forder, 2007)

At the end of the 1950s and the beginning of the 1960s, a limited number of hospitals in the United States began to develop infection control programs. The work was primarily concentrated at significant medical academy centers rather than in public health agencies. In the 1970s, hospitals with infection-control programs were expanded (Centers for Disease Control and Prevention [CDC.], 2011).

The Association of Practitioners in Infection Control (APIC), also known as the Association for Professionals in Infection Control and Epidemiology, was founded in 1972 by infection control practitioners. APIC was established to provide practitioners with ongoing professional development, advancement, and education opportunities. Furthermore, programs focused on Knowledge, experiences, and exam scores promoted infection control as an appealing career in 1980 (Dixon, 2011).

In 2009, the Iraqi Ministry of Health (MOH.) partnered with the World Health Organization (WHO) to develop a national guideline for infection control in hospital settings. The Iraqi Ministry of Health (MOH.) issued recommendations for preventing infection and waste disposal for healthcare agencies in 2012. The goal of the recommendations was to improve the Knowledge and resources that healthcare workers and management needed to undertake infection control (Ministry of Health, 2012)

2.2 Conceptual Framework

Environmental Theory

Florence Nightingale's theory on infection control was adopted for this study. The theory states that nurses must provide a clean environment by promoting infection prevention and control. The nurse plays a vital role in translating Knowledge and practice in infection prevention and control(Trafford, 2018).

Nightingale acted out prevention and control practices through her Knowledge regarding infection prevention and control, which placed the patient in the best possible position for healing (Trafford, 2018).

Nightingale stressed that cleanliness (sanitation, Hygiene), infection prevention, and control measures in the clinical environment improve health care. The clinical environment impacts the patients' exposure to infection-related diseases. Nightingale focused on caring for the sick and emphasized the importance of Hygiene and patient care in infection prevention and control (Trafford, 2018).

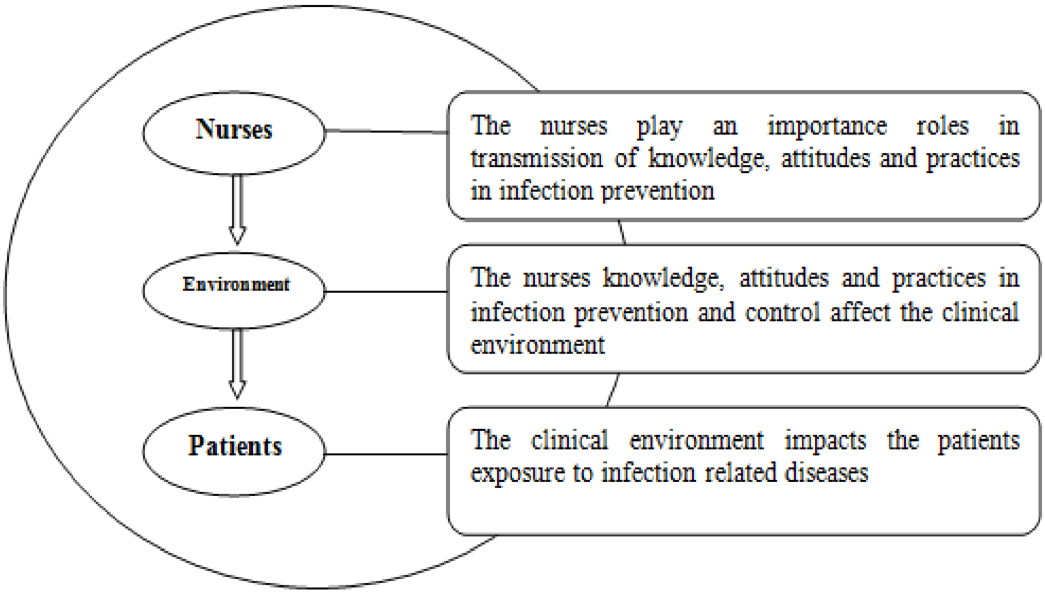

Figure 2-1: Florence Nightingale's Environmental theory (Gurler, 2014).

1. Nurse

The knowledge and skills that the nurses acquire enable them to translate it into a positive attitude and good practice in preventing and controlling the infection. Nurses are responsible for preventing the spread of infection in a clinical setup (Gurler, 2014).

2. Environment

The nurse's Knowledge and practices in infection prevention and control affect the clinical environment. A poor evidence-based practice environment exposes the patient to infection. Nurses should know Isolation procedures to prevent the spread of infectious conditions (Gurler, 2014).

3. Patient

The clinical environment exposes the patient to Hospital-acquired infections. These infections impact patient outcomes such as delayed hospitalization (Gurler, 2014).

2.3 Overview of Hospital-Acquired Infection

A hospital-acquired infection, also known as a "nosocomial infection," is an infection that is obtained in healthcare facilities. It is sometimes called "healthcare-associated infections" (HCAIs). HCAIs can happen in any healthcare facility. HCAIs can be caused by bacteria, fungi, viruses, or other less common pathogens. Healthcare workers also spread infection, in addition to contaminated instruments, linens, or air droplets HCAIs can arise from the outside contaminated environment, other infected patients, and staff that may be infected (CDC, 2018a)

The risk of HCAIs depends on the patient's immune status, infection control measures, and the spread of pathogens in society (Loeches et al., 2018).

These HCAIs include bloodstream infections, catheter-associated urinary tract infections (UTI.s), and ventilator-associated pneumonia (VAP). And also, surgical site infection (SSI.). CDC works to control and prevents these infections because they are an essential threat to patient safety (CDC.,2014).

In the USA., CDC estimated that about (1.7 million) HCAIs, from all types of pathogens cause or contribute to (99,000) deaths each year. In

Europe, the HCAIs are estimated to account for two-thirds of the (25,000) deaths each year (Haque et al., 2018).

The operating room is a high-risk environment in a Hospital that encounters a high rate of infection and mortality. Therefore, the theatre staff's compliance and level of Knowledge toward reducing risk in OR Healthcare workers (HCW) Compliance and level of Knowledge toward mechanisms to reduce this risk directly impact clients and staff safety (Nsekambabaye, 2017).

Surgical site wound contamination happens mainly during the intraoperative period and is associated with endogenous and exogenous factors (Dhakal et al., 2016).

Operating room staff adherence to strict aseptic principles and careful observation of sterile technique reduces post-operative wound infection. Perioperative personnel who are not scrubbed in the sterile field must maintain meticulous hand hygiene to decrease the transmission of bacteria to the surgical field or the patient (Nsekambabaye, 2017).

2.4 Role of Infection Control Nurses

1- Conducting daily ward rounds to check infection control documents.

2-Informing the nursing staff about the hospital's infection control procedures.

3- Providing feedback on any Infectious Illness cases that head nurses report.

3- Evaluating and assessing the isolation protocol implemented by the unit employment.

4- Detecting the occurrence of a hospital-acquired infection and determining the source of the contagion.

5- Ensuring that all hospital staff, as required by hospital policy, are vaccinated against infectious diseases.

6- Attending regular infection control committee meetings to assess the situation at any time (Ernakulam Medical Centre, 2017).

2.5 Source of infection

Healthcare-associated infections can be classified as either endogenous (also known as self-infection) or exogenous (also known as cross-infection).

2.5.1Endogenous infection

Endogenous infection or self-infection, in which the causative agent of the infection is present in the patient at the time of admission to the hospital, but there are no signs of infection. The infection develops during the stay in the Hospital (WHO, 2013a).

Many pathogens that cause HCAIs come from the patient "s own body (normal flora). E.g., bacteria usually present in the colon can gain entry to the urinary tract and cause urinary tract infection. Endogenous infection can be controlled and prevented by providing adequate nutrition for patients, avoiding urinary and intravenous catheters if possible, and continuously performing hand hygiene (National IPC Guidelines, Sierra Leone, 2015).

2.5.2 Exogenous Infection

Exogenous infection is the infection that a patient acquires after entering the health care facilities, as he does not have an infection before entering the Hospital. However, signs and symptoms appear after staying in Hospital due to contact with contaminated equipment and changing psychological and physical conditions (WHO, 2013b).

Exogenous infection results from the transfer of pathogens to the patient or the HCWs from an external reservoir. E.g., contaminated hands of HCWs and other patients (cross-contamination), contaminated instruments, or the environment. Infection control measures such as hand washing, PPE., disinfection, and Sterilization play a vital role in reducing the risk of HCAIs (National IPC. Guidelines, Sierra Leone, 2015).

2.6 Chain of Infection

The chain of infection represents the transmission of pathogens; it consists of six links. The infection does not occur unless all six elements in the chain are present in sequential order. Transmission occurs when the infectious agent exits from the Reservoir via a portal of exit, travels through a transmission mode, and enters via a portal of entry to a susceptible host. The chain of infection provides an understanding of how infections spread and the contributory factors that facilitate spread, which is vital in preventing and controlling HCAIs. Breaking any link in the chain will prevent infection, especially the "mode of transmission link" (National IPC Guidelines, Singapore, 2017; Timby & Smith, 2014).

There are six links in the chain of infection:

1. Infectious Agent
2. Reservoir
3. Portal of Exit
4. Modes of Transmission
5. Portal of Entry
6. Susceptible Host (National IPC Guidelines, Singapore, 2017).

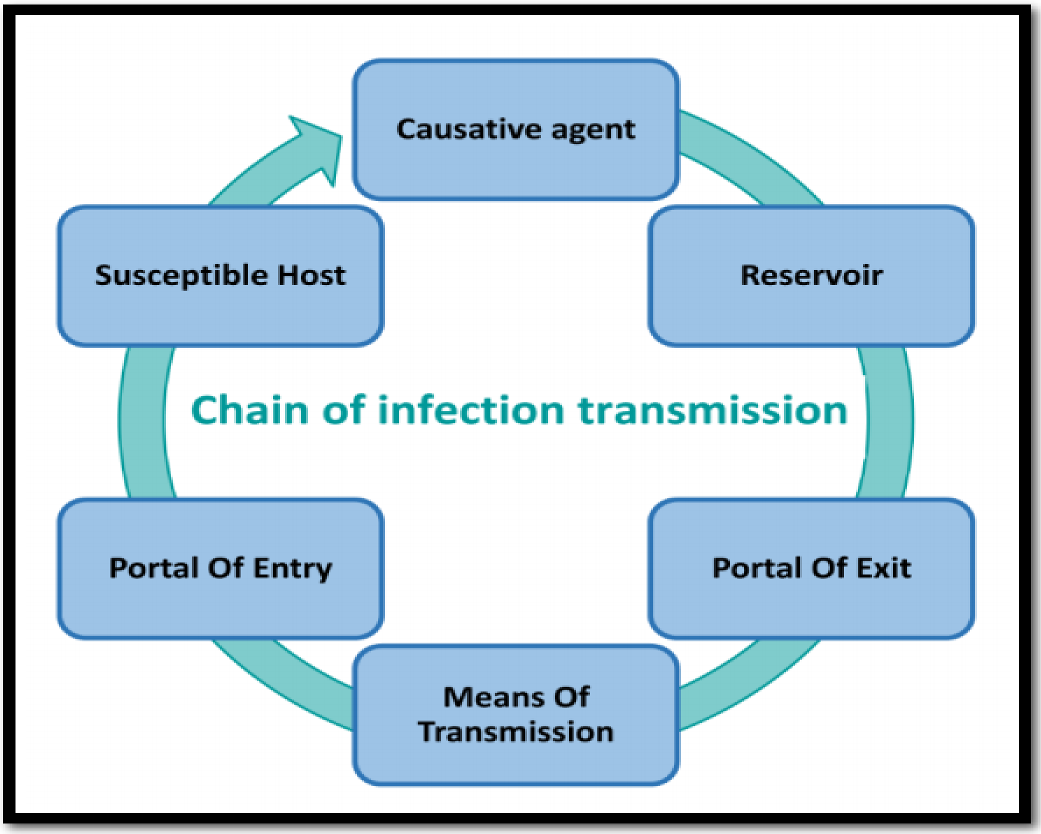

Figure 2.2: The chain of infection ([NHMRC], 2020)

2.6.1 Pathogens (infectious agents)

Any microorganism (or microbe) can cause an infection, such as bacteria, viruses, parasites, or fungus. There are some factors that affect the pathogen "s ability to cause infection, including ferocity (ability to multiply and grow), invasiveness (ability to enter tissue), and pathogenicity (capacity to cause disease) (Australian Commission on Safety and Quality in Health Care [ACSQHC], 2012; Lemass et al., 2014).

Many microbes cause Healthcare-associated infections, and each one can cause infection in healthcare settings. Bacteria are responsible for about 90% of infections, whereas protozoans, fungi, viruses, and mycobacteria contribute less than bacterial infections (Khan et al., 2015).

2.6.2 Reservoir

The Reservoir is where the infectious agent usually lives, grows, and multiples. It includes humans, animals, and the environment. The Reservoir may or may not be the source from which an infectious agent is transmitted to a host. For e. g., the soil is the Reservoir of Clostridium botulinum, but the source of most botulism infections is improperly packaged food that contains Clostridium botulinum spores (Bloomfield et al., 2012).

2.6.3 Portal of Exit

A portal of exit is how an infectious agent leaves its Reservoir. The respiratory tract (nose and mouth), intestinal tract (rectum), urinary tract, blood, and other body fluids. Usually, the exit portal matches the place where the pathogen is found. For e.g., tuberculosis and influenza virus go out from the respiratory tract, schistosomes via urine, and cholera vibrio in feces (CDC., 2012a).

2.6.4 Modes of Transmission

The mechanisms by which the infectious agent is transmitted from Reservoir to a susceptible host. Transmit varies by type of pathogens. Some infectious agents may be transmitted by more than one route. There are different classifications for modes of transmission, including:

1. Contact transmission
2. Droplet transmission
3. Airborne transmission
4. Vector-borne Transmission
5. Vehicles-borne Transmission (National IPC Guidelines, Singapore, 2017).

2.6.4.1 Contact Transmission

It is the most common type of transmission. It contains two types direct contact (which happens when the pathogen is transferred from the host to another, for example, the blood transferred from the patient to the nurse with non-intact skin, or by sexual contact). The other type is indirect contact (which occurs when the pathogen is transferred by an intermediate contaminated object or individual, for example, the contaminated hands of healthcare workers can transfer the infectious agents from one patient to others (National Centre for Disease Control [NCDC], 2017).

2.6.4.2 Droplet Transmission

The transmission of droplets happens when the infected Individuals cough, sneeze, and through some procedures. The size of the infectious particle (droplet) is more than 5 microns. The transmission of infection occurs when the distance between infected and uninfected persons is less than one meter. However, the droplets could be transmitted indirectly to the surfaces, tools, or mucous membrane by hands, then touch the eyes, nose, or mouth. Some examples of the contagious agents transmitted by droplets are influenza viruses and meningococcus. (NCDC, 2017).

2.6.4.3 Airborne Transmission

The infection transmitted by air may occur by small particles, including contagious agents that stay infective long distances. The size of these particles is less than 5 microns are created through the patient's cough, sneeze, breath, or talk, and by vaporization of larger droplets in conditions with low humidity. Aerosols that contain pathogens could be scattered for long distances by air current, e.g., air conditioning or ventilation systems, and then enter into the airways respiratory design of the susceptible host without any contact with the contagious patient. The pathogens transmitted by the airborne are the rubeola virus (measles), chickenpox, and mycobacterium tuberculosis (NHMRC, 2019; Suleyman et al., 2018).

2.6.4.4 Vector-borne Transmission

Vectors are living organisms that can transport pathogens between humans or from animals to humans. Many of these vectors are blood-sucking insects, which ingest infectious agents through a blood meal from an infected host and later inject it into a new host during their next blood meal. Mosquitoes are the best-known disease vector. Others include ticks, flies, sandflies, and fleas. Vector-borne diseases account for more than 17% of all infectious diseases, causing more than 700000 deaths yearly (Schrank & Branch, 2017; Caroline & Mary, 2012).

2.6.4.5 Vehicle-borne Transmission

Is the transmission of pathogens by contaminated water, food, drugs, tools, equipment, and blood from the Reservoir to the susceptible host; the individuals are infected when contacting directly with these vehicles, for example, fluids of the patient's body (blood, vomiting, diarrhea, and sweating) The diseases that occur due to drinking contaminated water are cholera and typhoid fever. Infectious diseases acquired from infected blood are hepatitis B virus and AIDs (acquired immune deficiency syndrome) (McNamara, 2020). prolonged intubation after unsuccessful extubation

2.6.5 Gateway of Entry

The Portal of entry is the pathway by which the pathogen enters the susceptible host through the penetration of damaged skin, respiratory system (inhalation), or digestive system (ingestion). The infection's risk depends on the deep penetration of infectious agents (Eoin, 2017; Bloomfield et al., 2012).

2.6.6 Susceptible Host

A person who lacks resistance against the pathogens is exposed to acquiring the infection from an infectious individual and can later transmit the disease to others, depending on the infectious agent. The patient may recover and receive lifelong immunity when recovering from measles or for a temporary period, as in influenza. Some factors that put individuals at risk of acquiring infections include age, chronic diseases (diabetes and hypertension), and immunodeficiency patients (Bjørnstad et al., 2020).

2.7 Infection Control and Prevention

Infection prevention and control (IPC) is a scientific path and workable solution prepared to prevent and control damage due to infection to patients and HCWs. It is based on infectious diseases, epidemiology, social science, and the promotion of the health systems. Implementing an infection control program within a healthcare facility is necessary to prevent HCAIs and prepare for and respond to crises of infectious diseases (WHO, 2020b).

Prevention is the best way of infection control, which is achieved when breaking the chain of infection. All health care facilities should have an infection control committee composed of epidemiologists, physicians, and nurses who will be responsible for monitoring and reporting infectious diseases, developing necessary infection control plans, the HCWs health program, developing the Knowledge and practices of HCWs, and infection control procedures for client care (Caroline & Mary, 2012; WHO, 2011b).

2.8 Infection Control Measures

Infection control measures are basic precautions designed to reduce direct, unprotected exposure to potentially infected blood, body, or secretions, such as urine and feces (excluding sweat), whether or not visibly contaminated with blood; non-intact skin, such as an open wound; and mucous membranes, such as the oral cavity. Infection control measures represent a cornerstone for providing safe health care, reducing the risk of further infection, and protecting HCWs, which should always be applied in all health care settings for all patients to protect them from HCAIs (Lemass et al., 2014; CHP., 2018).

Infection control measures represent the minimum prevention measures that stratify all clients, regardless of actual or suspected infection conditions, in any place where health care is provided. These evidence-based measures are prepared to protect HCWs and prevent the prevalence of pathogens among patients. It includes hand hygiene; use of personal protective equipment (PPE.) (e.g., gloves, gowns, facemasks); respiratory hygiene and cough etiquette; safe injection practices; medical waste management; and cleaning, disinfection, and Sterilization of devices and equipment (WHO, 2019b; CDC., 2018b).

2.8.1 Hand Hygiene

Hand hygiene is a significant component of infection control measures and one of the most effective methods to prevent the transmission of pathogens associated with health care. It is the simple and most effective way to reduce and prevent the spread of infection. Therefore, it is essential in every setting, including ICU. Good hand hygiene is the single most important activity for reducing the spread of HCAIs (CDC., 2020a; Hogston & Marjoram, 2011).

Hand hygiene is the responsibility of medical and healthcare providers to protect themselves and patients' lives from infection. Several terms are used for hand hygiene: hand antisepsis, disinfection, degerming, decontamination, or sanitizing. Hygiene of hands includes washing hands with soap and water; this occurs when hands are visibly dirty and alcohol-based hand rub (Shinde & Mohite, 2014).

2.8.1.1 Five Moments for Hand Hygiene

According to the WHO, the five moments for hand hygiene approach defines the critical moments when healthcare workers perform hand hygiene. This approach recommends HCW.s to clean their hands:

1. Before touching a patient.
2. Before clean/ aseptic procedures.
3. After body fluid exposure/ risk.
4. After touching a patient.
5. After touching the patient's surroundings (WHO, 2020c).

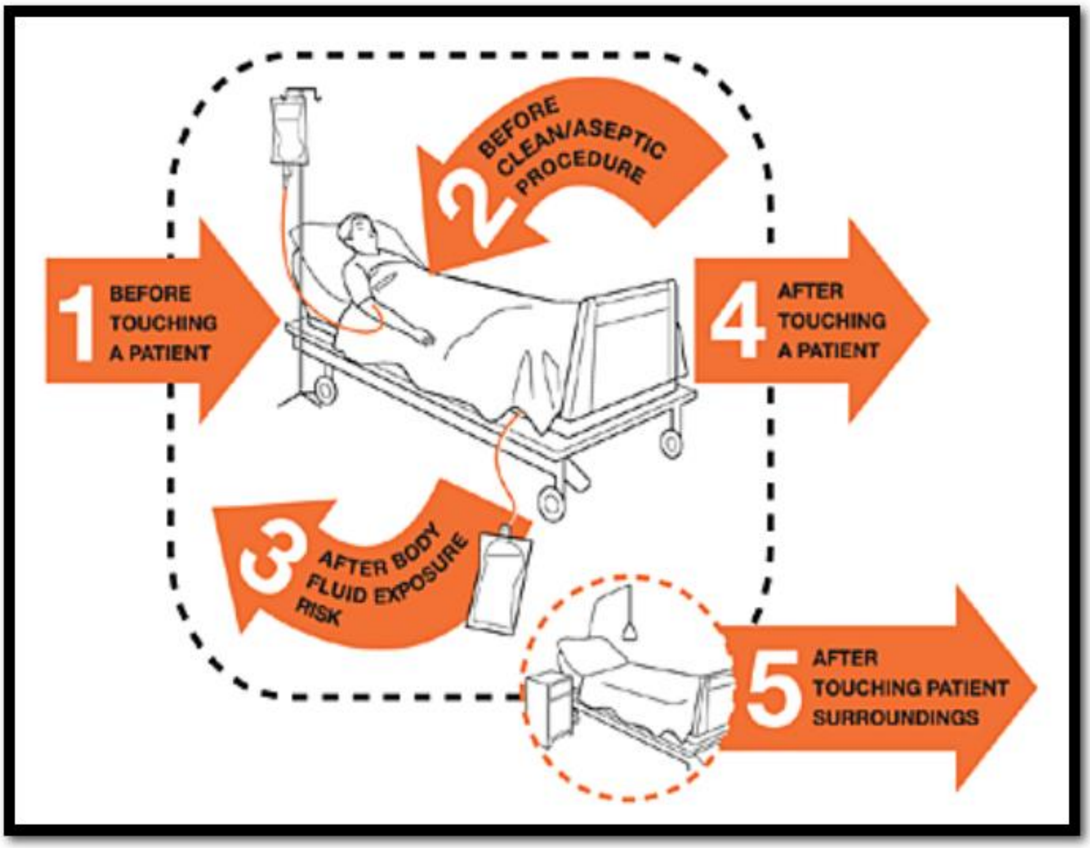

Figure 2.3: The five moments for hand hygiene (NIPCG, Singapore, 2017).

2.8.1.2 Methods of Hand Washing

A) Routine Hand Washing

Hand washing is usually limited to hands and wrists; the hands are washed for a minimum of 40 – 60 seconds with plain soap and warm water (Gould et al., 2010).

B) Surgical Hand Washing

Surgically hand washing is done before the operations to eliminate and kill the temporary germs to a minimum by using an antiseptic soap such as (chlorhexidine or povidone-iodine) for a period of (3-5) minutes (MOH/ WHO, 2009).

C) Alcohol-Based Hand Rub

It removes or destroys pathogens and gives a long-lasting effect by using alcohol (e.g., 70%) for 15–30 seconds to sanitize the hands when they are not visibly soiled. Alcohol-based hand rub is the best standard of hand hygiene practice in healthcare settings (MOH/WHO, 2009).

2.8.1.3 Hand Care

a) Intact skin is a natural defense against infection

b) HCWs should cover all cuts and abrasions with a water-resistant dressing

c) Use of hand cream to maintain the moisture of hands.

d) Do not use personal hand creams at work because they may counteract antiseptic properties in the antiseptic gel/ alcohol (National IPC Guidelines, Singapore, 2017).

2.8.2 Personal Protective Equipment (PPE)

Personal Protective Equipment PPE. is an essential strategy to prevent infectious diseases in hospitals. Health care providers must appropriately use PPE to prevent transmitting pathogens and pollutants. Improper practice in removing PPE. will contaminate their bodies and increase the risk of acquiring infections for HCWs and the patients (Phan et al., 2019).

Health care workers, especially nurses, are at elevated danger of being exposed to contagious and contaminated body fluids and blood, leading to morbidity and even mortality during their work. This can decrease by using standard precautions that include hand washing, personal protective equipment (gloves, apron, gowns, masks, face shield, and eye shield or goggles), safe injection practice, safe use of equipment and tools, cough etiquette, and Hygiene of respiratory (Abukhelaif.2019).

The nurses in healthcare settings always need training courses on selecting, wearing, and doffing the PPE. Correctly to reduce the risk of contamination. Clean hands correctly are an essential final step after doffing the equipment. Nurses must take care to implement several important points for their safety, which are:

1- Keep hands away from the face.

2- Limit touching the surrounding of the patient as much as possible.

3-Take off protective equipment immediately after leaving the patient's room.

4- And then wash the hands (James, 2014).

2.8.2.1 Gloves

Gloves are protective barriers to the safety of health care providers and patients. They are considered part of the essential personal protective equipment to protect caregivers from contaminated blood and fluids. Gloves include (surgical and non-sterile gloves) (Jain et al., 2017).

The gloves reduce contamination of the hands of healthcare workers after contact with patients and their blood and body fluids, therefore reducing the transmission of infectious agents among patients. Hands must be washed before wearing gloves because gloves are not considered a substitute for handwashing, and wearing them does not reduce the transmission of infection if not washed, and when they are not changed from one patient to another, they are considered carriers of infection (Fuller et al., 2011).

2.8.2.1.1 Criteria for Choosing Gloves

As with all Personal Protective Equipment., the need for gloves is based on a careful assessment of the task, the risk of pathogens transmission, and contamination of HCW "s clothing and skin. Risk assessment includes consideration of:

1- Who is at risk.

2- Selection of surgical or non-surgical gloves based on contact with susceptible sites, clinical devices, and the aspect of care.

3- Whether there is contact with blood, body fluids, non-intact skin, mucous membranes, or contaminated equipment.

4- Gloves are put on last in combination with other PPE. (Loveday et al., 2014; Siegel, 2007).

2.8.2.1.2 Types of Gloves

2.8.2.1.2 (1). Sterile Gloves

It is used when the hand may contact ordinarily sterile sites, during any surgical procedure, or dealing with sterile clinical devices, e.g. (urinary catheter procedure, wound dressings, central venous line insertion, and lumbar puncture). These gloves are used only once, preferably worn close to the patient's area so that they do not become contaminated, taken off immediately after the work is done, must be changed among patients, and the most important thing is to wash hands after removing and disposing of it in the appropriate place (NHMRC, 2019).

2.8.2.1.2 (2) Non-sterile gloves

It is disposable gloves, also called clean gloves, used when hands may contact blood, body fluids, contact with non-intact skin, or contaminated instruments, e.g. (venipuncture, vaginal examination, dental examination, emptying a urinary catheter bag) (Loveday et al., 2014).

2.8.2.1.2 (3) Reusable Thick gloves

Gloves that are used when dealing with polluted waste or tools (during cleaning and sterilization of equipment and devices, or during dealing with sharp objects, chemicals, detergents, and antiseptics in the departments of the Hospital these types of gloves can be used again after cleaning and disinfected (MOH/ WHO, 2009).

2.8.2.2 Gown

It is a barrier usually made of impermeable materials used by HCWs during the application of procedures that may lead to splashing body fluid or blood. Guidelines recommend that protective clothing (apron or gown) must be worn by all H.C.W.s when in contact with the patients and equipment that may lead to contamination of skin and uniforms with pathogens. The type of apron or gown is required based on the risk assessment (NCDC, 2017; Mehta et al., 2014).

Gowns are always dressed in combination with other PPE. Gowns are usually the first piece of PPE. to be dressed. The gown usually covers from the bottom of the neck to the middle of the thigh and the sides of the body and arms thoroughly. Gowns must be available in appropriate sizes for all HCWs to ensure complete body coverage. Do not go out with a gown outside the work area. When removed, the outer, "contaminated" side of the gown is turned inward and rolled into a bundle to prevent the spread of infection to the outside and be disposed of properly in the container of medical waste (CDC., 2007, Last update: July 2019).

There are two kinds of gowns, according to (NCDC, 2017) are:

1-Surgical Gown (Sterile)

This gown used during a surgical procedure that requires a sterile area could occur during the procedure splashes of blood and body fluids.

This kind of gown is enveloped and made of impermeable materials to fluids, but if the fluid can be penetrable, an apron should be worn over it.

2- Non-Sterile Gown

A clean gown is used in routine procedures in which splashing of fluids and blood may occur. It is worn to save the clothes of health care workers from becoming contaminated as they are made of materials that are impermeable to fluids.

2.8.2.3 Mask

A protective barrier is used by HCWs, patients/ clients, and visitors to protect the mucous membranes (mouth and nose) from pathogens because the mucous membranes of the mouth, nose, and eyes are susceptible portals of entry for pathogens. When the person can transmit the infectious agents via coughing or sneezing through droplets or airborne, a breathing mask must be worn to prevent the spread of infection by everyone, especially if the distance is close (Rose & Furrows, 2014).

Masks are used for three primary objectives in the healthcare facility:

1. Wore by HCWs to protect them from contact with pathogens from patients (e.g., respiratory secretions).

2. Wore by HCWs when doing sterile procedures to protect patients from exposure to the pathogen

3. Wore by patients who have coughing or sneezing to protect others from pathogens (CDC., 2007, Last update: July 2019; Tada et al., 2014).

2.8.2.3(1) Types of The Masks

a. Surgical Mask

The surgical Mask aims to protect HCWs from inhaled droplets that contain infectious agents and infect the respiratory system; it can protect from influenza virus, chickenpox, and meningococcal illness. The benefits of this Mask are:

1-It is worn easily

2-Single-use and easily removed

3-Restful compared with other types of masks (Honda & Iwata, 2016).

b. Particulate Respirator Mask (N95)

This Mask protects HCW.s from inhaled infectious agents transmitted by the airborne route and causes diseases like chickenpox, measles, and tuberculosis. It is a protective mask for the respiratory designed for filtering airborne particles. When undergoing experiments, it was found that it prevents (95%) minimal of so tiny (0.3 microns) experiment particles if it is convenient to the face, but it does not remove all the risks of spreading infection. This kind of Mask is not convenient for individuals with hair on their faces and young children because the Mask does not fit duly with their faces because of the small size for children and the presence of hair for adults (Peggy et al., 2018).

c-N100 or P3 Mask

It is used during interventional procedures that penetrate the skin and mucous membranes, suctioning respiratory secretions, laboratory work, working in an environment where pathogens may be concentrated, and patients with hemorrhagic fever. It is used once and keeps the filter continuously available, so it is expensive. If it is not available, use three or five from the surgical Mask, according to the nature of the task performed (CDC, 2020b).

2.8.2.4 Face shield and Goggles

They are protective barriers of personal protective equipment that are worn by healthcare workers who are working in surgical operations (e.g., surgery, airway suction, and insertion of a nasogastric tube) to protect eyes, nose, and mouth from splashing of fluids, blood, and secretions during coughing, sneezing or saliva which carrying infectious agents. A face shield is considered an alternative to protective goggles to reduce the splash of fluid and blood into the mucous tissues in the eye, but it is advised to combine with other PPE. such as goggles and face masks during surgery to provide protection (Roberge, 2016).

2.8.2.4.1 Specifications of the Face Shield and Eye

1)Eyeglasses should be plastic with clear vision with side and front shields.

2)It is preferable to be used once, but if it is multiple-use, it must be washed and sterilized before reuse.

3)The face shield should be long enough to protect the mouth and be curved on both sides.

4) It should be comfortable and straightforward to use and should be suitable over personal glasses.

5) It is chosen according to the risk assessment (National Institute for Occupational Health and Safety [NIOSH], 2016).

A face shield, eye goggles, and Mask can be removed safely after gloves removal and handwashing are performed. The front of a mask, eye goggles, and face shield are considered contaminated (CDC., 2007, Last update: July 2019).

2.8.3 Respiratory Hygiene and Cough Etiquette

Respiratory hygiene and cough etiquette must be applied as standard infection control measures. Sneezing and coughing must be covered to prevent dispersing respiratory secretions into the air. Hands must be washed with soap and water after coughing, sneezing, or contact with respiratory secretions or objects contaminated by these secretions (CHP., 2018).

2.8.3.1 Steps in Respiratory Hygiene and Cough Etiquette

Anyone who has signs and symptoms of a respiratory infection, regardless of the reason, must follow or be advised to follow respiratory Hygiene and cough etiquette as follows:

1- Cover the nose/ mouth with disposable tissues when coughing or sneezing. If there are no issues, coughing or sneezing into the inner elbow, not in hand.

2-Use disposable tissues to collect respiratory secretions.

3- Dispose of tissues in the waste container after use.

4- Perform hand hygiene after touching respiratory secretions and contaminated tools with these secretions.

5- Keep unclean hands away from the mouth, eyes, and nose.

6- Advise persons with respiratory infections to wear surgical masks, especially during epidemic periods.

7- Patients with respiratory infections must sit as far away from others as possible (NHMRC, 2019).

Healthcare workers should assist patients (e.g., elderly and children) who need help collecting respiratory secretions. Patients with immobile will need a container at hand for disposal of used tissues and near hand hygiene facilities (CHP, 2018).

2.8.4 Safe Injection Practices

Safe injection does not lead to injury for health care providers and the patients and does not lead to transmission of infections (HBV, HCV, and AIDs). There are seven steps followed to injection safely, which are:

1- The area of the work must be clean.

2- Handwashing.

3- Use sterile equipment.

4- A sterilized vial of medication.

5- Sterilize the skin before injection.

6- Collect sensitive equipment.

7- Waste management correctly (WHO, 2016a).

The unsafe injection practices lead to the spread of viral infections such as HBV, HCV, and AID.s and bacterial infections among healthcare workers, patients, and the community. These practices include over-use of medications by injection where oral drugs are available, not compliance of HCWs with guidelines to follow the correct injection practices, breaking the ampoule without using cotton or gauze, and improper disposal of waste (broken glasses or needles) after completing from the injection and using the single-use vial for multiple patients (Datta et al., 2018).

2.8.5 Medical Waste Management

Medical waste includes liquid waste (such as body fluids and blood), gaseous and solid wastes produced during care to patients in hospitals, medical care institutions, laboratories, drug stores, and human and veterinary medicine clinics. Medical wastes divided into two types are:

1- Regular (non-hazardous) medical waste, similar to household waste, is not dangerous for caregivers. It accounts for 75-95% of all waste, such as office paper, food remnants, and regular waste.

2- Hazardous waste, which constitutes 10-25% of all waste generated in the Hospital, causes high risks for caregivers, patients, and the environment, which may be contagious, toxic or radioactive, or anatomical (International Committee of the Red Cross [ICRC], 2011; Mugabi et al., 2018; Al-Nakkash et al., 2019).

2.8.5.1Types of Hazardous Medical waste

1-Infectious wastes are the wastes that contain or are suspected of containing infectious agents and include materials used for the analysis of infectious diseases in the laboratories, waste of isolated patients, forensic waste and morgues, experimental animals, contaminated cotton and gauze, swabs, and other wastes contaminated with the blood and secretions.

2-Sharp wastes such as syringes, scalpels used in surgery, and broken glasses may cause cuts or prick to the ski

3- Anatomical (pathological) wastes include tissue and other parts of patients' bodies.

4-Chemical wastes are solid or liquid, or gaseous wastes resulting from diagnostic, therapeutic, or experimental or cleaning, disinfection actions, and waste with a high content of heavy metallic elements (mercury, cadmium from some types of spent batteries, and lead).

5-Pharmaceutical wastes include expired medicines and pharmaceuticals, vaccines, and other unused medicines for one reason or another.

6- Waste is solid, liquid, or gaseous waste contaminated with radioactive materials used in checks of human fluids procedures to diagnose and treat tumors and tissue.

7-Toxic wastes are high-risk wastes that can cause mutation or congenital disabilities in the human body or have carcinogenic consequences, including wastes of chemotherapy and fluids of patients who receive chemotherapy.

8-The waste used to handle spills is chemical waste such as disinfectant spills, heavy metals such as mercury spills, and infectious waste such as spills of blood and body secretions (WHO, 2021c).

2.8.5.2 Principles of Medical Waste Management

1)Sorting and separating waste

2)Waste collection.

3)Waste transportation.

4)Waste storage.

5)Waste treatment.

6)Final disposal of waste (CDC, 2015).

All HCW.s must safely dispose of hazardous medical waste to ensure that others are not exposed to the risk of this waste. Where medical waste is sorted at the place of generation by HCW.s and placed in containers or bags of colors designated for the type of waste, in accordance with health protocols and local and national legislation (NICE.2016; MOH, 2012).

2.8.5.3 Medical Waste Color Coding

1)Highly contagious waste- red bag

2)Other infectious, anatomical, and sharps waste-Yellow bag

3)Chemical waste (medicine)- Brown bag

4)Radioactive waste is placed in lead containers to prevent damage

5)Waste chemotherapy- blue bag

6)Non-hazardous medical waste (household)- black bag (MOH/ WHO) 2009 ;MOH., 2012).

2.8.6 Disposal of Sharp Objects

The leading causes of injuries to the healthcare teams and service workers are the incorrect disposal of sharp objects, needles, and broken glasses. This is due to the failure to put sharp objects and needles in the containers designated for them, or containers that are full of sharp objects and are not disposed of, neglect, and some sharp tools forgotten in the patient's linen, which leads to the injury of the cleaning workers. Prevention of injuries from sharp objects achieved by:

1-Single-use needles

2-Avoiding re-cap needles that are used

3-Putting sharp objects in the containers designated for them, preferably close to the patient's bed

4-Avoid putting the hand in a container of sharp objects or waste

5-The containers must be of good quality and puncture-resistant

6-When the containers designated for sharp waste-filled to three-quarters of their size should be changed

7-It is important to educate all HCWs and service workers on how to dispose of sharp objects safely (FDA., 2018; Khalaf, 2009).

2.8.7 Cleaning, Disinfection, and Sterilization

Cleaning, Sterilization, and disinfection of tools, medical devices, and hospital environment are essential in preventing and controlling HCAIs. Improper disinfection and Sterilization of tools and reusable things still happen in many areas and lead to HCAIs. Sterilization and disinfection processes require specific infrastructure equipment and include many steps that need to be correct, from tools collection, receipt from the unit, processing, storage, and distribution throughout the facility. The most common HCAIs due to the reuse of tools that have not been properly disinfected and sterilized are surgical site infections (SSI), hepatitis B and C, Human Immunodeficiency Virus (HIV.) infection, and ventilator-associated pneumonia (VAP) (WHO/ Pan American Health Organization [PAHO], 2016).

2.8.7.1 Classification of Instruments Used for Patient Care

The classification of the risk of infection transmission by instruments is called the "Spaulding Classification." The risk of infection transmission is classified according to the location where the instrument will be used. Instrument contacts can be categorized as critical, semi-critical, or non-critical, as shown below

2.8.7.1. 1 Critical Device:

It comes in contact with sterile body parts, such as blood contact. Various kinds of surgical tools come in contact with blood or other sterile parts of the body, like flexible endoscopes. Therefore, it should be cleaned and sterilized well before reuse according to the Spaulding Classification

2.8.7.1.2 Semi-Critical Device:

It contacts mucous membranes or non-intact skin, such as various endoscopes, anesthesia tools, and respiratory therapy equipment. These tools must at least be cleaned and then disinfected at a high level.

2.8.7.1.3 Non-Critical Device:

It contacts the intact skin, such as blood pressure cuffs or stethoscopes. These devices should be routinely cleaned or disinfected at a low level, and this does not prevent high-level disinfection depending on the risk assessment and the risks that the patient may be exposed to (National IPC Guidelines, Sierra Leone, 2015; WHO/ PAHO, 2016).

2.8.7.2 Cleaning

process of removing odd bodies such as dust and organic matter from tools and surfaces through water and detergents. The cleaning process is the first step before decontamination and purging organic and inorganic substances. If they stay attached to tools or surfaces, they may interact with antiseptics or sterilizers or reduce their effectiveness (CDC, 2008, update: May 2019).

2.8.7.2.1 Recommendations for Cleaning and Verification of Reusable Medical Equipment/ Devices

The cleaning process must be established on the industrialists' directives, in cooperation & consultation with the infection control team. Full PPE must be worn before starting the cleaning process:

1.Medical instruments have to clean well before sterilizer and decontamination, considering factors that may affect the cleaning process.

2. The cleaning process should be following protocols that include dismantling, sorting, soaking, manually or mechanically cleaning, and drying the tools.

3. Separate cleaned items and encode them reliably (e.g., color coding).

4. The materials used in the cleaning process should comply with the manufacturer's instructions.

5. There should be a trained person and specializing in the cleaning process.

6. The cleaning process should be reviewed regularly by professionals (MOH/ WHO, 2009; Ling et al., 2018).

The cleaning process can be done manually or mechanically by mechanical machines designed to perform such a purpose as automatic washing machines, as the mechanical washing machine saves time and reduces effort, and protects workers from pollution during the washing process, but sometimes resorting to manual cleaning is preferred, especially for tools or small equipment And sensitive, which requires special treatment to protect it from scratching or breakage (NIPCG, Singapore, 2017).

2.8.4.3 Disinfection

Disinfection removes minimal infectious agents without the whole Sterilization. It is usually utilized to remove or break down pathogens over equipment that is sensitive to heat or when disposable instruments are not obtainable. It is not a sterilization operation and should not be utilized as a suitable alternative to Sterilization. Some items and methods provide diverse levels of purging. These grades are distributed as follows:

1) Low-Level Disinfection (LLD): it removes bacteria, some fungi, and wrapped viral. It is utilized for non-critical medical tools and several environmental roofs. It includes "hydrogen peroxide 3%, accelerated hydrogen peroxide 0.5%, some quaternary ammonium compounds, and diluted sodium hypochlorite (e.g., bleach) solutions".

2) High-Level Disinfection (HLD): it removes "bacterial, covered viruses, fungi, mycobacteria (e.g., TB), and non-covered viruses" by the utilization of HLD or pasteurization. HLD is utilized for semi-critical medical tools that can't be sterilized. As much as possible, it is preferable to sterilize semi-critical medical devices. HLD includes (glutaraldehyde 2%, hydrogen peroxide 6%, peracetic acid 0.2%, and accelerated hydrogen peroxide 7%). The tools should be cleaned and dried well before starting the disinfection process (MOH, 2012; NIPCG, Singapore, 2017).

The types of disinfection are: calorific (thermal) sanitation is the simplest, most effective, and least expensive disinfection style. it is suitable for tools that can resist heat, as temperatures eliminate the pathogens and may do not need the sterilization process; and The second type is chemical purging, which can be carried out by using a number of chemical disinfectants according to the industrialist's consultation such as alcohols, chlorine compounds, formaldehyde, and hydrogen peroxide. Instruments that have been disinfected must be separated, well packed and stored (CDC, 2008, update: May 2019; Sukhlecha et al., 2015).

2.8.7.4 Sterilization

Sterilization is a necessary and important process before performing surgical interventions, especially interventions that penetrate sterile sites of the body and includes killing all infections, including infectious agents coated with spores and the evaluation process can be performed either by the alchemical or physical method, and it is important before performing the sterilization process must make sure from:

1. The tool or device can withstand this process.
2. Follow the manufacturer's instructions and directions.
3. The instrument or medical device does not require a particular type of Sterilization.
4. Maintain records and dates of sterilization operations and ensure the storage of tools or devices after Sterilization (MOH, 2012).

There are many methods for performing Sterilization, which require specialized people to perform such a procedure. One of these methods is steam Sterilization, the most common and easiest method to use and requires heat and water to perform Sterilization. This method is used for tools that withstand heat and steam, the other method is Sterilization using the heat dry, and that is by using a special oven that generates heat and is used to sterilize minerals and is not suitable for plastics or fabrics. There is also a method of cold Sterilization using chemicals such as glutaraldehyde solution, which is suitable for heat-sensitive elements, and that is by following the manufacturers' instructions for sterilizers and devices to be sterilized (Sukhlecha et al., 2015; Provincial Infectious Diseases Advisory Committee (PIDAC), 2013; MOH/ WHO, 2009).

Medical devices and equipment that connect with sterile tissue, sterile body fluid, or blood are considered critical devices, e.g. (surgical instruments and biopsy forceps). These instruments need a good sterilization process before they are used in order to stop the carriage of contagion to patients (CDC, 2008, update: May 2019).

2.9 Knowledge of Nurses toward Infection Control measures

Knowledge means that nurses have information and facts acquired from their previous study (curriculum) or training courses about controlling infection and preventing its transmission from patients to patients or HCWs or from HCWs to patients. However, the study results in Ibadan, south-west Nigeria, revealed that the Knowledge and practice of healthcare workers about tuberculosis TB infection control were poor. Therefore, this study recommended the importance of training courses for nurses about tuberculosis infection control to increase the Knowledge and skills of nurses on how to control infections; in increment, managers of healthcare facilities must publish clear guidelines and establish a suitable surveillance system for (TBIC) (Akande, 2020).

Another study, According to Olowookere et al. (2015), the study in which nurses' preparedness in the control and management of Ebola Viral Disease (EVD) was assessed, showed a knowledge gap and poor infection control preparedness among respondents. Thus, the Knowledge and practices of nurses toward EVD. Need improvement. The WHO Update (2014) states that the occurrence of fatal infections such as severe acute respiratory syndrome (SARS) and viral hemorrhagic fevers (e.g., Ebola Viral Disease) highlights the serious need for effective infection control practices in health care. Failure to apply infection control measures leads to the transmission of infection, and healthcare settings can act as amplifiers of disease in the course of outbreaks, with a bearing on both Hospital and public health (Chitimwango, 2017).

2.9.1 Adequate Knowledge toward Infection Control

Adequate Knowledge means the nurses have good information about preventing and controlling infections and can implement infection control measures correctly in healthcare settings. For example, about adequate Knowledge, in 2014, a study was conducted to assess the sources of Knowledge and information of nursing students on controlling health care infection and standard precautions, where the results about Knowledge were acceptable. The results of students' Knowledge about handwashing were high (adequate). The curriculum was the primary source of students' information and knowledge (Ghalya & Ibrahim,2014).

2.9.2 Inadequate Knowledge toward Infection Control

Non-compliance to implement infection control measures leads to the spread of infectious agents in hospitals and makes them pumps for diseases during the epidemic stage. They have harmful consequences for public health and hospitals. According to the World Health Organization, there have been significant gaps in nurses' Knowledge during the previous decades, and the application of infection control measures, especially in places with limited resources, has become deeper (WHO, 2016c).

The results of assessing the Knowledge, attitudes, and practices among nurses of post-exposure prevention from AIDS at Jigme Dorji Wangchuk National Referral Hospital, Bhutan, revealed that nurses' Knowledge was so low (inadequate) that 80% had poor Knowledge about PEP. from AIDS. This study recommended training courses for nurses regarding PEP. To improve and increase all nurses' Knowledge and practices to know how to deal with this infection and prevent themselves and others from it (Tshering et al.,2020).

Critical care nurses must protect critically ill patients against infection. The study was performed to assess critical care nurses' Knowledge and evaluate their practice regarding infection control standard precautions. The study reviewed that two-thirds (63.6%) of the studied sample had unsatisfactory Knowledge levels. Hence, recommendations were made to update critical care nurses' Knowledge and performance through continuing in-service educational programs (Eskanderl et al., 2013).

Abou El-Enein and El Mahdy (2011) determined the degree to which nurses applied standard precautions regarding hand hygiene and personal protective equipment in a dialysis unit. The study reviewed that less than half of the nurses (47.1%) correctly knew that they had to wash their hands before and after caring for a patient

Sessa et al. (2011) assessed the level of Knowledge, attitude, and practice regarding disinfection procedures among nurses in Italian hospitals. The study indicated that the level of Knowledge, particularly of the most common HAIs, was not satisfactory and a small percentage of nurses reported that they appropriately perform the disinfection in their working activity. Therefore, Sessa and colleagues recommended HAIs control and training programs to address shortfalls and improve Knowledge and adherence to procedures and HAIs prophylaxis and management for patient safety and reducing HAIs.

Another study was conducted to assess healthcare personnel's Knowledge, attitude, and practices concerning the transmission of pathogens via Fomites. The results showed a large gap between the Knowledge about fomites acting as vectors in the spread of pathogens and practices to minimize this spread (Aftab et al., 2016)

2.10 Attitudes of Nurses toward infection Control

Attitudes mean how nurses think, feel, and behave about infection control and prevention. Despite the knowledge that the hands of HCWs play an essential role in the transmission of healthcare-associated infections if their contaminated and handwashing reduces the spread of infectious agents, healthcare workers' compliance with handwashing was poor (Chitimwango,2017).

A study was conducted to assess the Knowledge, attitude, and practice of HCWs regarding nosocomial infections and prevention; the results revealed that 43% (less than half) of HCWs have positive attitudes toward HAIs and prevention (Mohandass et al., 2021).

Another study was conducted to describe healthcare providers' Knowledge and attitudes towards infection control measures. The results of the study revealed that the providers of healthcare had moderate Knowledge and practices, and most of the staff had positive attitudes toward infection control measures; therefore, the study recommended training courses for the H.C.W.s to know how can prevent themselves and patients from HAIs (Lobo et al., 2019).

Standard precautions are practices followed by HCWs with all patients infected or not while receiving healthcare. Standard precautions aimed to break the chain of infections. A previous study was conducted to assess nurses' Knowledge, attitudes, and practices regarding Standard Precautions against nosocomial infections in teaching hospitals in Zabol, Iran. The results revealed that (43%) of nurses had poor attitudes, 37% had moderate attitudes, and 33% had good attitudes, while (43) % had poor Knowledge and (42) % had moderate practice. Compliance with the application of Standard precautions is vital to prevent the spreading of infections to patients and HCWs (Sarani et al., 2016).

According to a study titled "Self-Reported Use of Personal Protective Equipment among Chinese Critical Care Clinicians during 2009 H1N1 Influenza Pandemic,". The results showed that the Chinese health care workers' commitment to self-protection equipment was 55% during pandemic influenza. It showed the positive attitudes through the high commitment of health care providers to wear personal protective equipment, while the negative attitudes were the very weak commitment of HCWs towards personal protective equipment. Hand washing is the essential standard to prevent infections in all healthcare institutions (Hu et al., 2012).

Non-compliance with hand hygiene among HCWs leads to an increase in the risk of infections. In a study conducted in India to assess the Knowledge, attitudes, and practices of handwashing among nursing and medical students, most medical students have moderate Knowledge and negative attitudes. However, the nursing students had better Knowledge, attitudes, and practices than the medical students regarding hand hygiene (Nair et al.,2014).

2.10.1 Positive Attitudes toward infection Control

Nurses' positive attitudes lead to promising findings in preventing healthcare-associated infections among HCWs and patients in healthcare settings. A study was conducted to assess the Knowledge, attitudes, and practices of HCWs regarding infection prevention. It revealed that the HCWs had good Knowledge and positive attitudes but fewer practices in Northern Red Sea region hospitals regarding infection control measures. This study recommended training courses to the team and provided all requirements for PPE., written recommendations to prevent the spreading of infectious agents, and emphasis on wearing personal protective equipment by the manager (Tesfai et al., 2020).

Another study was conducted in Italy to assess nurses' levels of Knowledge, attitudes, and practices about disinfection procedures. It revealed that nurses had good Knowledge and highly positive attitudes and recommended planning to increase the prevention and control of infections through educational programs to increase their Knowledge and enhance their attitudes and practices (Sessa et al., 2011).

2.10.2 Negative Attitudes toward infection Control

Negative attitudes toward infection control and prevention lead to infections from the Reservoir to susceptible hosts. The study was conducted in Oman to measure nursing students' Knowledge, attitudes, and practices in Colleges of Nursing at Sultan Qaboos University (S.Q.U.), Nizwa, and Buraimi University toward infection control and prevention. It showed that the Knowledge and practices of most students were good, but their attitudes were negative. Based on the study results, the recommendations included encouraging and teaching students to adhere to personal protective equipment to prevent infections (ALHinaai, 2021).

According to the study conducted in a tertiary hospital of western India to assess healthcare workers' Knowledge, attitudes, and practices regarding disinfection and sterilization procedures. It revealed that the Knowledge and practices of HCWs were poor, and their attitudes were negative; this led to an increase in the transmission of infections due to non-compliance of HCWs with infection control measures; therefore, the staff needs additional training to know the correct procedures of sterilizations and disinfections (Sukhlecha et al., 2015).

2-11 Infection Control Committee

A health care facility has a moral duty to provide a safe environment for its patients. The infection control committee investigates hospital-acquired or nosocomial infections and seeks to prevent or control them. This committee is of the most important hospital committees which should be established in all hospitals. (Jane, 2013).

Purpose of Infection Control Committee

1-The committee’s purpose is to ratify the infection control team's ideas and disseminate infection control information.

2-The committee provides political support that empowers the infection control team to implement infection control policies.

3-helps the hospital in fulfilling the duty of providing a safe environment for the patients. (Jane, 2013).

The role of the Infection Control Committee is very multi-faceted. It should be involved in planning, monitoring, evaluating, updating, and educating. In addition, it sets a general infection control policy and provides input into specific infection control issues. Simply stated, its function is to prevent and control. (Farrah, 2010).

Members of the committee should be staff from a variety of departments. For example, it might include some or all of the following (infection control nurse, nurse, doctor, or doctor working in the operating room) responsible for sterilizations (Muluken et al.,2013).

Nosocomial infection control is accomplished in a variety of ways, some of which include: surveillance of nosocomial infections, product evaluation, investigation of infection outbreaks and infection clusters, development of infection control procedures for all departments, staff and patient education, medical waste management, everyone knows that infection control is the responsibility of all healthcare workers. Patients and employees are only safe from infectious processes when everyone follows good infection control techniques. (Farrah, 2010).

2.12 previous studies

First study

(Abuduxike et al., 2020) They conducted a cross-sectional study in a teaching hospital in Northern Cyprus to assess healthcare workers' knowledge, attitude, and practice toward standard precautions. A purposive sampling of 233 healthcare workers (nurse, doctor, physiotherapist, pharmacist, scientist of laboratory, paramedic, administrator, driver, and staff of cleaning) in departments of (emergency, cardiac, surgery, pediatric, obstetrics and gynecology, and the operating room they were selected for the study. The results indicated that 57% of the participants (male and female) had satisfactory knowledge, more than 37% had positive attitudes, and more than 30% had good practices regarding standard precautions. However, the results showed that there was little commitment to standard precautions. Therefore, the study recommended training programs for HCWs depending on the profession and the risk of infection exposure.

Second study

(Raheem & Muhbes.,2021)Infection control is an important procedure, and measures should be applied and followed in various departments of hospitals, especially in the Emergency Department, by the healthcare team and the nurses who are in contact with the patients with infectious diseases. The study assessed the nurses' knowledge and attitudes regarding infection control measures. A descriptive, cross-sectional study was conducted in the Emergency Department at AL-Diwaniyah Teaching Hospital. The current study started from (27 September/ 2020) to (13 June/ 2021) on a non-probability (purposive) sample consisting of (100) nurses. Data were collected by administering self-report questionnaires to nurses. (13) experts obtained the validity of the questionnaire. A pilot study was conducted to determine the instrument's stability and reliability. The questionnaire consisted of three parts; the first part was the demographic characteristics of the participants. The second part was assessment of nurses' knowledge regarding infection control measures. The third part was assessment of nurses' attitudes regarding infection control measures. (70%) of the participants were males, (71%) received training courses regarding infection control. (49%) of nurses had moderate knowledge, and (75%) had positive attitudes regarding (ICMs). There was a relationship between the nurses' knowledge and attitudes and an association between the nurses' knowledge and attitudes regarding infection control measures and some demographic data at $p \leq 0.05$. The study recommended continuing to provide training courses for nurses about (ICMs). to improve the nurses' knowledge.

Third study

(Nasiri et al., 2019) They conducted cross-sectional studies investigating nurses' knowledge, attitudes, and practices regarding infection control and prevention measures. They were 18 studies conducted with (4577) nursing students at the end stage and staff nurses in Iran, Jordan, India, and other countries. In most studies, the nurses have good knowledge (n = 10, 40%-90%) and positive attitudes (n = 4, 37%-100%), but most studies show moderate and bad practices toward infection control and prevention measures. The studies recommended training courses regarding standard precautions and infection control. Training the beginners in the employment, developing the infrastructure to improve policies and standards related to control of nosocomial infection, to enhance and increase nurses' knowledge, attitudes, and practices.

Fourth study

(Hussein et al., 2017) Conducted a cross-sectional study among 271 HCWs at Wolaitta Sodo Otona Teaching and Referral Hospital in Ethiopia, assessing the HCWs' knowledge, attitudes, and practices regarding infection control measures by administering the self-report questionnaire. The results of the study declared that more than (93%) of the participants had positive attitudes; however, (6.6%) had negative attitudes, more than (99%) had good knowledge, and (0.7%) had weak knowledge, while more than (60%) had a good practice, and (39.5%) had bad practices regarding infection control and prevention. In addition, this study found that training and working in multiple departments have a great relationship with infection prevention and control practices, while educational level and job description have nothing to do with that. Therefore, the study recommended monitoring the practice of HCWs towards infection control measures and prepare of them to follow the rules, guidelines, protocol, regulations, and training courses to improve the level of practice.

Fifth study:

(Wahba,2016)Nosocomial Infections (N.I.) occur worldwide, affecting both developed and developing countries and ranking as a major killer of patients of all ages. The study aimed to assess the nurses' Knowledge, attitude, and practice regarding infection control in operating rooms in Port Said Hospitals; the Research Design: a descriptive correlation study design was used in hospitals of three different health care sectors (general, private, and health insurance) in Port Said city. Sample: Tools and Procedure: Data were collected using three tools. The first tool, a questionnaire sheet, comprises two parts; the first includes personal and job characteristics, and the second covers the nurses' Knowledge about infection control in operating rooms. The second tool includes the nurses' attitudes scale about infection control in operating rooms. The third tool is an observation checklist to evaluate the nurses' practice regarding hospital infection. The study revealed that most of the studied nurses had good Knowledge (80%), while most had unacceptable attitudes (70%). As regards their practice, about half of them (52%) had inadequate practice regarding infection control. It can be concluded from the present study that studied nurses had good Knowledge and unacceptable attitudes, and about half had inadequate practice regarding infection control in operating rooms. The study recommended that continuous training programs, conferences, and seminars about infection control are needed to improve nurses' Knowledge that can be translated into good practices and positive attitudes.

Sixth study:

(Ogoina et al., 2015) Conducted a cross-sectional study among 290 participants from healthcare workers (doctors, nurses, scientists of laboratory, and officers of house) in Nigeria in two tertiary hospitals to describe the HCWs' knowledge, attitudes, and practices regarding infection control measures by administering the self-report questionnaire. The results of this study showed that all participants were 290. (111 (38.3%) doctors, 147 (50.7%) nurses and 32 (11%) scientists of laboratory). The total level of the median knowledge and attitudes towards infection control measures were over (90%), and the median practices score was (50.8%); the result of HCWs' knowledge was poor safety injection practices, and they complained of insufficient resources to the application of infection control measures. Officers of the house, scientists of the laboratory, and junior nurses declared a lower level of knowledge and compliance with measures of infection control in comparison with professional doctors and nurses. The study recommended setting up specialized infection control committees in hospitals in Nigeria and conducting educational courses for health care workers to prevent and control infection, especially for junior nurses, to limit transmission of infections.

Chapter Three

Methodology

Chapter Three

Methodology

The researcher describes and presents the essential characteristics of the study methodology in this chapter, including the research design, administrative arrangements, ethical considerations during data collection, study setting, sample, study instrument, preliminary study (pilot test), and statistical approach.

3.1 Design of the Study

A descriptive, cross-sectional study was conducted in operating rooms at AL-Hilla Teaching Hospitals on a group of nurses. The study started from the period (19 th September / 2021 to 13 th June 2022).

3.2 Administrative Arrangements

The first approval was obtained from the College of Nursing, University of Babylon, Department of Graduate Studies, to conduct this study after presenting the objectives and significance. As well as the approval of the official Research Ethics Committee for the questionnaire was obtained on 18 th January and on 27 th January. The official approval was received from Babylon Health Directorate, the Centre for Training and Development Staff then, and then the approval was sent to Al-Hilla Teaching Hospitals (Appendix A).

3.3 Ethical considerations through the data collection

Ethical Considerations are essential to protect the rights of persons regarding the collected data confidentiality and promote the professional study conducted; the following ethical issues are applied depending on:

1-Voluntary Agreement of the participants.

2- Respect the exclusiveness of the participants

3-Phrasing the questions is accessible and understandable according to the educational level of nurses and cultural background.

3.4 Setting of the Study

The study was conducted in the Operating rooms at Al-Hilla Teaching Hospitals, used as a rich field to collect data; these operating rooms were distributed as the following:

3.4.1 Operating Rooms in Babylon teaching Hospital for Maternity and pediatric

It is the first hospital in Al-Hilla city, established in (1959) as a general hospital related to community needs; it was assigned as a maternity and children's hospital in (1985), with a capacity of (400) beds. A surgical unit specializing in maternity and obstetric surgical intervention is located on the ground floor of Babylon teaching hospital for maternity and children. According to the statistical department in this hospital, the total number of surgeries was (7,197) in 2020 and (7,168) in 2021. The physical structure of this unit includes the following areas:

1. Changing room and bathroom
2. Administration and restroom
3. There are four operating rooms for maternity and gynecological procedures, plus two operating rooms for children's surgery.
4. Central sterile supplement department (CSSD) furniture with one autoclave and one oven for dry sterilization, including a storage area.

3.4.2 Operating rooms in Al-Imam Al-Sadiq Teaching Hospital

This hospital was established in (2017) with a capacity of (400) beds. Which specializes in general operation and gynecological surgeries; the unit extends between the second and third floor; it is content (8) general operating rooms while (3) operating rooms for gynecological surgeries; according to the hospital statistical department, the total surgeries performed during the year 2020 and 2021 were 3,595 and 5,359. The physical structure of the area contains the following:

1. Changing room and bathroom.
2. Operating rooms

3. Administration and restroom
4. bathroom located away from the sterile area A central sterilization department is a large unit separated from the operating room on the first floor, which can be reached by a sterile lift assigned for transporting the sterile package. In contrast, the other lift is assigned to transport the un-sterile package; this department contains the following areas:

1. Public area doorways and corridors.
2. Changing room and restroom.
3. Dirty area for receiving used surgical equipment.
4. The working zone includes (Clean area for Inspection, assembly, packing, and sterilization of equipment).
5. Storage for packages.

3.4.3. Operating Room in Al- Hilla Surgical Teaching Hospital

The hospital started to receive the Babylonian citizen in (1972), with a capacity of (447) beds. The operating room, which was assigned as general surgery rooms, were distributed between the first and the second floor as (6) rooms on each floor; the statistical department of the hospital reached (15,283) surgical procedures in the year 2020 and (14,834) operations in the year 2021 , the following area included these units:

1. Staff changing rooms and bathrooms.
2. Administrator room and restroom.
3. Operating rooms.
4. Small sterilization room.

3.5. Sample of The Study

A non-probability (purposeful) sample of (200) nurses was selected based on some criteria to assess their knowledge and attitudes toward infection control measures; they were chosen from operating rooms from night and morning shifts in Al-Hilla Teaching Hospitals distributed as follows:

Table (3-1) Distribution of sample

Name of the Hospital	Total No. of OR nurses	Number of participants	Out of Sample
Babylon teaching for Maternity and pediatric hospital	55	41	14
Al-Imam Al-Sadiq teaching hospital	104	79	25
Al- Hilla teaching hospital	107	80	27
Total number	266	200	66

3.5.1. Inclusion Criteria

1- Nurses who agreed to participate in the study.

2-Both gender of nurses, male and female, at least, they have one year of experience.

3-Nurses who work in operating rooms in both shifts, night and morning.

3.5.2. Exclusion Criteria

The sample that was excluded from the study is:

1-The nurse who did not complete the answers to the questionnaire questions.

2- Nurses who refused to participate in this present study.

3- Nurses participated in a pilot study

3.6. Instrument of The Study

The researcher constructed the instrument from many previous studies and publications to meet the objectives of the present study, and it comprises three components (Appendix B), comprising the following:

3.6.1 Part I: Demographic Data

This part is constituted from (7) elements that include demographical data of the nurses (age, gender, educational level, years of experience, years of experience in operating rooms, training courses related to infection control, and marital status).

3.6.2 Part II: Assessment of Nurse's Knowledge toward Infection Control Measures in operating rooms.

This part consists of (45) questions as an MCQ questionnaire. All knowledge questionnaire items have been classified into two categories of an answer, "correct and incorrect," this part is divided into six domains that include

1-General Nurses' knowledge related to hospital-acquired infections (HAIs) and their prevention (12) questions.

2- Nurses' Knowledge related to hand hygiene (5) questions.

3- Nurses' Knowledge related to Personal Protective Equipment (PPE) (6) questions.

4- Nurses' Knowledge related to safe handling of equipment and instruments (8) questions.

5- Nurses' Knowledge related to sterilization and disinfection (8) questions.

6- Nurses' Knowledge related to waste management (6) questions.

3.6.3 Part III: Assessment of Nurses' Attitudes toward Infection Control Measures in operating rooms.

This part deals with nurses' attitudes toward infection control measures consisting of 25 items. These items are measured in a 3-level type Likert scale (agree, neutral, and disagree).

3.7 Rating and Scoring:

The following patterns were used for rating and scoring the items:

1-Two scales are used in the knowledge for rating the items. The items rated as (correct and incorrect), the levels of the scale scored as (2) for correct, and (1) for incorrect.

2-Three Likert scales were used to rate the items as agree, neutral, and disagree. The three points are scored in positive items as (1) for disagree, (2) for neutral, and (3) for agree, in negative items as (1) for agree, (2) for neutral, and (3) for disagree.

3.8 Pilot Study

A non-probability (purposive) sample of (20) male and female nurses was selected from operating rooms of AL-Hilla Teaching Hospitals and carried out from (February 3 to February 10/ 2022) who agreed to participate in this study. The sample of the pilot study was excluded from the primary study sample. The participants of nurses were exposed to tests and retests.

3.8. The Purposes of the Pilot Study Were to:

1- Evaluate the study instrument's stability and reliability.

2- Identify the standard time required to fill out the instrument by the nurse during the self-report.

3- Determine the difficulties that faced the nurses in questions about the instrument during data collection.

3.9 Validity of Questionnaire

The validity of the questionnaire was obtained by reviewing the questionnaire by (25) experts to estimate the clarity and relevance of the questionnaire about nurses' knowledge and attitudes toward infection control measures in operating rooms. Multidisciplinary are field experts in nursing college from Babylon University (9) experts, Baghdad University (2), Karbala University(4) experts, Dhi-Qar University(1) expert, Al-Kufa

University (3) experts, Ninwa University(1)and (2) experts from the republic of Egypt(Mansoura University(1)expert, El Mina University(1)expert, In addition to 3 physicians with a doctorate in community medicine (one from the Iraqi University / College of Medicine, / one from Hilla College / University and the other from Basra University of Oil and Gas with an experience of more than (10) years in their domain. A deep review occurred of the questionnaire, and some changes were performed according to their opinions (appendix C). Alterations occurred to some items, and the Likert-type scale was used according to the experts' suggestions with attitudes, while MCQ scale was used with knowledge.

3.10 Reliability of the Questionnaire:

The reliability of the study instruments means making sure that the answer will be almost the same if it is repeatedly applied to the same people at different times. The same people the second time, after confirming the apparent validity of the study tool, the researcher applied it to a random exploratory sample of 20 nurses composed of 10% of the original sample where the members of this sample were later excluded from the original sample on which the final study was conducted. Reliability coefficient using the tested coefficient of Alpha Cronbach as shown below.

Table3-1: Reliability of the Studied Questionnaire (*n=20*)

No	Variables	Items	Alpha Cronbach	Accepted Value	Assessment
1-	Knowledge	45	0.73	0.70	Accepted
2-	Attitude	25	0.87	0.70	Accepted

3.11 Methods of Data Collection

The data was collected using the instrument filled by the nurses after acquiring the institution's permission. The researcher takes oral and written agreement from each nurse to participate in this study (Appendix B). The time to answer the instrument's questions with each participant takes about

(25- 35) minutes. The data was collected from the date (12 th February to 17 th March /2022).

3.12 Methods of Statistics Data Analysis

In order to statistically analyze the data collected from the study sample to arrive at the results, the researcher used the SPSS version (24) and Microsoft Excel (2016) program to analyze this data and deal with it statistically, to find the relationships between the variables, and obtain the final results of the research based on a set of statistical tests.

3.12.1 Descriptive approach

Descriptive statistics includes a set of mathematical and statistical methods adopted to describe the main features of data quantitatively by using tables and charts. Descriptive statistics always aim to present and describe the data required to be processed, organized, summarized, and categorized, and presenting them makes it easier for the recipient to recognize and understand its content. The analysis was performed through the use:

A. Statistical tables "Frequencies and percent" which are:

$$\% = \frac{\boldsymbol{Frequency}}{\boldsymbol{Sample\ Size}}\ x100$$

B. Mean of scores "*M*±."

The average score can be calculated by using the following:

$$M.S = \frac{\sum \mathrm{ri} = 1\mathrm{Fi\ x\ Si}}{\sum \mathrm{ri} = \ 1\mathrm{Fi}}\ x100$$

<u>For Knowledge Scores</u>

The overall responses according to a total mean of a score which follows:

M= 45-60 refers to Poor knowledge.

M=61-75 refers to Fair Knowledge.

M=76-90 refers to Good Knowledge.

For Attitudes Scores

The overall responses according to the total mean of a score which follows:

M= 25-41 refers to Negative Attitudes.

M=42-58 refers to Neutral Attitudes.

M=59-75 refers to Positive Attitudes.

C. Standard Deviation test $\pm SD$.

$$SD = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(Xi - \bar{\chi})^2}$$

D. It uses a correlational coefficient "Cronbach alpha" used in estimating the internal consistency of the study tool, which can be calculated by using the following:

E. $$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{K}\sigma_{ii}}{\sum_{i=1}^{K}\sum_{j=1}^{K}\sigma_{ij}}\right]$$

3.12.2Inferential approach

1.One Way ANOVA

Analysis of variance (ANOVA) for equality of Means (testing for coincidence when the mean's parameter is different).

Source of variance	Sum of square	d.f	Mean square	F
Between Groups	$SS_B = \sum \frac{(\sum xP1)^2}{n} - \frac{(\sum xP)^2}{n}$	$df_B = K\text{-}1$	$\frac{MS\beta}{MS\beta}$	$\frac{MSB}{MSW}$
Within Groups	$SS_w = \sum \frac{(\sum xP1)^2 \quad (\sum xP)^2}{\bar{N}}$	$df_w = N\text{-}k$	$\frac{SSw}{DFw}$	
Total	$SS_T = \sum (\sum xP1)^2 \quad \frac{(\sum xP)^2}{\bar{N}}$	$df_t = N\text{-}1$		

2. Sample Independent t-test

The Independent Samples *t-Test* compares the means of two independent groups to determine whether there is statistical evidence that the associated population means are significantly different.

$$t = \frac{\mu_A - \mu_B}{\sqrt{\left[\frac{\left(\Sigma A^2 - \frac{(\Sigma A)^2}{n_A}\right) + \left(\Sigma B^2 - \frac{(\Sigma B)^2}{n_B}\right)}{n_A + n_B - 2}\right] \cdot \left[\frac{1}{n_A} + \frac{1}{n_B}\right]}}$$

$(\Sigma A)^2$: Sum of data set A, squared (Step 2).
$(\Sigma B)^2$: Sum of data set B, squared (Step 2).
μ_A: Mean of data set A (Step 3)
μ_B: Mean of data set B (Step 3)
ΣA^2: Sum of the squares of data set A (Step 4)
ΣB^2: Sum of the squares of data set B (Step 4)
n^A: Number of items in data set A
n^B: Number of items in data set B

Shortcuts for measuring importance compared to the level are used as follows:

(1) NS: *Non significantly at probability-value>0.05.*

S: *Significantly at probability*

3. Spearman's Correlation Coefficient This test is used for qualitative variables

$$P = 1 - \frac{6 \sum d2\,i}{\eta\,(\eta 2 - 1)}$$

Chapter Four

Results of the Study

Chapter Four

Results of the Study

Under the objectives of the current study findings, the descriptive and inferential statistic approach is organized in tables and figures that include the followings:

Table 4-1: Descriptive Statistic of Socio-Demographic Variables

SDVs	Classification	Freq.	%
Age/years (*M± SD= 27.79±4.18*)	21-25 years	60	30.0
	26-30 years	107	53.5
	31-35 years	11	5.5
	≥35 years	22	11.0
	Total	200	100.0
Gender	Male	86	43.0
	Female	114	57.0
	Total	200	100.0
Marital status	Single	84	42.0
	Married	116	58.0
	Total	200	100.0
Education level	School nursing	23	11.5
	Diploma nursing	65	32.5
	Bachelors	112	56.0
	Total	200	100.0
Years of experience	<5 years	104	52.0
	5-10 years	73	36.5
	>10 years	23	11.5
	Total	200	100.0
Experience in current workplace	<5 years	173	86.5
	5-10 years	27	13.5
	Total	200	100.0
Number of training courses	No	89	44.5
	1-2 sessions	81	40.5

	>2 sessions	30	15.0
	Total	200	100.0

The finding shows participants' age, the mean age is 27 (±*4.18*), and the age 25-30 years old were recorded as the highest percentage (*n=107*; 53.5%). Regarding gender, more than half of the studied sample were female nurses (n=114; 57%) compared with those who were male. In marital status-related findings, nurses exhibited married (n=116; 58%) compared with those still single. Respected to the education level, the bachelor' nurses composed the highest percentage (*n= 112;* 56%). Years of experience associated findings, the nurses had <5 years of experience in the nursing profession and their current workplace (*n=104*; 52%) and (*n=173*; 86.5%), respectively. In terms of training courses, it is obvious from the findings that the nurses no attend training sessions (*n=89*; 44.5%).

4-2. Assessing Nurses' Knowledge toward Infection Control Measures

Table 4-2-1. Nurses Knowledge related to General Information about Hospital Acquired Infections

List	General information of HAI Items	Responses	Freq.	%	*MS±SD*	*Ass.*
1	Nosocomial infection is the infection that the patient acquires while entering the hospital and appears after the passage	Incorrect	117	58.5	*1.41±0.493*	*Fair*
		Correct	83	41.5		
		Total	200	100.0		
2	The purpose of infection control measures	Incorrect	60	30.0	*1.70±0.459*	*Pass*
		Correct	140	70.0		
		Total	200	100.0		
3	The first essential component of infection control	Incorrect	70	35.0	*1.65±0.478*	*Fair*
		Correct	130	65.0		
		Total	200	100.0		
4	An essential link in the chain of transmission	Incorrect	125	62.5	*1.37±0.485*	*Fair*
		Correct	75	37.5		
		Total	200	100.0		
5	Which of the following is helpful for the prevention of hospital-acquired infections	Incorrect	76	38.0	*1.62±0.486*	*Fair*
		Correct	124	62.0		
		Total	200	100.0		
6	General standard precautions for infection control	Incorrect	56	28.0	*1.72±0.450*	*Pass*
		Correct	144	72.0		
		Total	200	100.0		
7	The path of entry of microorganisms into the host body	Incorrect	102	51.0	*1.49±0.501*	*Fair*
		Correct	98	49.0		
		Total	200	100.0		
8	The most important and most common infection causative agents in health care institutions	Incorrect	138	69.0	*1.31±0.463*	*Fail*
		Correct	62	31.0		
		Total	200	100.0		
9	Which of the following paragraphs is true regarding the source of hospital-acquired infection	Incorrect	54	27.0	*1.73±0.445*	*Pass*
		Correct	146	73.0		
		Total	200	100.0		
10	The most common types of infections associated with health care in operating theatres units	Incorrect	104	52.0	*1.48±0.500*	*Fair*
		Correct	96	48.0		
		Total	200	100.0		
11	Wounds of the intestines, gallbladder, mouth, and esophagus	Incorrect	122	61.0	*1.39±0.488*	*Fair*
		Correct	78	39.0		
		Total	200	100.0		
12	Vaccinations are available to prevent	Incorrect	96	48.0	*1.52±0.500*	*Fair*
		Correct	104	52.0		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)"

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed fair responses regards knowledge related to general information of hospital-acquired infection as indicated by moderate mean scores at all studied items except items number (6 and 9) the responses were passed as indicated by higher mean scores and nurses fail to answer the *"causative agents in health care institutions*" as indicated by low mean scores.

Table 4-2-2: Overall Nurses Knowledge related to General Information about Hospital Acquired Infections

HAI Knowledge	Freq.	%	*M ± SD*
Poor (*M=12-16)*	51	25.5	*18.4±2.56*
Fair (*M=17*-20)	101	50.5	
Good (*M=21*-24)	48	24.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (50.5%) of nurses expressed fair knowledge related to general information about hospital-acquired infection at an average of *18.4* (±*2.56*).

Table 4-2-3.Nurses Knowledge related to Hand Hygiene

List	Hand Hygiene Items	Responses	Freq.	%	*MS±SD*	*Ass.*
1	Routine hand washing using soap and water takes time	Incorrect	89	44.5	*1.55±0.498*	*Fair*
		Correct	111	55.5		
		Total	200	100.0		
2	Surgical hand washing takes a period	Incorrect	71	35.5	*1.64±0.479*	*Fair*
		Correct	129	64.5		
		Total	200	100.0		
3	When should hands be washed using disinfectants (alcoholic solution)	Incorrect	131	65.5	*1.34±0.476*	*Fair*
		Correct	69	34.5		
		Total	200	100.0		
4	The most effective strategy for reducing healthcare-associated infections	Incorrect	175	87.5	*1.12±0.331*	*Fail*
		Correct	25	12.5		
		Total	200	100.0		
5	The "first moment" in "The Five Moments of Hand Hygiene."	Incorrect	122	61.0	*1.39±0.488*	*Fair*
		Correct	78	39.0		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)"

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed fair response regards knowledge related to hand hygiene as indicated by moderate mean scores at all studied items, except nurses fail to answer the "*effective strategy for reducing healthcare-associated infections*" as indicated by low mean scores.

Table 4-2-4: Overall Nurses Knowledge related to Hand Hygiene

Hand Hygiene Knowledge	Freq.	%	*M ± SD*
Poor (*M=5*-6)	59	29.5	*7.06±0.943*
Fair (*M=7-8*)	133	66.5	
Good (*M=9-10*)	8	4.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (66.5%) of nurses expressed a fair level of knowledge related to hand hygiene at an average of *7.06*(±*0.94*).

Table 4-2-5. Nurses Knowledge related to Personal Protective Equipment

List	PPE Items	Responses	Freq.	%	*MS±SD*	*Ass.*
1	Disposable gloves for profound interference and penetration of the body's defenses such as the skin, mucous ..	Incorrect	103	51.5	*1.48±0.501*	*Fair*
		Correct	97	48.5		
		Total	200	100.0		
2	Used during routine measures that may lead to clothing pollution	Incorrect	120	60.0	*1.40±0.491*	*Fair*
		Correct	80	40.0		
		Total	200	100.0		
3	If the glove is torn during work, the following must be done	Incorrect	127	63.5	*1.36±0.482*	*Fair*
		Correct	73	36.5		
		Total	200	100.0		
4	The mask used to protect health care providers from the potential risk of exposure of the mucous membranes ..	Incorrect	159	79.5	*1.20±0.404*	*Fail*
		Correct	41	20.5		
		Total	200	100.0		
5	The correct order of removal of PPE	Incorrect	165	82.5	*1.17±0.380*	*Fail*
		Correct	35	17.5		
		Total	200	100.0		
6	Gloves must be worn before placing the urinary catheter	Incorrect	136	68.0	*1.32±0.467*	*Fail*
		Correct	64	32.0		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)."

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed fair to fail responses regards knowledge related to personal protective equipment as indicated by moderate to low mean scores first 3 and last 3 items, respectively.

Table4-2-6: Overall Nurses Knowledge related Personal Protective Equipment

Personal Protective Equipment Knowledge	Freq.	%	*M ± SD*
Poor (*M=6-8)*	108	54.0	*7.95±1.16*
Fair (*M=9-10*)	84	42.0	
Good (*M=11-12*)	8	4.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (54%) of nurses expressed a poor knowledge of personal protective equipment at an average of *7.95* (±*1.16*).

Table 4-2-7.Nurses Knowledge related to Safe Handling of Equipment and Tools

List	Safe Handling of Equipment and Tools Items	Responses	Freq.	%	MS±SD	Ass.
1	When cleaning tools by hand, it is recommended to wash them well underwater to prevent	Incorrect	184	92.0	*1.08±0.271*	*Fail*
		Correct	16	8.0		
		Total	200	100.0		
2	The humidifier of the artificial ventilator must be changed	Incorrect	142	71.0	*1.29±0.454*	*Fail*
		Correct	58	29.0		
		Total	200	100.0		
3	It is preferable first when exposed to a needle prick injury or a wound with any sharp object	Incorrect	140	70.0	*1.30±0.459*	*Fail*
		Correct	60	30.0		
		Total	200	100.0		
4	Contaminated tools are immersed after surgical procedures in chlorine 5.0 solution	Incorrect	162	81.0	*1.19±0.393*	*Fail*
		Correct	38	19.0		
		Total	200	100.0		
5	Routine cleaning of tools and surfaces should be carried out wearing an apron and gloves	Incorrect	173	86.5	*1.13±0.342*	*Fail*
		Correct	27	13.5		
		Total	200	100.0		
6	Respiratory tubes used if contaminated or not working for the same patient	Incorrect	134	67.0	*1.33±0.471*	*Fail*
		Correct	66	33.0		
		Total	200	100.0		
7	After performing surgeries, the hollow tubes and suction tools must be sterilized using..	Incorrect	149	74.5	*1.25±0.436*	*Fail*
		Correct	51	25.5		
		Total	200	100.0		
8	Which of the following chemicals can destroy and corrode surgical instruments	Incorrect	151	75.5	*1.24±0.431*	*Fail*
		Correct	49	24.5		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)"

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed a fail response regards knowledge related to general safe handling of equipment and tools, as indicated by low mean scores at all studied items.

Table 4-2-8:Overall Nurses Knowledge related to Safe Handling of Equipment and Tools

Safe Equipment Knowledge	Freq.	%	*M ± SD*
Poor (*M=8-10)*	140	70.0	*9.82±1.70*
Fair (*M=11-13)*	54	27.0	
Good (*M=14-16)*	6	3.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (70%) of nurses expressed poor knowledge related to safe handling of equipment and tools at an average of *9.82* (*±1.70*).

Table 4-2-9.Nurses Knowledge related to Sterilization and Disinfection

List	Sterilization and disinfection Items	Responses	Freq.	%	*MS±SD*	*Ass.*
1	Medical sterilization refers to	Incorrect	171	85.5	*1.14±0.352*	*Fail*
		Correct	29	14.5		
		Total	200	100.0		
2	Removing and destroying harmful organisms to a minimum so that the tools and equipment are safe for use	Incorrect	142	71.0	*1.29±0.454*	*Fail*
		Correct	58	29.0		
		Total	200	100.0		
3	Sterilized packages using a steam sterilizer (autoclave) often become contaminated after	Incorrect	166	83.0	*1.17±0.376*	*Fail*
		Correct	34	17.0		
		Total	200	100.0		
4	Which of the following is considered one of the chemical disinfection methods?	Incorrect	157	78.5	*1.21±0.411*	*Fail*
		Correct	43	21.5		
		Total	200	100.0		
5	Disinfection and sterilization are considered	Incorrect	179	89.5	*1.10±0.307*	*Fail*
		Correct	21	10.5		
		Total	200	100.0		
6	The main factors on which steam sterilization depends are?	Incorrect	130	65.0	*1.35±0.478*	*Fair*
		Correct	70	35.0		
		Total	200	100.0		
7	The easiest way to sterilize is sterilization	Incorrect	158	79.0	*1.21±0.408*	*Fail*
		Correct	42	21.0		
		Total	200	100.0		
8	The temperature required for (sterilization) by dry heat is…….	Incorrect	143	71.5	*1.28±0.452*	*Fail*
		Correct	57	28.5		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)"

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed fail responses regards knowledge related to sterilization and disinfection as indicated by moderate mean scores at all studied items except items number (6); the responses were fair, as indicated by moderate mean scores.

Table 4-2-10: Overall Nurses Knowledge related to Sterilization and Disinfection

Sterilization and Disinfection Knowledge	Freq.	%	*M ± SD*
Poor (*M=8-10)*	126	63.0	*9.77±2.19*
Fair (*M=11-13)*	63	31.5	
Good (*M=14-16)*	11	5.5	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (63%) of nurses expressed a poor level of knowledge related to stylization and disinfection at an average equal *to 9.77*(*±2.19*)

Table 4-2-11. Nurses Knowledge related to Medical Waste Management

List	Medical Waste Management Items	Responses	Freq.	%	*MS±SD*	*Ass.*
1	Highly infectious waste is placed in a plastic bag or container of a color	Incorrect	99	49.5	*1.50±0.501*	*Fair*
		Correct	101	50.5		
		Total	200	100.0		
2	Infectious and acute wastes shall be placed in a container or plastic bag of a color	Incorrect	83	41.5	*1.58±0.493*	*Fair*
		Correct	117	58.5		
		Total	200	100.0		
3	Non-hazardous medical waste shall be placed in a container or plastic bag of a color	Incorrect	82	41.0	*1.59±0.493*	*Fair*
		Correct	118	59.0		
		Total	200	100.0		
4	Which of the following is true regarding handling the syringe and needle after use	Incorrect	139	69.5	*1.30±0.461*	*Fail*
		Correct	61	30.5		
		Total	200	100.0		
5	In the event of an error in placing hazardous medical waste in the bag or package not intended for it	Incorrect	113	56.5	*1.43±0.497*	*Fair*
		Correct	87	43.5		
		Total	200	100.0		
6	The best way to wrap the needle after use	Incorrect	120	60.0	*1.40±0.491*	*Fair*
		Correct	80	40.0		
		Total	200	100.0		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (Fail=1-1.33, Fair=1.34-1.67, Pass ≥1.68)"

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed a fail response regards knowledge related to medical waste management as indicated by moderate mean scores at all studied items except items number (5) were fair.

Table 4-2-12:Overall Nurses Knowledge related to Medical Waste Management

Medical Waste Management Knowledge	Freq.	%	*M ± SD*
Poor (*M=6-8)*	73	36.5	*8.82±1.28*
Fair (*M=9-10*)	106	53.0	
Good (*M=11-12*)	21	10.5	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (53%) of nurses expressed a fair knowledge related to medical waste management at an average of *9.77*(±*2.19*).

Table 4-2-13: Overall Nurses Knowledge related to Infection Control Measures

Nurses Knowledge	Freq.	%	*M ± SD*
Poor (*M=45-60)*	79	39.5	*61.82±5.03*
Fair (*M=61-75*)	121	60.5	
Good (*M=76-90*)	0	0.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (60.5%) of nurses expressed a fair level of knowledge toward infection control measures at an average of *9.77*(±*2.19*).

Figure 4-1: overall Nurses Knowledge towards Infection Control Measures

Table4-3-1.Nurses' Attitudes toward Infection Control Measures

List	Attitudes Items	Rating	No.	%	M S±SD	Ass.
1	The hospital-acquired infection leads to severe consequences	Disagree	20	10.0	*2.68±0.646*	*Positive*
		Neutral	23	11.5		
		Agree	157	78.5		
2	Healthcare-associated infections can be reduced by vaccination	Disagree	26	13.0	*2.63±0.703*	*Positive*
		Neutral	21	10.5		
		Agree	153	76.5		
3	Nurses must follow infection control measures in operating rooms at all times.	Disagree	24	12.0	*2.36±0.688*	*Positive*
		Neutral	79	39.5		
		Agree	97	48.5		
4	Infection control measures play an essential role in protecting health care workers.	Disagree	12	6.0	*2.76±0.551*	*Positive*
		Neutral	24	12.0		
		Agree	164	82.0		
5	Increasing workloads on nurses lead to an increased risk of healthcare-related infections.	Disagree	20	10.0	*2.63±0.659*	*Positive*
		Neutral	34	17.0		
		Agree	146	73.0		
6	Hand washing tools are not always available	Disagree	35	17.5	*2.40±0.770*	*Positive*
		Neutral	49	24.5		
		Agree	116	58.0		
7	The use of alcohol in hand hygiene may lead to irritation and dryness of the hands.	Disagree	22	11.0	*2.53±0.686*	*Positive*
		Neutral	49	24.5		
		Agree	129	64.5		
8	Washing hands reduces the possibility of transmission of infection	Disagree	19	9.5	*2.71±0.629*	*Positive*
		Neutral	19	9.5		
		Agree	162	81.0		
9	There is no need to wash hands when using gloves.	Disagree	108	54.0	*1.71±0.842*	*Neutral*
		Neutral	42	21.0		
		Agree	50	25.0		
10	Sometimes, nurses forget to wash their hands.	Disagree	71	35.5	*2.00±0.847*	*Neutral*
		Neutral	57	28.5		
		Agree	72	36.0		
11	Wearing a mask is not necessary when the nurse provides health care to patients in the operating rooms.	Disagree	120	60.0	*1.56±0.754*	*Negative*
		Neutral	48	24.0		
		Agree	32	16.0		
12	Gloves are constantly available when needed in the operating rooms.	Disagree	71	35.5	*2.02±0.856*	*Neutral*
		Neutral	54	27.0		
		Agree	75	37.5		
13	Participation of nurses in training courses on infection control procedures to reduce acquired infections	Disagree	38	19.0	*2.51±0.795*	*Positive*
		Neutral	22	11.0		
		Agree	140	70.0		
14	Wearing personal protective equipment is not considered an infection control measure	Disagree	125	62.5	*1.59±0.821*	*Negative*
		Neutral	32	16.0		
		Agree	43	21.5		
15	Gloves are used to reduce transmission of infection	Disagree	44	22.0	*2.41±0.828*	*Positive*
		Neutral	29	14.5		
		Agree	127	63.5		

16	Sterilization instructions in operating rooms are necessary	Disagree	22	11.0	*2.71±0.652*	*Positive*
		Neutral	13	6.5		
		Agree	165	82.5		
17	Sterilization of equipment and tools is necessary to prevent infection	Disagree	19	9.5	*2.71±0.629*	*Positive*
		Neutral	19	9.5		
		Agree	162	81.0		
18	Health care providers always wash their hands with disinfectant before and after touching the pt.	Disagree	26	13.0	*2.61±0.706*	*Positive*
		Neutral	25	12.5		
		Agree	149	74.5		
19	Nursing staff needs training courses in sterilization and disinfection	Disagree	16	8.0	*2.76±0.584*	*Positive*
		Neutral	15	7.5		
		Agree	169	84.5		
20	Management of medical waste reduces the risk of infection spreading	Disagree	31	15.5	*2.63±0.738*	*Positive*
		Neutral	12	6.0		
		Agree	157	78.5		
21	Separation of medical waste is not necessary	Disagree	121	60.5	*1.63±0.845*	*Negative*
		Neutral	31	15.5		
		Agree	48	24.0		
22	Medical waste does not lead to environmental risks	Disagree	158	79.0	*1.36±0.737*	*Negative*
		Neutral	11	5.5		
		Agree	31	15.5		
23	Implementation of a safe waste disposal system will increase the workload	Disagree	109	54.5	*1.75±0.888*	*Neutral*
		Neutral	31	15.5		
		Agree	60	30.0		
24	Not all hospital staff should be vaccinated against hepatitis A, B, C, and D	Disagree	159	79.5	*1.33±0.696*	*Negative*
		Neutral	15	7.5		
		Agree	26	13.0		
25	It is not necessary to vaccinate all hospital workers with Covid vaccine 2019	Disagree	151	75.5	*1.36±0.680*	*Negative*
		Neutral	26	13.0		
		Agree	23	11.5		

"(MS) Mean of Scores, (SD) Standard deviation, Level of Assessment (negative≤1.66, Neutral=1.67-2.33, Positive ≥2.34)."

In terms of statistical mean and standard deviation, this table demonstrated that the nurses expressed neutral to positive responses regarding attitudes towards infection control measures as indicated by moderate to high mean scores at all studied items except items number (21, 22, 24 and 25) were negative attitudes as indicated by low mean scores.

Table 4-3-2: Overall Nurses Attitudes towards Infection Control Measures

Attitudes	Freq.	%	*M* ± *SD*
Negative (*M=25-41)*	8	4.0	*55.43±8.12*
Neutral (*M=42-58*)	132	66.0	
Positive (*M=59-75*)	60	30.0	
Total	200	100.0	

M: Mean for total score, SD=Standard Deviation for total score

Findings demonstrated that (66%) of nurses expressed a neutral attitude towards infection control measures at an average of *55.43* (±*8.12*).

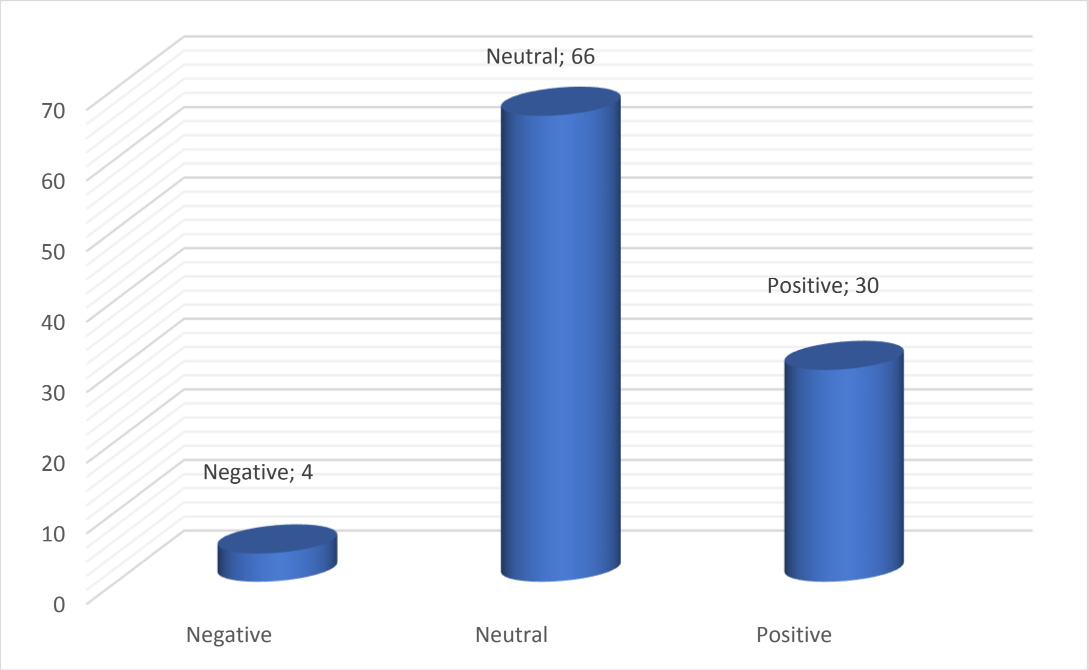

Figure 4-2: Overall Nurses Attitudes towards Infection Control Measures

4.4. Significant Differences in Nurses Knowledge and Attitudes regarding their Socio-Demographic Variables

Table 4-4-1: Statistical Differences in Nurses Knowledge and Attitudes with regards to their Age (*n=200*)

Age	Source of variance	Sum of Squares	d.f	Mean Square	F	*$p \leq 0.05$*
Knowledge	Between Groups	.078	3	.026	2.106	.101
	Within Groups	2.411	196	.012		
	Total	2.488	199			
Attitudes	Between Groups	.695	3	.232	2.235	.085
	Within Groups	20.318	196	.104		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic

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Findings demonstrated no significant differences in nurses knowledge (p=0.101) and attitudes (p=0.085) towards infection control measures with regard to their age groups.

Table 4-4-2: Statistical Differences in Nurses Knowledge and Attitudes with regards to their Gender (*n=200*)

Variables	Gender	Mean	SD	t-value	d.f	*p≤ 0.05*
Knowledge	Male	1.41	.123	4.261	198	*.001*
	Female	1.34	.093			
Attitudes	Male	2.25	.284	1.393	198	*.165*
	Female	2.18	.351			

SD: Standard deviation, t: t-test, d.f: Degree of freedom, p: Probability value.

Findings demonstrated significant differences in nurses knowledge and their gender (*t=4.261; p=0.001*); and no significant differences in attitudes (*t=1393; p=0.165*).

It is observed that male nurses are significantly associated with improved knowledge of infection control measures (Fig. 4-3).

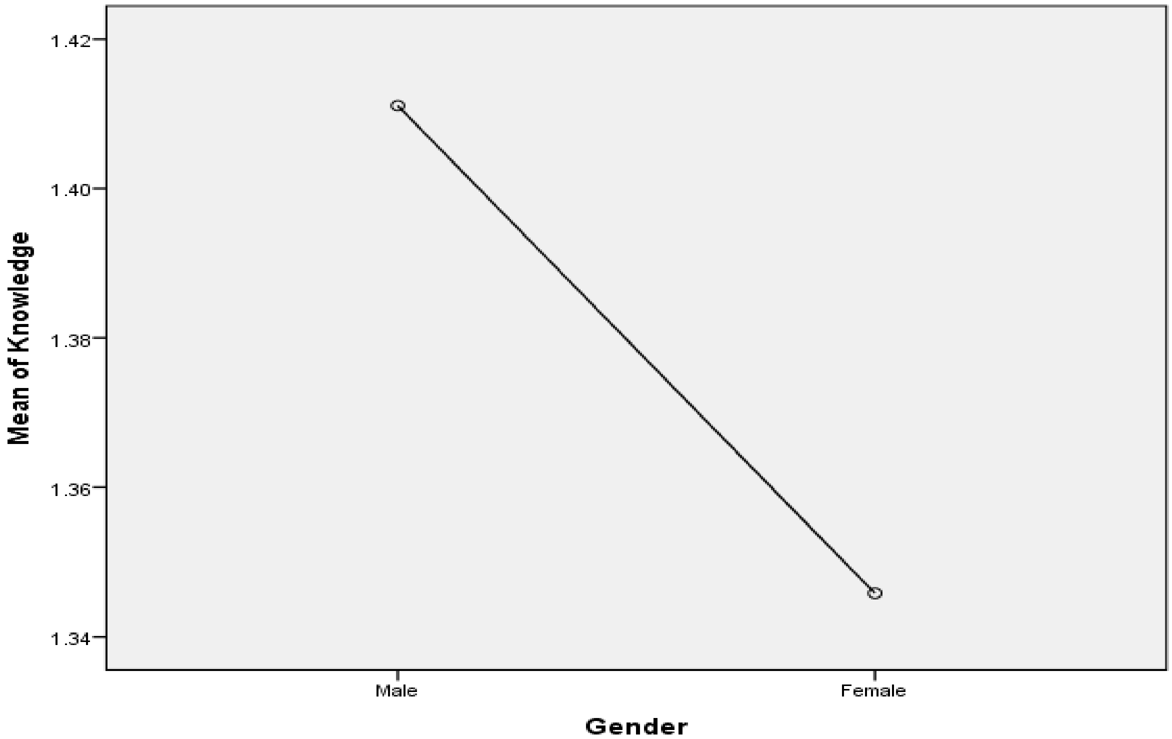

Figure 4-3: Distribution of Nurses Knowledge according to Gender

Table 4-4-3: Statistical Differences in Nurses Knowledge and Attitudes with regards to their Marital Status (*n=200*)

Marital Status	Source of variance	Sum of Squares	d.f	Mean Square	F	*p≤ 0.05*
Knowledge	Between Groups	.002	1	.002	.122	.727
	Within Groups	2.487	198	.013		
	Total	2.488	199			
Attitudes	Between Groups	.005	1	.005	.045	.831
	Within Groups	21.008	198	.106		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic

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Findings demonstrated that there were no significant differences in nurses knowledge (*p=0.727*) and attitudes (*p=0.831*) towards infection control measures with regard their marital status.

Table 4-4-4: Statistical Differences in Nurses Knowledge and Attitudes with regards their Education Level (*n=200*)

Education Level	Source of variance	Sum of Squares	d.f	Mean Square	F	*p≤ 0.05*
Knowledge	Between Groups	.161	2	.080	6.802	.001
	Within Groups	2.328	197	.012		
	Total	2.488	199			
Attitudes	Between Groups	1.076	2	.538	5.318	.006
	Within Groups	19.937	197	.101		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic.

Findings demonstrated significant differences in nurses knowledge (p=0.001) and attitudes (p=0.006) towards infection control measures with regard to their education level.

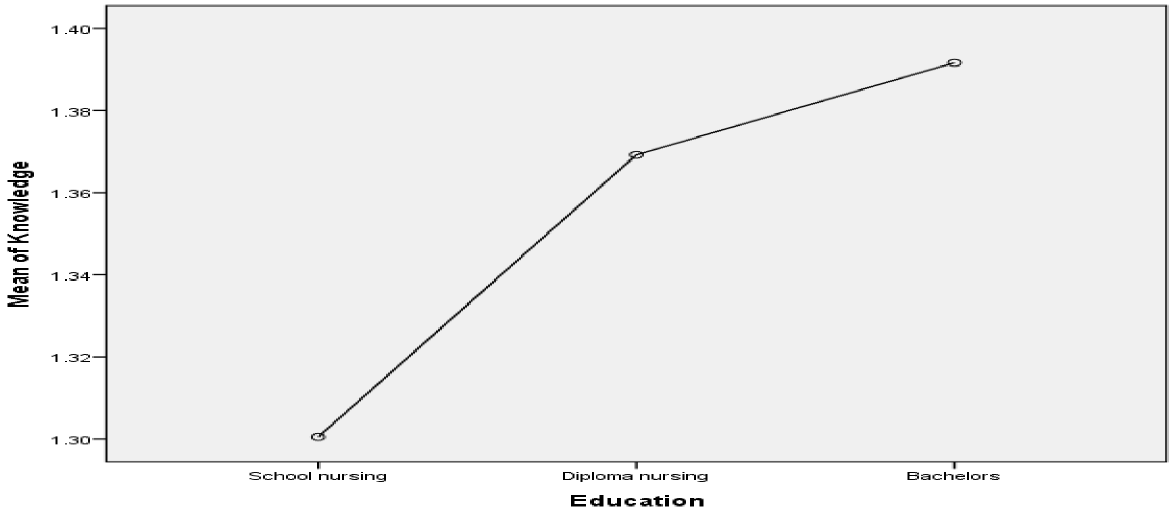

Figure 4-4: Distribution of Nurses Knowledge according to Education level

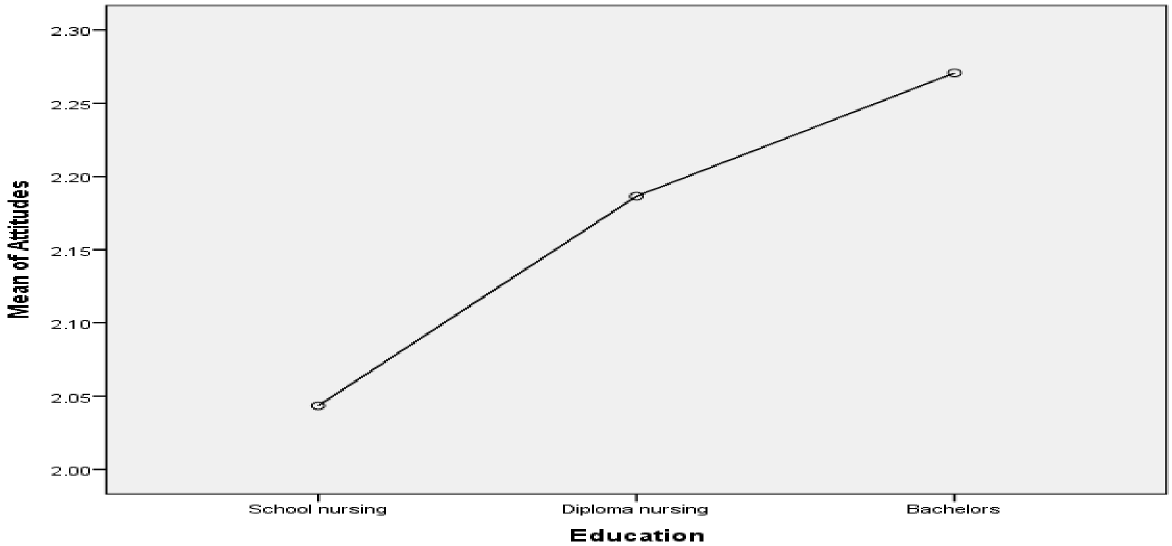

Figure 4-5:Distribution of Nurses Attitudes according to Education level

Table 4-4-5: Statistical Differences in Nurses Knowledge and Attitudes with regards their Years of Experience (*n=200*)

Years of Experience	Source of variance	Sum of Squares	d.f	Mean Square	F	*p≤ 0.05*
Knowledge	Between Groups	.499	2	.250	24.720	.001
	Within Groups	1.989	197	.010		
	Total	2.488	199			
Attitudes	Between Groups	.449	2	.224	2.150	.119
	Within Groups	20.564	197	.104		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic.

Findings demonstrated significant differences in nurses knowledge (p=0.001); and no significant differences in attitudes (p=0.119) towards infection control measures with regard to their years of experience.

The differences in favour of those with>10 years of experience are associated with higher mean knowledge scores (Fig. 4-6).

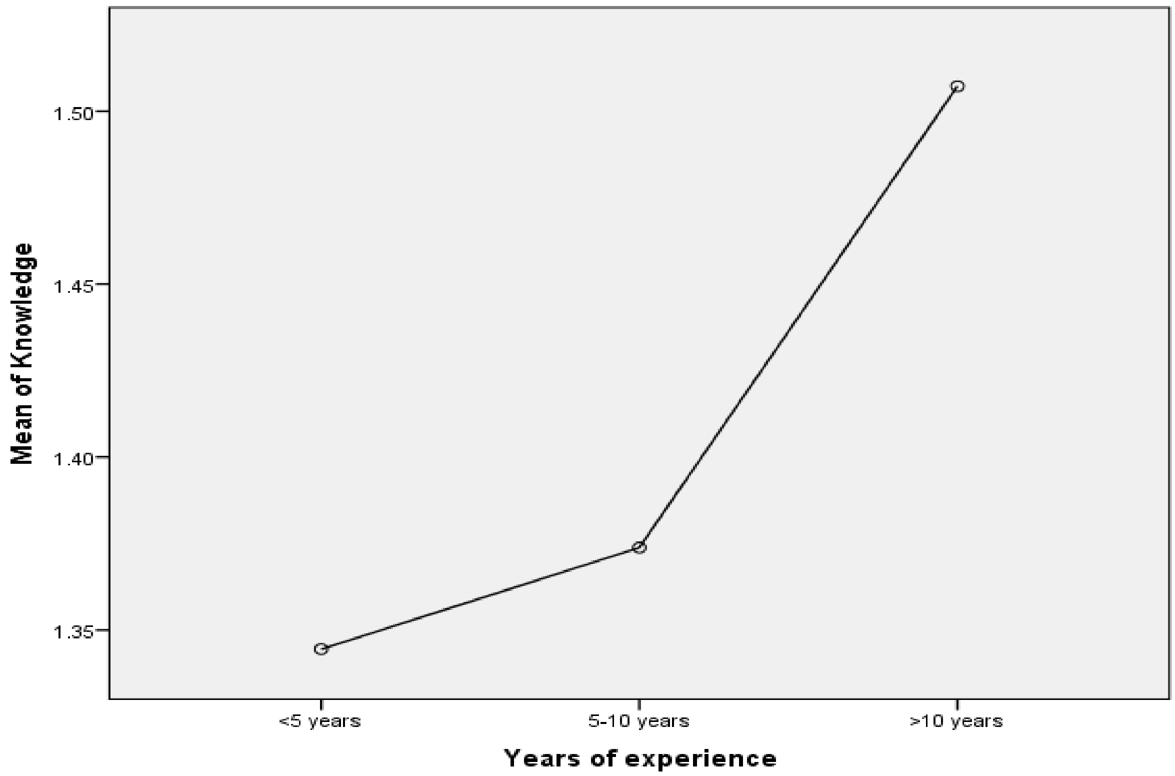

Figure 4-6: Distribution of Nurses Knowledge according to Years of Experience

Table 4-4-6: Statistical Differences in Nurses Knowledge and Attitudes with regards their Experience in Current Workplace (*n=200*)

Current Experience	Source of variance	Sum of Squares	d.f	Mean Square	F	*p≤ 0.05*
Knowledge	Between Groups	.007	1	.007	.592	.443
	Within Groups	2.481	198	.013		
	Total	2.488	199			
Attitudes	Between Groups	.055	1	.055	.522	.471
	Within Groups	20.958	198	.106		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic.

Findings demonstrated no significant differences in nurses knowledge (p=0.443) and attitudes (p=0.471) towards infection control measures with regard to their experience in the current workplace.

Table 4-4-7: Statistical Differences in Nurses Knowledge and Attitudes with regards their Number of Training Courses (*n=200*)

Number of Training Courses	Source of variance	Sum of Squares	d.f	Mean Square	F	*p≤ 0.05*
Knowledge	Between Groups	.859	2	.430	51.953	.001
	Within Groups	1.629	197	.008		
	Total	2.488	199			
Attitudes	Between Groups	.449	2	.225	2.153	.119
	Within Groups	20.563	197	.104		
	Total	21.013	199			

d.f: Degree of freedom, F: F-statistic.

Findings demonstrated significant differences in nurses knowledge (p=0.001), and no significant differences in attitudes (p=0.119) towards infection control measures with regard to their number of training courses.

We see that the nurses who attended more than 2 sessions significantly increased their knowledge of infection control measures (Fig. 4-7).

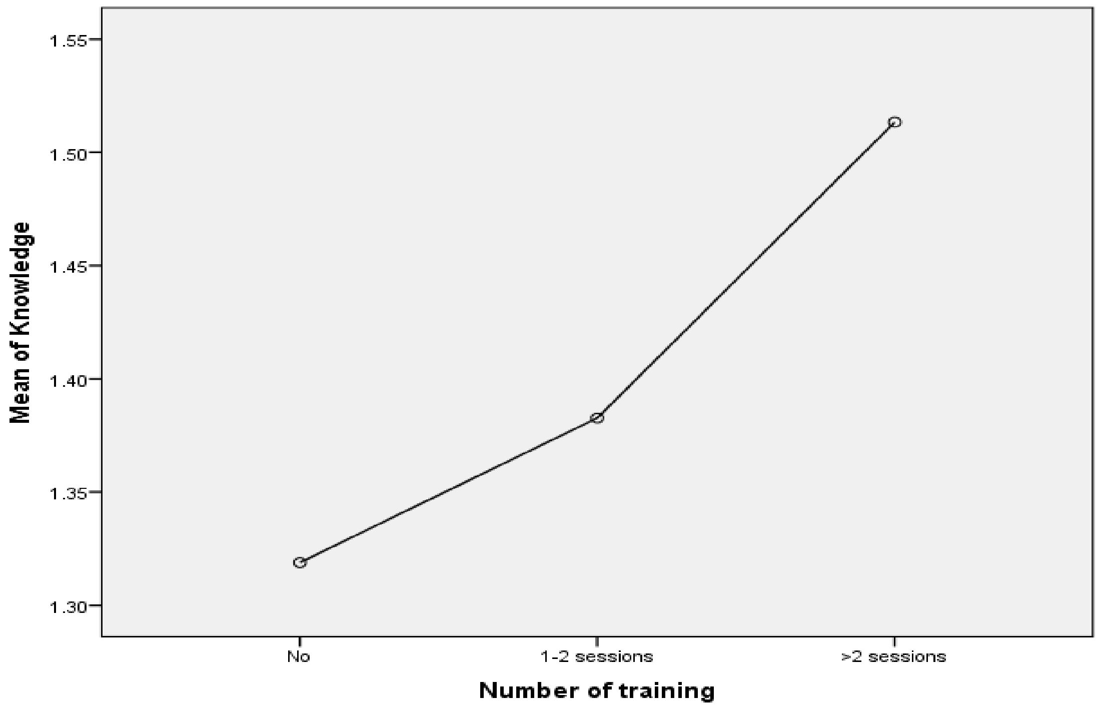

Figure 4-7: Distribution of Nurses Knowledge according to Number of Training Courses

Table 4-5. Correlation between Nurses Knowledge and their Attitudes towards Infection Control Measures (*n=200*)

Knowledge			
Attitudes	*Spearman's rho*	*.014*	Positive-Sig.
	Sig. (2-tailed)	*.041*	
	N	*200*	

Findings exhibit a significant correlation (positive) between nurses knowledge and their attitudes (*r=0.014; p=0.041*).

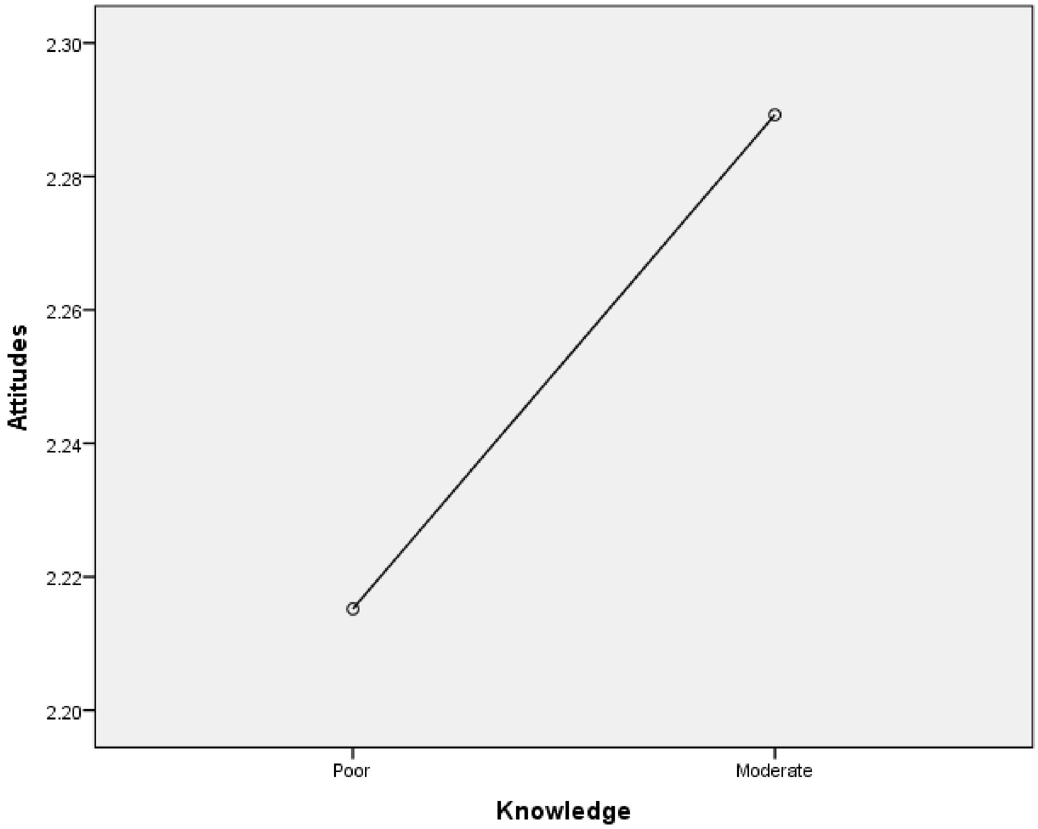

Figure 4-8: Distribution of Nurses Knowledge according to their Attitudes

Chapter Five

Discussion of the Study Results

Chapter Five

Discussion of the study Results

In this chapter, the researcher interpreted and discussed the study's results according to the study's objectives. These results are supported by previous and similar studies and the literature review to assess the nurses' knowledge and attitudes regarding infection control measures

5.1. Socio-Demographical Data of The Study Sample.

The study was conducted in operating rooms at Al-Hilla Teaching Hospitals; in (table 4.1), the finding shows that the participants' age; the mean age is 27 (±*4.18*), and the Age 25-30 years old were recorded as the highest percentage (*n=107*; 53.5%) of the study sample(200) this finding illustrates the policy of the higher health authorities to employ new graduates to fill the shortage of nursing staff, and also because most of the sample members hold a Bachelor's degree in Nursing. The findings of the present study are consistent with a study conducted by (Desta et al., 2018), who found that (52%) of the study sample is in the age group (24-30) years. In contrast, a study was conducted by (Hassan & Muhbes, 2020); their results showed that the age of participants was (20-24); they constituted (38%) of the whole sample. in, Trinidad and Tobago, a study done by (Unakal et al., 2017) shows that the lowest percentage was recorded (1.3%) among participants less than 20 years old.

According to Gender, more than half of the study sample were female nurses (n=114; 57%) compared with males who constitute (n=76; 43%). The majority of the sample were females because most of the nurses working in the operating rooms were females. These findings are in the same line as the study (Wahba.,2016). To assess the knowledge, attitudes, and practices of nurses in operating rooms in Port Said hospitals in the Arab Republic of Egypt, the study showed that most of the study sample was female (96%) compared with male(4%), while, the results of a study conducted by (Rajih, 2020), who found that most of the participants were males (56%), and the remaining were females (44%).

According to marital status, about 58% (116) nurses were married compared to those still single; the result comes because most of these age groups are the age of marriage, especially after the completion of the study and appointment in the field of nursing. After graduating from study and finding employment opportunities, the Iraqi young take the side of marriage.; these results disagreed with the study of (Adekanle et al., 2015), who reported that the number of married nurses was less than the number of unmarried. Also, a study done by (Desta et al., 2018) found that (56%) of participants were single.

According to educational level, there are three educational levels because these levels are only in operating rooms. The results declared that the Bachelor's nurses composed the highest percentage (n= 112; 56%) of the total sample. Because of the presence of many nursing colleges and the presence of evening and morning studies in them, Where the College of Nursing was established in Babylon in 2007 and contained morning and evening studies, from which about 1,400 graduates have graduated in addition to most nurses who have a preparatory certificate and diploma, they have completed their studies in nursing colleges. The operating rooms are also considered one of the main places for their work according to the instructions of the Ministry of Health. These results of our study are equivalent to a study by (Fashafsheh et al., 2015), which mentioned that most of the study sample (55.4%) graduated from nursing college. also, a study was conducted in ICU at Al-diyania teaching hospital, which found that (64%) of the nursing staff had bachelor's degree in nursing(Rajih,2020); on the other hand, a study conducted by (AL-Salih et al., 2018) noticed that nursing secondary school had the major percentage (55%).

Concerning years of experience in operating rooms revealed that most of half of the study sample (n=173;86.5%) had (1-5) years; this may be because most of the participants in the study sample are young whose ages range between 25-30 years; this study agreed with the study conducted by (Lam et al., 2020) were showed that (58.3 %) of the nurses had experience from (1-5) years, these results were the higher according to years of nurses' experience in the workplace.

In the table (4.1) (104;52%), the participants have experienced less than five years in the field of nursing, which illustrates the employment of new graduate nurses' staff.; these results of the study are supported by a study conducted by (Rajih, 2020) which noticed that more than half of his study sample (60%) had experience(1-3) years. on the other hand, the results of a study did not equivalent to the result of the study conducted in the operating room of the General Surgery Department of Benha University Hospitals and Benha Teaching Hospital in Egyptian (Ahmed et al., 2020), which found that more than half (56.7%) of the nurses have an experience from (6-10) years.

Moreover, the findings revealed that (n=89;44.5%) of the total sample have no training course while (n=81;40.5%) have (1-2) sessions and (n=30;15%)have more than two sessions course about infection control in order to achieve infection prevention and control in operating rooms and to save themselves and the patients, In order to achieve the success and continuity of health institutions in providing the best services to patients by the application of infection control measures. These results disagreed with the findings of a study by (Uchenna et al. (2015) that revealed that most participants (65.5%) did not receive training courses in infection control.

5.2. Assessing nurses' Knowledge toward Infection Control Measures

5.2.1. Overall Nurses' Knowledge related to General Information about Hospital Acquired Infections

According to the table (4.2.2), more than half of nurses (50.5%) expressed moderate level of knowledge related to general information about hospital-acquired infections (HAIs) at an average *of 18.4* (±*2.56*); this results may be due to most of the study sample are newly appointed and not have enough experience about this topic.

The current results supported by the study (AL-Salih et al, 2018) showed that the nurses had bad to moderate or passed knowledge toward nosocomial infections. On the other hand, in a study conducted by (Rajih, 2020), the results of this study disagreed with the current study, which showed that most nurses had good knowledge after receiving an educational program

5.2.2. Overall Nurses' Knowledge related to Hand Hygiene.

According to table (4.2.4), the Findings demonstrated that (66.5%) of nurses expressed a moderate level of knowledge related to hand hygiene at an average equal *to 7.06*(±*0.94*). The current study comes along with a study carried out by (Nedelcu et al., 2020), which reported that the nurses' knowledge of HAIs and hand hygiene was inadequate. Needed improvements as well as Another study conducted by (Kabir et al., 2018) in a tertiary care hospital in Dhaka city; the result of this study supported the present study, which declared that the nurses' hand hygiene practice was poor due to insufficient knowledge. In contrast, results of another study conducted in Tehran (Iran) by (Ghadmgahi et al. 2011) disagree with the current study; they discovered that the majority of nurses had good knowledge, (45.5%)

had intermediate knowledge, and about (6.7%) was had weak knowledge related to hand washing.

5.2.3. Overall Nurses' Knowledge related to Personal Protective Equipment

According to the table (4.2.6), the Findings verified that more than half of the nurses (54%) expressed a poor level of knowledge related to personal protective equipment at an average of *7.95* (±*1.16*). This may be because of the weak role of continuing nursing education in hospitals in providing lectures and training courses about PPE.

The present study's findings were approved with the results obtained from the previous study conducted in Saudi Arabia by AL-Saleh et al. (2014); they reported that the healthcare workers had a significant lack of knowledge regarding using personal protective equipment. In contrast, The finding of our study did not look similar to the study conducted by (Baniyousef et al., 2015), in which their results revealed that the total score of nurses' knowledge about personal protective equipment was acceptable; this may be due to the inclusion of this information in previous study curriculum; Also, the study carried out by (Kerity & Naji, 2017). They found that the Knowledge of HCWs was excellent after providing the educational program, and the reason for these results because that the program is succeeding in raising the level of knowledge related to PPE for HCWS staff.

5.2.4 Overall Nurses' Knowledge related to Safe Handling of Equipment and Tools

According to table (4.2.8), the Findings discovered that (70%) of nurses expressed a poor level of knowledge related to safe handling of equipment and tools at an average equal *to 9.82* (±*1.70*). The present study results appeared in this way, perhaps due to the nurses' lack of attention and follow-up and several educational levels in the study sample.

The finding of our study is in the same line as the result of a study conducted by(Sahiledengle,2019) which illustrated that (50.9) of nurses had unacceptable practices due to insufficient knowledge. While a study conducted by (Sessa et al., 2011) stated that (96.4) of the nurses had a high level of knowledge related to Safe Handling of Equipment and Tools may be due to the presence of many training courses and increased interest of nurses in this field.

5.2.5 Overall Nurse's Knowledge related to Sterilization and Disinfection

The majority of nurses (63%) expressed poor knowledge regarding sterilization and disinfection at an average of *9.77*(±*2.19*). As seen in the table (4.2.10). This may be because the nurses' information was insufficient, the different educational levels, and the lack of training courses for disinfection and sterilization.

These results came along with a study carried out by (Bhandari & Bande, 2016) that supported the current results, which revealed that the nurses' knowledge regarding sterilization and disinfection was more than other HCWs; however, it was insufficient and needed improvement. and therefore, should organize regular lectures, conferences, or meetings to improve the situation. also, in another study, Sukhlecha et al., 2015, demonstrated that healthcare workers' knowledge efficiency and attitudes about sterilization and disinfection were insufficient and related to inadequate instruction to healthcare workers; in-service training is required to improve knowledge and update the information about sterilization and disinfection. There is a need to sensitize and motivate new healthcare staff through lectures and hands-on training that can be imparted in workshops. Therefore, the orientation activities aimed to raise awareness and develop knowledge for new workers Providing guidelines and policy information about their responsibilities may be beneficial. In contrast, the results of the present study did not show similar to the study finding conducted by (Kerity

& Naji. 2017)to evaluate the Knowledge and Practices of Health care Workersers' toward Infection Control at Primary Health Care Centers in Holy Karbala City, which found that 96% of participants had excellent knowledge related to Sterilization and Disinfection after applying for an education program. And this may be because of the quality of this education instruction provided to participants, and it is role important in improving knowledge regarding infection.

5.2.6 Overall Nurses' Knowledge related to Medical Waste Management

In Tables (4-2-12). Findings show that (53%) of nurses expressed a moderate level of knowledge related to medical waste management at an average of *9.77*(±*2.19*). These results appeared in this way because of the founding different educational levels in the study, lack of experience for participants in a study, or may be because there are no training courses, especially on medical waste management.

The present study finding is supported by the study conducted by (Mohammed et al., 2019), who illustrated that HCWs' Knowledge was insufficient for waste management. On the other hand, the study results by (Kerity & Naji. 2017) are not similar to the present study's findings, which mentioned that 80% of participants had good Knowledge about Medical Waste Management before providing an educational program.

5.2.7 Overall Nurses' Knowledge related to Infection Control Measures

In the table (4.2.13), the Findings demonstrated that more than half (60.5%) of nurses expressed a moderate level of knowledge regarding infection control measures at an average equal to 9.77(±2.19), and (39.5%) of them had poor knowledge. This finding of knowledge indicated that participants did not receive sufficient information during the study and from the training courses; additionally, it may be due to the presence of different educational levels and short training sessions for newly appointed nurses regarding infection control and prevention, moreover, non-continuous training courses for nurses.

Our findings at the same line as a study conducted by Raheem & Muhbes,2021, to assess nurses' knowledge and attitudes regarding infection control measures in Emergency Department At Al- Diwaniyah Teaching Hospital; they reported that (49%) of nurses had moderate knowledge regarding infection control measures and (15%) of them had poor knowledge. Also (Rajih ,2020) conducted a study to Evaluate the Effectiveness of an Education Program on Nursing Staffs ' Knowledge about Infection Control Measures at the Intensive Care Unit in Al-Diwaniya Teaching Hospital; the study showed that all the study sample responses were fair knowledge with a statistical mean of scores (1.342) before application of an Education Program. The similarity of the results of these studies with our study is due to the lack of training sessions, the weak role of continuing education in health institutions, and the lack or absence of educational programs.

Results of the study in Baghdad were consistent with our findings, as the country went through a war crisis, and medical equipment and training courses were unavailable, which led to a lack of Knowledge (Al-Jubouri, 2014).

Kerity & Naji (2017) conducted a quasi-experimental study at primary health care centers to assess the effectiveness of an educational program on knowledge and practices of HCWS in Karbala city. The study discovered that knowledge of the study sample was fair before receiving an education program but became excellent after applying to an educational program. These findings indicate that the program's effectiveness regarding healthcare workers' knowledge is very positive and clear.

The descriptive study was carried out in Egypt by Ahmed et al. (2020); the study discovered that (68.3%) of studied nurses had insufficient total knowledge about standard precautions in operating rooms.

A study conducted by Gawad (2017) was carried out in Sana'a city (Yemen), which revealed that most of the respondents (63.8%) had weak knowledge; this low knowledge level perhaps results from the decrease of the program controlling infections. Additionally, in the Study, there is scanty information and a shortage of continuing training concerning SPs and NIs.

The present findings contradicted a study done by (Ronak, 2016). that study found that about (54%) of participants had good knowledge, while 46% were moderate according to their total knowledge score. The good knowledge may be because most participants have diplomas and bachelor's degrees and dealt with this topic during their initial studied and participated in training courses.

Another study (Rochwani & Sharma, 2019) was undertaken in India among (100) nurses. It asses nurses' knowledge of standard precautions; it revealed that most of the sample's overall knowledge rating was satisfactory. These study results because the participants had long years of work experience and training opportunities.

According to the above studies, the level of knowledge depends on the availability of medical supplies to work with them and the establishment of training courses on an ongoing basis that maintains the knowledge factor among nurses.

5.3 Overall Nurses' Attitudes toward Infection Control Measures

In table (4.3.2), nearly two-thirds (66%) of nurses expressed neutral attitudes toward infection control measures at an average equal *to 55.43* (±*8.12*). While (4%) of the total sample had negative attitudes, the remaining

(30%) had neutral attitudes regarding infection control measures. The current study's results may be due to insufficient information regarding prevention, infection control, and how to follow the correct methods of dealing with personal protective equipment and other standard precautions.

The results of this study are supported by the study (Yakob et al., 2015) among HCWs in Mizan-Aman general hospital, which found that the attitudes of HCWs were neutral.

The current study's findings disagreed with the study conducted by (Uchenna et al., 2015) to assess the level of knowledge, attitude, and practice of universal precaution among healthcare workers in Nigeria; they reported that most HCWs (88.3) had positive attitudes.

Another study carried out by (Tesfai et al., 2020) did not find similarities with the current results, where healthcare workers' attitudes regarding infection control and prevention were satisfactory (91.6%). These findings may be because most healthcare workers have hospital infection knowledge, which adds to the recent pandemic and contributes to the fear of infection. Furthermore, our study disagrees with the study that reported forty-three percent were positive toward (NI) and its prevention in hospitals in Punjab, India, due to good Knowledge (Mohandass et al., 2021).

5.4 Significant Differences between Nurses' Knowledge toward infection control measures and their Socio-Demographic Variables

The study's current findings demonstrated no significant differences in overall nurses' knowledge related to infection control measures and some of their Socio-Demographic Variables at $p>0.05$, such as(Age, marital status, and years of experience in operating rooms). In contrast, the other Socio-Demographic Variables (Gender, education level, years of experience, and training courses) had significant differences with overall nurses' knowledge related to infection control measures.

the present study results observed that the male nurses are significantly associated with improved knowledge toward infection control measures (Fig.4-3) this indicated that male nurses are more concerned, aware and informed about infection control measures or may be because a small number of male nurses participating in the study., also, the Findings demonstrated significant differences in nurses' knowledge (p=0.001) concerning their education level. The study revealed that nurses with bachelor's degrees are more knowledgeable about infection control measures. These results may be due to most of the study sample are hold bachelor's degrees, and the researcher thinks that educational level is affected because advanced education leads to awareness of nurses to adhere to infection control, as well as the differences favor those with>10 years of experience are associated with higher mean knowledge scores (Fig. 4-6). This may be because nurses with more than 10 years of service have accumulated experience, and it may also be due to a large number of practice in their field of specialization, as well as their entry into training workshops and educational programs. Therefore, the number of nurses with more than 10 years of experience in the field should be increased in operating rooms. Furthermore, the findings see that nurses who attended more than two training sessions significantly increased their knowledge of infection control measures (Fig. 4-7). These results indicated that training courses are the most important sources of knowledge for nurses. Therefore, health institutions must increase training courses and educational programs related to infection control measures...and this is done by activating the role of the Continuing Nursing Education Committee.

Results of the current study agreed with the study (Ayed, 2015), which was conducted in Palestinian hospitals, which revealed that there was no association between nurses' overall knowledge about measures of infection control and some demographical information (Age and years of experience in the workplace), except the training course contradicted with the current finding. At the same time, the other demographic data (Gender and qualification) were associated with the nurses' knowledge at p-value < 0.05. Moreover, a study conducted by (Datta et al., 2018) reported a disagreement with this finding, which showed a strong correlation between the nurses' Age and their Knowledge regarding safe injection practices.

The study of (Sessa et al., 2011) corresponded to the current study and demonstrated a significant association between nurses' knowledge of disinfection procedures and their educational level in Italy.

Also, our results agree with a study conducted in AL-Amara city that deals with the impact of knowledge on infection control. The findings show that nurses' knowledge is significantly associated with (the level of education, the number of training courses, and years of employment in nursing) p-value < 0.05; the quality and quantity of knowledge and skills that health care workers acquire are positively influenced by the level of education. When nurses increase their level of education, their knowledge also increases (AL-Hraishawi & Naji, 2015).

The knowledge of infection prevention in hospitals in Punjab/India has been significantly associated with participants' educational qualifications (Mohandass et al., 2021).

The current finding matches the finding obtained from other studies by Ghadmgahi et al. (2011) in Tehran (Iran), which showed a good relationship between the training course and nurses' knowledge about NIs. also Gawad supports this finding (2017) in the Sana'a city (Yemen), the study results showed that no significant relationship between knowledge of nurses regarding standard precautions and NIs and their nurses' working area.

Al-Jubouri did not support our findings. (2014) in Baghdad City (Iraq), who showed no significant relationship between the nurse's training courses about NIs and their knowledge related NIs.

5.5 Significant Differences between Nurses' Attitudes toward infection control measures and their Socio-Demographic Variables

The study's current findings illustrated no significant differences in nurses' attitudes toward infection control measures and some of their Socio-Demographic Variables, such as(Age, Gender, marital status, years of experience, years of experience in operating rooms, and training courses) at $p > 0.05$ while education levels of nurses were strongly associated with their attitudes at p-value < 0.01 because the nurses with higher level of education, have good viewpoint or perception toward applying infection control measures.

The findings of this study agreed with the study of (Bayleyegn et al., 2021) conducted at the University of Gondar Comprehensive Specialized Hospital in Ethiopia, which revealed a significant association between the HCWs' attitudes toward the prevention of healthcare-associated infection and Educational level, As well as a study conducted in Oman (ALHinaai, 2021), which is similar to the current study's finding, demonstrated that there was an association between the attitudes of the nursing students and their educational level and clinical level course. Also, agreed with the current study on one variable (Gender) when it revealed no association between the participants' attitudes and their Gender.

Healthcare workers' working experience and educational level (p-value of 0.021 and 0.037, respectively) are statistically associated with attitudes toward hospital-acquired infection prevention (Bayleyegn et al., 2021).

The findings of the current study did not look similar to the study (Mohammadzadeh et al., 2013) conducted in Yazd/Iran; the study confirmed that attitude scores increased significantly with years of employment (P=0.032) and that the attitude score increased with age, but it was not statistically significant.

5.6 Correlation between Nurses' Knowledge and their Attitudes toward Infection Control Measures (*n=200*)

Concerning the table (5-4), Findings exhibited there was a significant correlation (positive) between nurses' knowledge and their attitudes (r=0.014; p=0.041). According to Figure (4-8), The more significant the knowledge, the higher the positive attitudes about infection control measures. It cleared the association between nurses' knowledge and attitudes, where the nurses with neutral attitudes had moderate knowledge. The fifth objective was achieved; this led to promising findings in nurses' compliance with infection control measures because the nurses with moderate knowledge level had the correct behaviour and good viewpoint toward applying infection control measures.

The current study disagreed with the study conducted in Jordan by (Darawad & Al-Hssami, 2013); they concluded there was no association between the knowledge and attitudes of the nursing students; most of them had insufficient knowledge and positive attitudes towards measures of infection control. On the other hand. The study's findings titled "Correlation between health professionals' knowledge, attitude and practice about infection control measures" belong to (Lobo et al., 2019) are supported by the current study, which revealed a linear association between the nurses' knowledge and attitudes.

Chapter Six

Conclusion and Recommendations

Chapter Six

Conclusion and Recommendations

6.1 Conclusion

Depending on the results of the study, the researcher concluded the following:

1. knowledge in terms of overall infection control measures, nurses expressed a moderate level due to influencing factors such as:

A. Nurse gender (knowledge significantly increases, knowledge significantly higher among nurses.

B. Education level (bachelors nurses significantly associated with higher knowledge.

C-Years of experience and training (more years of experience and training significantly improve knowledge).

2. Knowledge in terms of hand hygiene, medical waste management, and general information about hospital-acquired infections; nurses expressed a moderate level of Knowledge. While**.** Knowledge in terms of personal protective equipment, safe handling of equipment and tools, and sterilization and disinfection; nurses expressed poor knowledge.

3. Nurses expressed a neutral attitude toward infection control measures depending on education attainment (bachelor's nurses and other degrees).

4. Nurses' attitude is significantly positive with their knowledge.

5. Conducted educational training by a local official, which in help to develop nurses' knowledge and attitude toward infection control measures.

6.2. Recommendations:

Based on the results and conclusions of the present study, the researcher recommends the following:

A) To Ministry of Health:

1. Continuing to provide educational programs or training courses for nurses on infection control measures and how to prevent and control infection within health institutions and emphasizing training for all newly appointed health care providers.

2. Form specialized committees or units to control infection follow-up and provide guidance and advice to health care providers.

3. Post written instructions and hang them on the operating room's walls to improve the nurses' knowledge and achieve compliance with infection control measures.

4. Doing continuous tests to assess nurses' knowledge and to know the positive change in their level of knowledge and reward them financially or morally.

5. The study suggested That the institutions provide all standard precautions of hand washing materials, personal protective equipment, sterilization, and disinfection materials to achieve infection control and protect its members from infection.

6. The study suggested that hospital directors and nursing officials increase the number of nurses with bachelors degrees, especially experienced nurses.

B) To Ministry of Higher Education and Scientific Research:

1. Working in cooperation with ministry of health to establish a curriculum for infection control measures in detail, given as part of the preliminary study curriculum, and establish a branch or subject for infection control measures in postgraduate studies.

2. In the future, additional research is required to raise the knowledge of nurses and their practices regarding measures of infection control in operating rooms, especially knowledge and practices of hand washing in order to prevent and reduce the transmission of infections

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Appendices

Appendix (A1): Administrative Arrangements

University of Babylon
College of Nursing
Research Ethics Committee

جـامـعة بــابــل
كـــلية التمريـض
لجنة اخلاقيات البحث العلمي

Issue No:

Date: / /2022

Approval Letter

To,
Mohammed Muhi Saher

The Research Ethics committee at the **University of Babylon, College of Nursing** has reviewed and discussed your application to conduct the research study entitled " **Assessment of knowledge and attitudes among nurses toward infection control measures at Al-Hilla teaching hospitals.**"

The Following documents have been reviewed and approved:

1. Research protocol
2. Research instrument/s
3. Participant informed consent

Committee Decision.

The committee approves the study to be conducted in the presented form. The Research Ethics committee expects to be informed about any changes occurring during the study, any revision in the protocol and participant informed consent.

Prof. Dr. Salma K. Jehad
Chair Committee
College of Nursing
Research Ethical Committee
18 / 01 /2022

Appendix (A2): Administrative Arrangements

Ministry of Higher Education and Scientific Research

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

University of Babylon
College of Nursing

جامعة بابل
كلية التمريض
لجنة الدراسات العليا

Ref. No. :
Date: / /

العدد : ٥٠٢
التاريخ : ٢٧/ ١ /٢٠٢٢

الى / دائرة صحة بابل / مركز التدريب والتطوير
م/ تسهيل مهمة

تحية طيبة :
يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالب الماجستير (محمد محيي سهر) لغرض جمع عينة دراسة الماجستير والخاصة بالبحث الموسوم:

تقييم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية.

Assessment of Knowledge and Attitudes among nurses toward Infection control Measures at AL-Hilla Teaching Hospitals.

مع الاحترام ...

المرافقات //
- بروتوكول.
- استبانة.

أ.م . د. نهاد محمد قاسم الدوري
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢٢/١/٢٧

صورة عنه الى //
- مكتب السيد العميد للتفضل بالاطلاع مع الاحترام
- لجنة الدراسات العليا
- الصادرة ..

E-mail:nursing@uobabylon.edu.iq

وطني 07711632208
المكتب 009647711632208

www.uobabylon.edu.iq

Appendix (A3): Administrative Arrangements

جمهورية العراق

وزارة الصحة والبيئة دائرة صحة محافظة بابـــل المديـــر العـــام مركـــز التدريب والتنمية البشرية وحدة أدارة البحوث العدد : ١١٢ التاريخ : ٢١ / ١ / ٢٠٢٢	جمهورية العراق	Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621

إلى / مستشفى الأمام الصادق (ع)
مستشفى بابل للنسائية والاطفال
مستشفى الحلة التعليمي

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

م/ تسهيل مهمة

السلام عليكم ...

أشارة إلى كتاب جامعة بابل /كلية التمريض / لجنة الدراسات العليا ذي العدد ٥٠٢ في ٢٠٢٢/١/٢٧
نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الماجستير (محمد محي سهر)
للتفضل بالاطلاع وتسهيل مهمة الموما أليه من خلال توقيع وختم استمارات أجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا أجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام

المرفقات :
استمارة عدد /٢

الدكتور
محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
/ / ٢٠٢٢

الدكتور
ماجد ياس خضير الشمري
مدير مستشفى الإمام الصادق (ع)
رئيس مجلس الادارة

نسخة منه إلى :
- مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز babiltrainning@gmail.com

Appendix (A4): Administrative Arrangements

جمهورية العراق

Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621	جمهورية العراق	وزارة الصحة والبيئة دائرة صحة محافظة بابــــل المديــر العـــام مركــز التدريب والتنمية البشرية وحدة أدارة البحوث العدد : ١١٢ التاريخ : ٢١ / ٩ / ٢٠٢٢

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

إلى / مستشفى الأمام الصادق (ع)
مستشفى بابل للنسائية والاطفال
مستشفى الحلة التعليمي

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

م/ تسهيل مهمة

السلام عليكم ...

أشارة إلى كتاب جامعة بابل /كلية التمريض / لجنة الدراسات العليا ذي العدد ٥٠٢ في ٢٠٢٢/١/٢٧
نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الماجستير (محمد مهدي سهر)
للتفضل بالاطلاع وتسهيل مهمة الموما أليه من خلال توقيع وختم استمارات أجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا أجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام

م. جامعي
منتظر كاظم عواد

المرفقات :
استمارة عدد /٢

الدكتور
محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
٢٠٢٢/ /

أ.د. ثبات ريس الفيحان
وحدة التعليم الطبي المستمر
مستشفى بابل للنسائية والاطفال

نسخة منه إلى :

- مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

سوزان ١/٣١

Appendix (A5): Administrative Arrangements

جمهورية العراق

وزارة الصحة والبيئة دائرة صحة محافظة بابـــــل المديـــر العـــام مركـــز التدريب والتنمية البشرية وحدة أدارة البحوث العدد : ١١٢ التاريخ : ٢١ / ١ / ٢٠٢٢	Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621

١٧٩٠
٢٠٢٢/٤/٢

إلى / مستشفى الأمام الصادق (ع)
مستشفى بابل للنسائية والاطفال
مستشفى الحلة التعليمي

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

م/ تسهيل مهمة

السلام عليكم ...

أشارة إلى كتاب جامعة بابل /كلية التمريض / لجنة الدراسات العليا ذي العدد ٥٠٢ في ٢٠٢٢/١/٢٧
نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الماجستير (محمد محي سهر)
للتفضل بالاطلاع وتسهيل مهمة الموما أليه من خلال توقيع وختم استمارات أجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا أجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام

المرفقات :
استمارة عدد /٢

الدكتور
محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
/ / ٢٠٢٢

نسخة منه إلى :
- مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

سوزان ١/٣١

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز babiltrainning@gmail.com

Appendix (A6): Administrative Arrangements

جمهورية العـــــراق

Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابــــــل المديــــر العــــام مركـــز التدريب والتنمية البشرية لجنة البحوث

استمارة رقم :-٠٣ /٢٠٢١

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية
لجنة البحوث

رقم القرار :- ٢٢

تاريخ القرار :- ٢٤ / ٢ /٢٠٢٢

قرار لجنة البحوث

تحية طيبة ...

درست لجنة البحوث في دائرة صحة بابل مشروع البحث ذي الرقم (٢٦ /٢٠٢٢/٠ / بابل) المعنـــون (تقيم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية) والمقــدم من الباحث(محمد محي سهر) إلى وحدة أدارة البحوث والمعرفي مركز التدريب والتنمية البشرية في دائرة صحة بابل بتاريخ ٢٠٢٢/٢/١٠ وقررت :

قبول مشروع البحث أعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة .

مــــــع الاحتـــــرام

الدكتور / محمد عبد الله عجرش
رئيس لجنة البحوث
/ /٢٠٢٢

نسخة منه إلى :
- مكتب المدير العام / مركز التدريب والتنمية البشرية / وحدة إدارة البحوث ... مع الأوليات.

سوزان

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز babiltrainning@gmail.com

Appendix (B): Questionnaire

صفحة موافقة المبحوث

عزيزي الممرض / عزيزتي الممرضة

بين ايديكم استبانة لدراسة:

"تقييم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية"

"Assessment of Knowledge and Attitudes among Nurses toward Infection Control Measures at Al-Hilla Teaching Hospitals"

لذا يرجى تفضلكم بملئ المعلومات المتعلقة بالبحث اعلاه، وأود إعلام حضراتكم بأن المعلومات التي ستدلون بها ستكون في غاية السرية، وفقط لأغراض البحث العلمي خدمة للصالح العام.

توافق بالمشاركة

نعم ☐

لا ☐

الباحث

محمد محي سهر.

ماجستير تمريض صحة الاسرة والمجتمع

كلية التمريض / جامعة بابل.

Appendix (B): Arabic Questionnaire

الجزء الأول: المعلومات الديموغرافية المتعلقة بالممرضين:

١.العمر: ☐ سنة

٢-الجنس: ذكر ☐ انثى ☐

٣. الحالة الزوجية: اعزب ☐

متزوج ☐

مطلق ☐

أرمل ☐

منفصل ☐

٤. المستوى التعليمي: خريج اعدادية تمريض ☐

خريج معهد التمريض ☐

خريج كلية التمريض ☐

خريج ماجستير او دكتوراه ☐

٥.عدد سنوات الخبرة في مجال التمريض: ☐ سنة

٦-عدد سنوات الخبرة في صالات العمليات ☐ سنة

٧.هل دخلت دورات تدريبية متعلقة بتدابير السيطرة على العدوى:

نعم ☐ **لا** ☐

إذا كانت الاجابة نعم

كم عدد الدورات:

١-٢ دورة ☐

٣-٥ دورة ☐

الجزء الثاني: تقيم معارف الممرضين نحو تدابير السيطرة على العدوى في صالات العمليات

اولا/المعارف العامة المتعلقة بالعدوى المكتسبة من المستشفيات (HAIs) والوقاية منها

١. **عدوى المستشفيات (Nosocomial infection) هي العدوى التي يكتسبها المريض اثناء دخوله المستشفى وتظهر بعد مرور:**

أ- ٢٤ ساعة-٤٨ ساعة

ب- ٤٨ ساعة-٧٢ ساعة

ج- ٧٢ساعة-٩٦ساعة

٢. **الغاية من تدابير السيطرة على العدوى هو:**

أ- تشجيع العاملين في الرعاية الصحية على ارتداء القفازات

ب- تشجيع العاملين في الرعاية الصحية على نظافة اليدين

ج- كسر سلسلة انتقال العدوى

٣. **العنصر الاساسي الاول لمكافحة العدوى هو**

أ- الوقاية

ب- المراقبة

ج- السيطرة

٤. **الحلقة الاكثر اهمية في سلسلة انتقال العدوى هو:**

أ- العامل الممرض Infectious Agent

ب- طريقة الانتقال Mode of Transmission

ج- مكان الدخول Portal of Entry

٥. **اي في ما يلي مفيدا للوقاية من العدوى المكتسبة في المستشفيات:**

أ- تدابير الحماية الشخصية

ب- التلامس مع المعدات الطبية

ج- التعامل مع المريض بدون اتخاذ الاجراءات الوقائية

٦. **الاحتياطات القياسية العامة للسيطرة على العدوى هي:**

أ- الاحتياطات التي يتم اتباعها مع الناس الاصحاء فقط

ب- الاحتياطات التي يتم اتباعها مع المرضى المصابين فقط

ج- الاحتياطات التي يتم اتباعها مع جميع المرضى سواء كانوا مصابين او لا

٧. **مسار الدخول الكائنات الحية الدقيقة الى جسم المضيف هو:**

أ- بوابة الدخولPortal of Entry

ب- بوابة الخروج Portal of Exit

ج- الاشخاص المعرضون Susceptible Host

٨. **العوامل المسببة للعدوى الأكثر أهمية والأكثر شيوعًا في مؤسسات الرعاية الصحية هي :**

أ- البكتيريا

ب- الفايروس

ج- الفطريات

٩. **اي من الفقرات التالية صحيحة فيما يتعلق بمصدر العدوى المكتسبة داخل المستشفيات:**

أ- داخلي المنشأ

ب- خارجي المنشأ

ج- داخلي وخارجي المنشأ

١٠. **من أكثر أنواع العدوى المصاحبة للرعاية الصحية شيوعاً في وحدات صالات العمليات هي:**

أ- عدوى الجهاز البولي المصاحبة للقسطرة البولية

ب- عدوى الجهاز التنفسي المرتبطة بأجهزة التهوية الاصطناعية

ج- عدوى التهاب مكان العملية الجراحية

١١. **تعتبر جروح الأمعاء، المرارة، الفم، والمريء:**

أ- نظيفة

ب- ملوثة

ج- ملتهبة

١٢. **التطعيمات متاحة للوقاية من:**

أ- التهاب الكبد الفايروسي نوع ((B

ب- التهاب الكبد الفايروسي نوع ((C

ج- فيروس نقص المناعة المكتسبة

<u>ثانيا: المعارف المتعلقة بنظافة اليدين.</u>

١. **يستغرق غسل اليدين الروتيني باستخدام الماء والصابون:**

أ- ١٥ ثانية – ٣٠ ثانية

ب- ٤٠ ثانية – ٦٠ ثانية

ج- ٢دقيقة – ٣ دقيقة

٢. **يستغرق غسل اليدين الجراحي:**

أ- ١٥ثانية- ٣٠ ثانية

ب- ٢ دقيقة - ٣ دقيقة

ج- ٣ دقيقة-٥ دقيقة

٣. يتم غسل اليدين باستخدام مواد مطهرة (محلول كحولي):

أ- عندما تكون اليدان متسختين بشكل ظاهري

ب- عندما تكون اليدان متسختين بشكل غير ظاهري

ج- قبل التداخل الجراحي

٤. الاستراتيجية الاكثر فعالية للحد من حالات العدوى المرتبطة بالرعاية الصحية هي:

أ- ارتداء أدوات الوقاية الشخصية

ب- التعقيم والتطهير

ج- غسل اليدين

٥. "اللحظة الأولى" في "اللحظات الخمس لنظافة اليدين" تحدث متى؟

أ- بعد ملامسة المريض /عند مغادرة نقطة الرعاية

ب- قبل ارتداء معدات الوقاية الشخصية (مثل القفازات / المئزر)

ج- قبل ملامسة المريض

ثالثًا: المعارف المتعلقة بمعدات الحماية الشخصية (PPE)

١. القفازات التي تستخدم لمرة واحدة عند التداخلات العميقة واختراق دفاعات الجسم مثل الجلد والأغشية المخاطية والأنسجة المختلفة هي:

أ- قفازات شديدة التحمل (سميكة)

ب- قفازات نظيفة (اللاتكس)

ج- قفازات جراحية معقمة

٢. **...................... تستخدم خلال الاجراءات الروتينية التي قد تؤدي إلى تلوث الملابس.**

أ- الصدرية العادية

ب- الصدرية الجراحية Surgical Gown

ج- المئزر Apron

٣. إذا تمزق القفاز أثناء العمل يجب عمل الاتي:

أ- مواصلة العمل من أجل مصلحة المريض

ب- لبس قفاز أخر فوق القفاز الذي تمزق

ج- خلع القفاز الذي تمزق وارتداء قفاز أخر

٤. القناع المستخدم لحماية مقدمي الرعاية الصحية من خطر التعرض للاغشية المخاطية المحتمل للدم او الافرازات المتطايرة نتيجة اجراء العمليات الجراحية هو:

أ- القناع الجراحي Surgical Mask

ب-قناع N100 or P3

ج- واقي الوجه Face Shield

٥. الترتيب الصحيح لإزالة معدات الحماية الشخصية هو:

أ- المئزر أولاً، ثم القفازات، ثم أدوات حماية العين، وأخيراً قناع التنفس

ب-القفازات أولاً، ثم المئزر، ثم قناع التنفس، وأخيراً أدوات حماية العين

ج- لا يهم ترتيب إزالتها

٦. يجب ارتداء قفازات قبل وضع القسطرة البولية للمريض من نوع:

أ- نظيفة (الاتكس)

ب-جراحية معقمة

ج- نايلون

رابعاً: المعارف المتعلقة بالتعامل الآمن مع المعدات والأدوات

١. عند تنظيف الادوات يدوياً، يوصى بغسلها جيدا تحت الماء وذلك لمنع:

أ- انتشار الميكروبات في الهواء

ب-حدوث مشاكل في شطف الادوات

ج- تراكم المواد المنظفة

٢. يلزم تغيير مرطب الهواء لجهاز التهوية الاصطناعي بعد مرور:

أ- ٢٤ساعة من استخدامه

ب-٤٨ساعة من استخدامه

ج- ٧٢ساعة من استخدامه

٣. يفضل أولا عند التعرض لإصابة وخز بالإبرة أو جرح بأية أداة حادة:

أ- غسل الجرح بالماء والصابون

ب-ترك الجرح ينزف لعدة ثواني

ج- تغطية الجرح بالشاش مباشرة

٤. يتم غمر الادوات الملوثة بعد الاجراءات الجراحية في محلول كلور ٥,٠ لمدة

أ- ٣ دقائق

ب-٥دقائق

ج- ١٠ دقائق

٥. يجب إجراء التنظيف الروتيني للأدوات والأسطح مرتديًا المئزر والقفازات وباستخدام:

أ- الماء الدافئ والمطهرات

ب- الماء الدافئ والمنظفات العادية

ج- الماء الدافئ والمنظفات والمطهرات

٦. انابيب التنفس المستخدمة في حال تلوثها او عدم عملها لنفس المريض.

أ- يجب ان تبقى كما هي

ب- يجب ان تغير بشكل فوري بعد التلوث او عدم عملها

ج- يمكن تغيرها بعد ساعة من تلوثها

٧. بعد اجراء العمليات الجراحية يجب تعقيم الانابيب المجوفة وادوات الشفط باستخدام ....

أ- تغسل بماء دافئ حتى تنظف وبعدها تعقم

ب- ترسل مباشرة للتعقيم

ج- توضع في غلوتر الدهايد لمدة ساعة

٨. أي من المواد الكيميائية التالية يمكن أن تدمر وتسبب تآكل الأدوات الجراحية؟

أ- الفينول والكحول

ب- المنظفات الأنزيمية ومبيضات الكلور

ج- مبيضات الكلور والمحاليل الملحية

خامسا: المعارف المتعلقة بالتعقيم والتطهير.

١. يشير التعقيم الطبي إلى:

أ- غياب معظم الجراثيم من الأدوات والبيئة المحيطة

ب- الممارسات التي تحد من انتشار مسببات الأمراض

ج- عملية تدمير وإزالة جميع أنواع الكائنات الحية الدقيقة

٢. إزالة وتدمير الكائنات الحية الضارة للحد الأدنى بحيث تصبح الأدوات والمعدات آمنة للاستخدام هو:

أ- التطهير

ب- التعقيم الكيميائي

ج- التعقيم بالحرارة الجافة

٣. الرزم المعقمة بجهاز التعقيم بالبخار(الاوتوكلاف) غالبا تصبح ملوثة بعد:

أ- بعد ٣٠ يومًا

ب- بعد ٦٠ يومًا

ج- اليوم الأول من التعقيم

٤. أي مما يلي تعتبر من الطريق الكيميائية للتطهير

أ- التطهير بالحرارة

ب- ايونات المعادن

ج- أيونات المعادن والقلويات والأحماض

٥. يعتبر التطهير والتعقيم:

أ- ضروريان لجميع المعدات الطبية

ب- التطهير ضروري بينما التعقيم غير ضروري لجميع المعدات الطبية

ج- ليسا ضروريين لجميع المعدات الطبية

٦. العوامل الرئيسية التي يعتمد عليها التعقيم بالبخار هي ؟

أ- البخار تحت الضغط، الوقت، ودرجة الحرارة

ب- الوقت، درجة الحرارة، والتركيز.

ج- درجة الحرارة، الوقت، والرطوبة.

٧. اسهل طريقة للتعقيم هي التعقيم:

أ- بالبخار

ب- بالحرارة الرطبة

ج- بالإشعاع

٨. درجة الحرارة المطلوبة ل(التعقيم) بالحرارة الجافة هي.......

أ- ١٨٠ سيليزي

ب- ١٨٣ سيليزي

ج- ١٩٠ سيليزي

سادسا: المعارف المتعلقة بإدارة النفايات الطبية

١. توضع النفايات شديدة العدوى في كيس أو حاوية بلاستيكية ذو لون:

أ- أسود

ب- أصفر

ج- أحمر

٢. توضع النفايات المعدية والحادة في حاوية أو كيس بلاستيكي ذو لون:

أ- أحمر

ب- أصفر

ج- أسود

٣. **النفايات الطبية غير الخطرة توضع في حاوية او كيس بلاستيكي ذو لون:**

أ- بني

ب- أصفر

ج- أسود

٤. **أي من الاجراءات التالية صحيح فيما يخص التعامل مع المحقنة والإبرة بعد الاستخدام:**

أ- يجب التخلص من الابرة والمحقنة كوحدة واحدة بعد الاستخدام

ب- لا يجب التخلص من الابرة والمحقنة كوحدة واحدة بعد الاستخدام

ج- يجب التخلص من الابرة اولا ثم المحقنة

٥. **في حالة حدوث خطأ في وضع النفايات الطبية الخطرة في الكيس أو العبوة غير المخصصة لها, فيجب:**

أ- إعادة فرز النفايات وفصلها

ب- ترك الوضع على ما هو عليه واعتبار النفايات كلها خطرة

ج- جمعها وتخزينها في أماكن خاصة

٦. **افضل طريقة لتغليف الابرة بعد استخدامها هي:**

أ- مسك الابرة باليد وارجاع غلافها باليد الاخرى

ب- تقنية اليد الواحدة

ج- ثني الابرة والتخلص منها في صندوق الادوات الحادة

الجزء الثالث: تقييم اتجاهات الممرضين نحو تدابير السيطرة على العدوى في صالات العمليات .

ت	الفقرات	موافق	محايد	غير موافق
١	العدوى المكتسبة في المستشفى تؤدي إلى نتائج خطيرة			
٢	العدوى المرتبطة بالرعاية الصحية يمكن تقليلها عن طريق اللقاح.			
٣	يتم اتباع تدابير السيطرة على العدوى في صالات العمليات من قبل الممرضين في جميع الأوقات.			
٤	تدابير السيطرة على العدوى تلعب دورًا مهمًا في حماية العاملين في مجال الرعاية الصحية.			

			زيادة أعباء العمل على الممرضين تؤدي إلى زيادة مخاطر العدوى المرتبطة بالرعاية الصحية.	٥
			مواد غسل اليدين لا يمكن الحصول عليها باستمرار.	٦
			استخدام الكحول في نظافة اليدين ربما يؤدي إلى تهيج وجفاف اليدين.	٧
			غسل اليدين يقلل من احتمالية انتقال العدوى.	٨
			لا داعي لغسل اليدين إذا تم استخدام القفازات.	٩
			في بعض الأحيان ينسى الممرضون غسل أيديهم.	١٠
			ارتداء القناع (the mask) غير مهم عندما يقدم الممرض الرعاية الصحية للمرضى في صالات العمليات.	١١
			الكفوف متوفرة باستمرار عند الحاجة لها في صالات العمليات.	١٢
			انخراط الممرضون في دورات تدريبية حول تدابير السيطرة على العدوى يقلل من العدوى المكتسبة.	١٣
			لا يعتبر ارتداء معدات الحماية الشخصية من تدابير السيطرة على العدوى.	١٤
			الكفوف تستخدم لتقليل انتقال العدوى.	١٥
			إرشادات التعقيم في صالات العمليات مهمة جدا.	١٦
			تعقيم المعدات والأدوات ضروري لمنع انتشار العدوى.	١٧
			مقدمي الرعاية الصحية (HCWs) يغسلون أيديهم دائما بمطهر قبل وبعد ملامسة المريض.	١٨
			الملاك التمريضي بحاجة إلى دورات تدريبية حول التعقيم والتطهير	١٩
			عزل النفايات الطبية تقلل من مخاطر انتشار العدوى.	٢٠
			فصل النفايات الطبية غير ضروري.	٢١
			النفايات الطبية لا تؤدي الى مخاطر بيئية.	٢٢
			تنفيذ التخلص الآمن من النفايات سيزيد من عبء العمل.	٢٣
			لا يجب تطعيم جميع العاملين بالمستشفى ضد الالتهاب الكبدي أ,ب,ج,د	٢٤

			تطعيم جميع العاملين في المستشفى بلقاح فايروس كورونا ٢٠١٩ غير ضروري	٢٥

Appendix (B): English Questionnaire

Part one: Soci- Demographic characteristics.

1-Age ☐ year**.**

2-Gender:

Male ☐ Female ☐

3- **Marital Status**

Single ☐

Married ☐

Widowed ☐

Divorced ☐

Separated ☐

4-Level of Education:

Nursing secondary school ☐

Nursing Institute ☐

College graduate ☐

Master or Phd ☐

5-Years of Experience in the nursing ☐ year**.**

6-Years of Experience operating rooms ☐ year

7- Training Course Related to Infection Control:

Yes ☐

No ☐

If answer yes number of courses ☐ Duration ☐

Part Two: Assessment of Knowledge among Nurses toward Infection Control Measures in operating rooms.

First: General knowledge regarding Hospital-Acquired Infections (HAIs).

1. Nosocomial Infection or (Health-Care-Associated-Infection) is an infection that a patient acquires while entering a hospital and appears after the passage of:

a. 24 hours
b. 48 hours - 72 hours
c. 72 hours - 96 hours

2. The purpose of infection control measures is to:

a. Encourage healthcare workers to wear personal protective equipment
b. Encourage health care workers to clean hands
c. Breaking the chain of infection

3. What is the first element for fighting an infection?

a. Prevention
b. Monitoring
c. Control

4. …………is the most important link in the chain of infection?

a. Infectious Agent
b. Mode of Transmission
c. The portal of Entry

5. The following is useful for preventing hospital-acquired infection:

a. Personal protective measures
b. Contact in medical equipment

c. Dealing with the patient without following preventive measures General standard

6. **General standard precautions for infection control are……...?**
   a. precautions that followed with healthy people only
   b. precautions that followed with infected patients only
   c. precautions that followed with all patients whether they were infected or not.
7. **………. means the pathway for microorganisms to enter the body of the host**
   a. The portal of Entry
   b. Mode of Transmission
   c. Susceptible Host
8. **The most important and most common infection causative agents in health care institutions are:**
   a. Bacteria
   b. Virus
   c. Fungi
9. **Which of the following is true regarding the source of hospital-acquired infection?**
   a. Endogenous
   b. Exogenous
   c. Internal and external origin
10. **The most common types of healthcare-associated infections in operating theatres units are**:
    a. Urinary tract infection associated with urinary catheterization
    b. Respiratory infection associated with artificial ventilation devices
    c. Infection of inflammation at the surgical site
11. **Wounds of the Intestine, gallbladder, mouth, and esophagus are:**
    a. clean

b. polluted

c. flamed

12. Vaccinations are available to prevent:

a. Hepatitis B virus type (B)

b. Hepatitis C virus type (C)

c. HIV

<u>**Second: Knowledge regarding Hand Hygiene.**</u>

1. **Routine handwashing using soap and water takes time:**
    a. 15 seconds - 30 seconds
    b. 20 seconds - 60 seconds
    c. 2 minutes - 3 minutes
2. **Surgical hand washing takes a period:**
    a. 15 seconds - 30 seconds
    b. 2 minutes -3 minutes
    c. 3 minutes - 5 minutes
3. **Hands are washed with antiseptic substances (alcoholic solution):**
    a. When both hands are outwardly dirty
    b. When the hands are not outwardly dirty
    c. Before surgical intervention
4. **........................ is the most effective strategy for reducing healthcare-associated infections**
    a. Wearing personal protective equipment
    b. Sterilization and disinfection
    c. Hand washing
5. **The "first moment" in the "five moments of hand hygiene" occurs when?**
    a. After touching the patient / upon leaving the point of care

b. Before wearing personal protective equipment (such as gloves/apron)
c. Before touching the patient

Third: Knowledge regarding Personal Protective Equipment (PPE)

1. **......................... are disposable gloves used for deep interventions and penetration of the body's defenses such as the skin, mucous membranes, and various tissues.**
   a. Durable Gloves (Thick)
   b. Clean gloves (latex)
   c. Sterile surgical gloves
2. **....................... used during routine procedures that may lead to clothing contamination.**
   a. Surgical gown
   b. Non-surgical gown
   c. Apron
3. **If the glove is torn during work, the following must be done: -**
   a. Continuing to work in the interest of the patient
   b. Put another glove over the glove that was torn
   c. Take off the glove that was torn and put on another one
4. **The mask used to protect health care providers from inhaling airborne pathogens is:**
   a. Surgical Mask
   b. N100 or P3 mask
   c. Face Shield
5. **The correct arrangement for removing PPE is:**
   a. Apron first, then gloves, eye protection tools, and finally respirator mask
   b. Gloves first, then apron, then respirator mask, and finally eye protection tools

   c. It does not matter the order of their removal

6. **Gloves should be worn before placing the patient's urinary catheter from a type:**
   a. Clean (latex)
   b. Surgical
   c. Nylon

<u>Fourth: Knowledge regarding Safe Handling of Equipment and Instruments.</u>

1. **When manual cleaning, recommended items should be washed below the water level to avoid:**
   a. Aerosolization of microbes
   b. Problems with rinsing
   c. Build-up of detergents
2. **The humidifier of the artificial ventilation device must be replaced after .... from use it**
   a. 24 hours
   b. 48 hours
   c. 72 hours
3. **Firstly, upon exposure to a needle, stick injury or injury with any sharp object:**
   a. Washing the wound with soap and water
   b. Let the wound bleed for a few seconds
   c. Covering the wound with gauze directly
4. **Contaminated instruments should be soaked in 0.5% chlorine solution for………**
   a. 3 minutes
   b. 5 Minutes
   c. 10 minutes

5. **Routine cleaning of tools and surfaces should be carried out, with wearing an apron and gloves, using:**
    a. Warm water and antiseptics
    b. Warm water and regular detergent
    c. Warm water, detergents, and disinfectants
6. **Breathing tubes if they become contaminated or do not function for the same patient.**
    a. It should remain as it is
    b. It should be changed immediately after contamination
    c. It can be changed after an hour
7. **Lumens and suction devices must be __ after a surgical procedure.**
    a. Flushed until clear prior to sterilization
    b. Sent immediately for flash sterilization
    c. Placed in glutaraldehyde for an hour
8. **Which of the following chemicals can destroy and corrode surgical instruments?**
    a. Phenols and alcohol
    b. Enzymatic detergents and chlorine bleach
    c. Chlorine bleach and saline

<u>Fifth: Knowledge regarding Sterilization and disinfection</u>

1. **Medical sterilization refers to:**
    a. Absence of most germs from tools and the surrounding environment
    b. Practices that limit the spread of pathogens
    c. The process of destroying all kinds of microorganisms
2. **.................. is the process of removing and destroying harmful organisms to a minimum so that tools and equipment are safe to use:**
    a. Disinfection

   b. Chemical sterilization
   c. Dry heat sterilization

3. **Sterilized packs processed with autoclave are most likely to become contaminated after:**
   a. 30 days
   b. 60 days
   c. The first day of sterilization
4. **Which of the following is a chemical method of disinfection?**
   a. Disinfection by heat
   b. Metal ions
   c. Metal ions, Alkalis, and acids
5. **Disinfection and sterilization are:**
   a. Necessary for all medical devices
   b. Disinfection is necessary, while sterilization is not necessary for all medical equipment
   c. Not necessary for all medical equipment
6. **The main factors on which steam sterilization depends are:**
   a. Steam under pressure, time, and temperature
   b. Time, temperature, and concentration
   c. Temperature, time, and humidity
7. **What is the easiest method of sterilization?**
   a. Steam sterilization
   b. Wet heat
   c. Radiation
8. **Temperature required for 'sterilization' with dry heat is:**
   a. 180°C
   b. 183°C
   c. 190°C

Sixth: Knowledge regarding Waste Management.

1. **Highly contaminated waste is placed in a color bag or plastic container:**
    a. Black
    b. Yellow
    c. Red
2. **Infectious and sharp wastes are placed in a colorful plastic container or bag:**
    a. Red
    b. Yellow
    c. Black
3. **Non-hazardous medical waste is placed in a container or plastic bag with the color:**
    a. Brown
    b. Yellow
    c. Black
4. **Any of the following are true in order to deal with the syringe and needle are handled after use:**
    a. Syringe and needle should be disposed of as one unit after use.
    b. The syringe and needle should not be disposed of as a single unit after use.
    c. The needle should be disposed of first, then the syringe
5. **In the event of an error in placing hazardous medical waste in the bag or the packaging not designated for it, it must:**
    a. Re-sort and separate the waste
    b. Leave the situation as it is and consider all waste dangerous
    c. Collecting and storing it in special places
6. **The best way to repack the needle after using it is:**
    a. Hold the needle with one hand and return its cover with the other hand

b. One hand technique

c. Bend the needle and dispose of it in the sharp object box

Part Three: Assessment of Attitudes among Nurses toward Infection Control Measures in operating rooms.

No	Items	Agree	neutral	Disagree
1	Hospital-acquired infections lead to dangerous outcomes.			
2	Healthcare-associated infection can be reduced by a vaccine.			
3	Infection control measures followed by the nurses at all times in operating rooms			
4	Infection control measures play an important role in the protection of healthcare workers.			
5	Increased workload on the nurses leads to increased healthcare-associated infection risks.			
6	Agents of handwashing are not constantly obtainable.			
7	used of Alcohol in hand hygiene may lead to irritation and dryness of the hands.			
8	washing Hands reduces the possibility of transmission of infection.			
9	There is no need to wash hands if gloves are used.			
10	Sometimes, the nurses forget to wash their hands.			
11	Wearing the mask is not important when the nurse provides health care to the patients in the operating rooms.			
12	gloves are constantly available when needed in the operating rooms.			
13	Participation of nurses in training courses about infection control measures to reduce acquired infection.			

14	Wearing personal protective equipment is not considered an infection control measures.			
15	The gloves are used to reduce the transmission of infection.			
16	Sterilization guidelines in operating rooms are necessary.			
17	Sterilization of equipment and instruments is necessary to prevent the spread of infection.			
18	Healthcare workers (HCWs) always wash their hands with antiseptics before and after touching the patient.			
19	Nursing staff needs training courses about sterilization and disinfection.			
20	Management of medical waste reduces the risks of infection spreading.			
21	Separation of medical waste is not necessary.			
22	Medical waste does not lead to environmental risks.			
23	Implementation of safe disposal of waste will increase workload.			
24	Not All hospital staff must be vaccinated against hepatitis A, B, C, and D			
25	Vaccination of all hospital workers with the 2019 coronavirus vaccine is not necessary			

Appendix (B): Questionnaire

استبانة الخبراء والمحكمين

بسم الله الرحمن الرحيم

حضرة الدكتور\ة.. المحترم\ة

نظرا للمكانة العلمية المرموقة لديكم يرجى التفضل بالمساهمة في تقييم الاستبانة المستخدمة في الرسالة الموسومة

تقييم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية

Assessment of Knowledge and Attitudes among nurses toward Infection Control Measures at Al-Hilla Teaching Hospitals

Objectives of the study

1-To identify the demographic characteristics of nurses that work at Al-Hilla Teaching Hospitals.

2- To assess Knowledge and Attitudes among Nurses toward Infection Control Measures at Al -Hilla Teaching Hospitals.

3-To investigate the differences in nurses' knowledge and attitudes with regards to their demographic characteristics such as (age, gender, educational level, etc.)

4-To find the relationship between nurses' knowledge and nurses' attitudes toward infection control measures .ولكم فائق الشكر والاحترام

اسم الخبير: ....

اللقب العلمي: ....

عدد سنوات الخبرة: ....

مكان العمل: ....

التاريخ: ....

التوقيع: ....

الباحث

طالب الماجستير

محمد محي سهر

كلية التمريض – جامعة بابل

فرع تمريض صحة الاسرة والمجتمع

Appendix (C):

خبراء تحكيم استمارة الاستبانة

ت	اسم الخبير	اللقب العلمي	مكان العمل	الاختصاص
١	د. حسن علوان بيعي	استاذ	جامعة بابل\ كلية طب حمورابي	طب صحة الأسرة والمجتمع
٢	د. محمد فاضل خليفة	استاذ	جامعة بابل\كلية التمريض	تمريض صحة الأسرة والمجتمع
٣	د.سلمى كاظم جهاد	استاذ	جامعة بابل \كلية التمريض	تمريض صحة الأسرة والمجتمع
٤	د. فخرية جبر محيبس	استاذ	جامعه بابل \كليه التمريض	تمريض بالغين
٥	د. فاطمة وناس خضير	استاذ	جامعة الكوفة /كليه التمريض	تمريض صحة الأسرة والمجتمع
٦	د. امين عجيل الياسري	استاذ	جامعه بغداد /كليه التمريض	تمريض صحة الأسرة والمجتمع
٧	د. سحر ادهم علي	استاذ	جامعة بابل \كلية التمريض	تمريض بالغين
٨	د. وسام جبار قاسم	استاذ	جامعة بغداد \كلية التمريض	تمريض صحة الأسرة والمجتمع
٩	د. نهاد محمد قاسم	استاذ	جامعة بابل\كلية التمريض	تمريض اطفال
١٠	د. رضوان حسين ابراهيم	استاذ	جامعة نينوى/كلية التمريض	تمريض صحة الأسرة والمجتمع
١١	د. ناجي ياسر سعدون	استاذ	جامعة بابل \ كلية التمريض	تمريض صحة الأسرة والمجتمع
١٢	د. ندى خزعل هندي	استاذ	جامعة بابل \ كلية التمريض	احياء مجهرية
١٣	د. هبة جاسم حمزة	استاذ مساعد	جامعة بابل \ كلية التمريض	احياء مجهرية
١٤	د. منصور عبد الله فلاح	استاذ مساعد	جامعة الكوفة\ كلية التمريض	تمريض صحة الأسرة والمجتمع
١٥	د. هدى راضي صبح	استاذ مساعد	مصر/جامعة المنصورة \ كلية التمريض	تمريض البالغين
١٦	د. سلمان حسين فارس	استاذ مساعد	جامعة كربلاء / كلية التمريض	تمريض صحة الأسرة والمجتمع
١٧	د. علاء حسين عبد	استاذ مساعد	جامعة البصرة للنفط والغاز	طب الاسرة والمجتمع

١٨	د. مرتضى غانم عداي	استاذ مساعد	جامعة الكوفة \كلية التمريض	تمريض صحة الأسرة والمجتمع
١٩	د. فاطمة مكي محمود	استاذ مساعد	جامعة كربلاء /كلية التمريض	تمريض بالغين
٢٠	د. حسام عباس داود	استاذ مساعد	جامعة بابل\ كلية التمريض	تمريض بالغين
٢١	د. حسن عبد الله عذبي	استاذ مساعد	جامعة كربلاء/ كلية التمريض	تمريض بالغين
٢٢	د. نوار صاحب خليل	استاذ مساعد	الجامعة العراقية\ كلية طب	طب الاسرة والمجتمع
٢٣	د. علاء محيبس طعمة	مدرس	جامعة ذي قار / كلية التمريض	تمريض صحة الأسرة والمجتمع
٢٤	د. ابتسام علي عبد الفتاح	مدرس	مصر/ جامعة المينا\ كلية تمريض	تمريض صحة الأسرة والمجتمع
٢٥	د. حقي اسماعيل منصور	مدرس	جامعة كربلاء/ كلية التمريض	تمريض صحة الأسرة والمجتمع

Appendix (D1):

Ministry of Higher Education and Scientific Research
جمهورية العراق
وزارة التعليم العالي والبحث العلمي
University of Babylon
College of Nursing
جامعة بابل
كلية التمريض

Ref. No. : العدد : ١٨٩٦
Date: / / التاريخ : ٢٤ / ٥ / ٢٠٢٢

الى /جامعة بابل / كلية التربية للعلوم الانسانية – قسم اللغة الانكليزية
م/ مقوم لغوي

تحية طيبة :

يرجى التفضل بتحديد عضو هيئة تدريس في كليتكم لغرض تقويم رسالة الماجستير للطالب (محمد محي سهر) والموسومة ب

تقييم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية.

Assessment of Knowledge and Attitudes among nurses toward Infection control Measures at AL-Hilla Teaching Hospitals.

مع الاحترام ...

ا.م . د. نهاد محمد قاسم
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢٢/٥/٢٤

نسخة منه الى//
-مكتب السيد العميد... للتفضل بالاطلاع مع الاحترام.
-مكتب السيد معاون العميد للشؤون العلمية...للتفضل بالاطلاع مع الاحترام.
- وحدة الدراسات العليا مع الاوليات.
-الصادرة .

E-mail:nursing@uobabylon.edu.iq
وطني 07711632208
المكتب 009647711632208

Appendix (D2):

Ministry of Higher Education and Scientific Research

University of Babylon

College of Education for Human Sciences

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة بابل

كلية التربية للعلوم الانسانية

Ref. No :

Date:

العدد: ٤٦٢٧

التاريخ: ١ /٥ /٢٠٢٢

جامعة بابل / كلية التمريض
الـواردة
العدد/ ٢٦٩
التاريخ ٢٩/ ٥ / ٢٠٢

إلى/ جامعة بابل/ كلية التمريض

مكتب السيد معاون العميد للشؤون العلمية المحترم

م/ أعادة رسالة

تحية طيبة:

نعيد إليكم رسالة طالب الدراسات العليا / الماجستير (محمد محي سهر) بعد تقويمها لغوياً من قبل (أ.د.حيدر غازي الموسوي) من قسم اللغة الانكليزية في كليتنا، وقد ثبت الملاحظات على متن الرسالة يرجى من الباحث الالتزام بها.

*** مع الاحترام ***

أ.د. اسامة كاظم عمران
معاون العميد للشؤون العلمية
والدراسات العليا

نسخة منه الى//
- الدراسات العليا .
- الصادرة.

//سارة//

07801010633 امنية

البريد الالكتروني bad_edu_humsci@yahoo.com

www.uobabylon .edu.iq

المستخلص

تعتبر العدوى من المشاكل الرئيسية في غرف العمليات. أظهرت العديد من الدراسات أن الممرضين معرضين بشكل خطير للعديد من المخاطر، مثل إصابات الوخز بالإبرة والإصابات الحادة، مع ارتفاع معدل الإصابة في غرفة العمليات بسبب العديد من العوامل مثل قلة الخبرة والعدوى المتقاطعة وعبء العمل الزائد. يحتاج الممرضون إلى مزيد من الاهتمام لضمان الامتثال الفعال للاحتياطات العالمية. تهدف الدراسة إلى تقييم المعرفة والمواقف لدى الممرضين تجاه تدابير مكافحة العدوى وتحديد العلاقة مع بعض المتغيرات الاجتماعية والديموغرافية.

أجريت دراسة مقطعية وصفية في غرف العمليات في مستشفيات الحلة التعليمية، عينة هادفة غير احتمالية قوامها (ن = ٢٠٠) ممرض وممرضة. توزعت هذه العينة على ٣ مستشفيات (مستشفى الحلة التعليمي الجراحي، مستشفى الإمام الصادق التعليمي، مستشفى بابل التعليمي للولادة والأطفال، تم جمع البيانات من خلال استخدام تقنية الاستبيان والتقرير الذاتي. يتضمن ما مجموعه سبعة عناصر للخصائص الاجتماعية والديموغرافية، و٤٥ عنصرًا معرفيًا، و٢٥ عنصرًا للاتجاهات. تم جمع البيانات في الفترة من (١٢ فبراير إلى ١٧ مارس ٢٠٢٢) من خلال استخدام استبيان التقرير الذاتي والتحليل من خلال الاستخدام الوصفي والاستنتاجي الطريقة الإحصائية (SPSS version (24)).

أوضحت النتائج وجود أكثر من نصف العينة المدروسة كانت اناث (ن = ١١٤؛ ٥٧٪) و (٤٤,٥٪) لم يتلقوا دورات تدريبية. (٦٠,٥٪) من الممرضين لديهن معرفة معتدلة فيما يتعلق بـ (ICMs) و (٦٦٪) من الممرضين لديهم موقف محايد تجاه تدابير مكافحة العدوى، كانت هناك فروق ذات دلالة إحصائية في معرفة الممرضين تجاه تدابير مكافحة العدوى مع بعض المتغيرات الاجتماعية والديموغرافية في $p \le 0.05$ (الجنس، التحصيل العلمي، الدورات التدريبية، سنوات الخبرة في مكان العمل) كما توجد فروق ذات دلالة إحصائية في المواقف مع التحصيل العلمي عند $p \le 0.05$.

كانت المعرفة العامة للممرضين والمواقف معتدلة تجاه تدابير مكافحة العدوى. كان هناك ارتباط إيجابي بين المعرفة والموقف عند $p \le 0.05$. وأوصى الباحث بأن تواصل وحدة التعليم الطبي المستمر عملها الحالي المتمثل في تقديم دورات إرشادية حول إجراءات مكافحة العدوى في جميع أقسام المستشفى، خاصة لموظفي غرفة العمليات، ونشر التعليمات المكتوبة وتعليقها على جدران غرف العمليات من أجل تحسين معرفة الممرضين.

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة بابل/ كلية التمريض

تقييم معارف واتجاهات الممرضين اتجاه تدابير السيطرة على العدوى في مستشفيات الحلة التعليمية

رسالة

مقدمة من قبل

محمد محي سهر

الى مجلس كلية التمريض/ جامعة بابل

جزء من متطلبات نيل درجة الماجستير في علوم التمريض

بأشراف

ا.د قحطان هادي حسين

ايلول ٢٠٢٢ميلادية　　　　صفر ١٤٤٤هجرية