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**جامعة 21 سبتمبر للعلوم الطبية
والتطبيقية**

Title

**"Awareness of Healthcare Workers toward the importance
of Personal Protective Measures to Prevent Infection
Transmission at 48 Model Hospital in Sana'a City –Yemen"**

Research proposal submitted to complete the requirements for obtaining
bachelor's degree nursing from the Medical College of 21 September University.

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قال تعالى

شَهِدَ اللَّهُ أَنَّهُ لَا إِلَهَ إِلَّا هُوَ وَالْمَلَائِكَةُ وَأُولُوا
الْعِلْمِ قَائِمًا بِالْقِسْطِ لَا إِلَهَ إِلَّا هُوَ الْعَزِيزُ الْحَكِيمُ

وقال تعالى "وَقُلْ رَبِّ زِدْنِي عِلْمًا " صدق

الله العظيم

Dedication

We dedicate our research
To our parents and family
Who present thier support and
motivation to us.

To our first love - Yemen.

To our reader & to our university and to our
colleague .

To every one who encouraged , motivated
and helped us to accomplish this work.

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cooperated with us.

Abstract

- **Background:** Hospital-acquired infection is a more serious problem in all hospital settings and the level of knowledge, towards the prevention of hospital-acquired infection among health care workers, and identifying the factors associated with it is important in dealing with these infections, controlling and managing them. It also contributes significantly to reducing hospital-acquired infections, as most studies and research confirm. In this study, we assessed the awareness of health staff towards the importance of personal protective measures to prevent transmission of infection in 48 hospital.
- **Objectives:** The aim of this study was to assess level Awareness of Healthcare Staff toward the importance of Personal Protective Measures to Prevent Infection Transmission at 48 Model Hospital.
- **Methods:** The study community was (657) worker in the staff of health care. A simple random sample was taken (259) healthcare workers . Identified using (Epicalc 2000). To apply a self-organized questionnaire .The descriptive-analytical approach was used to display the frequency and ratio of the main results. It was processed by the (Spss) program.
- **Results:** The study reached multiple results, most notably
 - There is high level of knowledge of HCWs regarding **importance** of PPE and its role in preventing the transmission of infection.(44%) **high knowledge**.(35.90%)**good knowledge**.(20.10%) **poor knowledge**.
 - There is an modrate level of knowledge of health workers regarding the **correct way** of preventive measures and use of PPE.(29.80%) **high knowledge**. (46.30%) **good knowledge**. (23.90%) **poor knowledge**.
 - There is an effect of both Age, Educational level, Specialization, Years of experience On the level knowledge of HCWs regarding importance of PPE and its role in preventing the transmission of infection.
- **Conclusion:** Healthcare staff high knowledge about PPE. variable of Age , Educational level, Specialization, Years of experience were Independent variables that have an impact on the level of knowledge of health workers about personal protective equipment.

- **Recommendations :**

- ❖ Continuing to raise the awareness of health workers about the use of personal protection methods through continuous training and awareness of safety and infection control standards issued by the Ministry of Health and the competent authorities globally.
- ❖ Continuous and complete provision of personal protective equipment in hospitals
- ❖ Continuous monitoring of workers to ensure their compliance and adherence to policies and procedures for using personal protective equipment to combat infection

- **Key words.** Awareness , healthcare staff ,personal protective measures, prevent infection transmission , 48 model hospital , sana'a city , Yeme.

ملخص البحث

الخلفية: تعد العدوى المكتسبة من المستشفيات مشكلة أكثر خطورة في جميع أماكن المستشفى ومستوى معرفته تجاه الوقاية من

العدوى المكتسبة من المستشفى بين العاملين في مجال الرعاية الصحية وتحديد العوامل المرتبطة بها له اهمية في التعامل مع هذه العدوى والتحكم بها وادارتها . كونها تساهم بشكل كبير في الحد من العدوى المكتسبة في المستشفيات ، كما تؤكد معظم الدراسات والأبحاث. في هذه الدراسة ، قمنا بتقييم مدى وعي الطاقم الصحي تجاه أهمية إجراءات الحماية الشخصية لمنع انتقال العدوى في

مستشفى 48 الطبي النموذجي

الأهداف: كان هدف هذه الدراسة هو تقييم مدى وعي موظفي الرعاية الصحية تجاه أهمية إجراءات الحماية الشخصية لمنع انتقال

العدوى في مستشفى 48 الطبي النموذجي

المنهجية: . كان مجتمع الدراسة (657) عاملا في مجال الرعاية الصحية . وتم اخذ عينه عشوائيه بسيطه (259) عامل في مجال

الرعاية الصحية . وتم تحديدها باستخدام (إيبكال 2000) . لتطبيق إستبيان منظم ذاتيا . تم إستخدام المنهج الوصفي

التحليلي لعرض تواتر ونسبة النتائج الرئيسيه. وقد تمت معالجته بواسطة برنامج (Spss) .

النتائج: توصلت الدراسة الى نتائج متعددة اهمها

1. هناك مستوى عالي من المعرفة لدى العاملين في مجال الرعاية الصحية بخصوص **اهمية** ادوات الحماية الشخصية ودورها في منع انتقال العدوى . وقد كانت بنسبة (44%) **معرفة عالية** . وبنسبة (35.90%) **معرفة جيدة** . وبنسبة (20.10%) **معرفة منخفضة**

2. يوجد مستوى معتدل من معرفة العاملين الصحيين فيما يتعلق **بالطريقة الصحيحة** للتدابير الوقائية واستخدام ادوات الوقاية

الشخصية . بنسبة (29.80%) **معرفة عالية** . وبنسبة (46.30%) **معرفة جيدة**. وبنسبة (23.90%) **معرفة منخفضة**

3. هناك تأثير لكل من العمر ، والمستوى التعليمي ، والتخصص ، وسنوات الخبرة على مستوى معرفة العاملين في مجال الرعاية الصحية فيما يتعلق باهمية ادوات الوقاية الشخصية ودورها في منع انتقال العدوى

الاستنتاج: معرفة عالية لموظفي الرعاية الصحية بمعدات الحماية الشخصية . متغيرات العمر , المستوى التعليمي , التخصص

. سنوات الخبرة. كانت متغيرات مستقلة لها تأثير على مستوى معرفة العاملين الصحيين حول اهمية ادوات الحماية الشخصية .

التوصيات:

• الاستمرار في توعية العاملين الصحيين حول استخدام أساليب الحماية الشخصية من خلال التدريب المستمر والتوعية

بمعايير السلامة ومكافحة العدوى الصادره عن وزارة الصحة والجهات المختصة على مستوى العالم

• توفير مستمر وكامل لادوات الحماية الشخصية في المستشفيات

• المراقبة المستمرة للعمال لضمان امتثالهم والتزامهم بالسياسات والإجراءات الخاصة باستخدام ادوات الحماية الشخصية لمكافحة

العدوى

الكلمات المفتاحية: _توعية , كادر الرعاية الصحية , إجراءات الحماية الشخصية , منع إنتقال العدوى.

مستشفى 48 النموذجي مدينة صنعاء , اليمن.

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List of Abbreviations

PPE	Personal Protective Equipment.
CDC	Centers of Disease Control.
HCWs	Healthcare Workers.
JACO	Join commission on Accerditation of heath Care Organization
PPT	Personal Protective Technology.
WHO	World Health Organization.
HCAIs	Health Care Associated Infections.
UTI	Urinary Tract Infection.
SICPs	Standard Infection Control Precautions.
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
BSI	Body Substance Isolation.
SARS	Sever Acute Respiratory Syndrome.
SICPs	Standard Infection Control Precautions.
GPs	General Practitioners
ICU	Intensive care unit.
NI	nosocomial infections.
HAI	Hospital-acquired Infection
SPs	Standard Precautions

Chapter one :

Introduction

1. Chapter one: Introduction

In this chapter, we will determine the sections that introduce this research such as the background of the study, an overview of the research questions, objectives, hypothesis, the importance of the study, and research structure.

1.1 Introduction of the study

Infection is one of the most important problems in health care services worldwide (Vaz K, McGrowder and others, 2010)

Healthcare-associated infections are the most frequent adverse event that threatens patient safety worldwide, About 5% to 15% of patients admitted to intensive care hospitals in developed countries acquire a healthcare-associated infection at any given time, IT has been WHO estimated that the risk of health care-associated infection is 2 to 20 times higher in developing countries compared to developed countries and 5% and 15% of patients admitted to hospitals in developed countries acquire these infections, hospital-acquired infections is one of the leading causes of death and has much economic cost due to increased hospitalization and prognosis (www.who.org)BOH.

in WHO Eastern Mediterranean Region has one of the highest frequencies of hospital-associated infections in the world. The prevalence of in the hospital-associated infection in countries of Eastern Mediterranean Region ranging from 12% to 18%. The burden of communicable infectious diseases among health care workers is also largely high in the Region, as a result of unsafe health care practices.

(<http://www.emro.who.int/ar/index.html>)BOH.

The prevention and control of infections are critical for a well-functioning health system, Infection control practice is a fundamental aspect of modern health care, HCWs play a critical role in providing care for patients with Infection.

The Joint Commission on Accreditation of health care Organization (JACO) and the centers for disease control and Prevention (CDC) documented that health care providers should follow certain guidelines when caring for The patients such as Personal Protective Technology (PPT)

Personal Protective Technology (PPT) Program's mission is to prevent work-related injury, illness, and death by advancing the state of knowledge and application of PPT (<http://www.CDC.org>)BOH.

Frontline HCWs such as nurses and physicians in the unit or wards hospital should ensure the appropriate use of PPE to protect themselves and prevent nosocomial spread.

Although a large proportion of infections and deaths attributable to hospital-associated infections are preventable and low-cost infection prevention and control interventions are available, progress in countries of Eastern Mediterranean Region in this field is still weak. (<http://www.emro.who.int/ar/index.html>)BOH.

The high risk of nosocomial infection in the countries of the Middle East region Including Yemen to Weak level of commitment of health care workers to standard infection control practices (Alwabr Gawad, MA, PhD,2017) and there are hurdles in using PPE optimally, such as higher patient volumes, unavailability of equipment, increased anxiety and fear,

dearth of information.

Studies that dealt with the commitment of health workers in hospitals to use personal protective equipment in Yemen are very few to the knowledge of researchers and are not comprehensive, as the use of PPE has been addressed within assessments of the level of infection control practice in general

aim this study Awareness of Healthcare Staff toward the importance of Personal Protective Measures to Prevent Infection Transmission at 48 Model Hospital.

1.2 Significance of the study

1.2.1 Theoretically Significance

This study will contribute to raising the level of knowledge of Healthcare Staff in hospitals about the importance of using Personal Protective Measures to Prevent Infection Transmission, the use of Personal Protective Equipment in assessing and preventing health risks, solving problems and in the management clinical care.

1.2.2 Applied Significance

Assessing compliance with Personal Protective Measures to Prevent Infection Transmission in any health care setting is vital and Regular updating and strengthening of infection control practices should be one of the priority function of any place where health services are rendered. The findings from this study will add to the existing literature Information and knowledge new regarding use Personal Protective Measures to Prevent Infection Transmission and may be used in developing interventions to increase infection control practices

1.3 Justification

- There are many of the health worker who are exposed to infection due to their lack of sufficient awareness of the importance of personal protective equipment and the correct way to use it, and this increases the risks to which they are exposed.especially among COVID-19 pandemic.
- We observes lack of proper knowledge of the wearing and removal of PPE by healthcare staff.
- We observes Neglect and indifference to Commitment to PPE among the medical staff.

1.4 Problem statement

Yemen is currently exposed to the worst humanitarian crisis in the world in accordance with the United Nations Response Plan for 2021. The war crisis affected all sectors of life, including the health sector (United Nations Response Plan ,2021)

health facilities, including governmental and private hospitals was exposed to multiple challenges such as Disability to provide health services, provide incentives, provide medicines and medical supplies, personal protection equipment for prevent transmission infection. (United Nations Response Plan ,2022)

In addition to the above, infection control programs in hospitals was exposed to low, which led to the exposure of thousands of patients and health Healthcare Staff to risk health, and there is currently no formal statistical for that. (Alwabr Gawad, MA, PhD,2017)

Results showed previous studies that the level of practice infection

control programs in hospitals in Yemen are weak and showed that improving health services, protecting patients from risk of hospital infection are focused on know the standards of infection control and the level of practice, personal protection equipment one of the most important standards of infection control. (Ameen .S.,2015)

Its use (PPE) requires effective assessment, an understanding of the suitability of various types of PPE in various clinical scenarios, and appropriate application, In addition to the above, PPE will be enable Health workers from Protect themselves and patients, will lead to reduce unnecessary cost, while ensuring that the appropriate care for patient. ((Ameen .S.,2015, Alwabr Gawad, MA, PhD,2017)

Despite the importance of the subject, the previous studies have not been addressed to study the importance of health worker's awareness of the use of personal protective equipment to prevent transmission infection in health facilities in Yemen thus a need came to study that in more detail.

Accordingly, this study aims assessment the awareness of the Healthcare Staff using personal protection equipment to prevent transmission infection at the 48 model Hospital in order to reach important results contributing to improving health status and patient care level in hospitals.

1.5 Research question

1.5.1 Major research question

What is the level Awareness of Healthcare Staff toward the importance of Personal Protective Measures to Prevent Infection

Transmission at 48 Model Hospital?

1.5.2 Minor Research Questions

1. What Is Demographic Characteristics of the Healthcare Staff?
2. What is the level of awareness of Healthcare Staff toward the importance of PPE?
3. What is the level awareness of Healthcare Staff toward the correct ways of preventive measures and use of PPE?
4. Is There the relation between the demographic characteristics and level of awareness of Healthcare Staff toward the importance of PPE?
5. Is There the relation between the demographic characteristics and level awareness Healthcare Staff toward the correct ways of preventive measures and use of PPE?

1.6 Research Objective

1.6.1 General objective

To assess level Awareness of Healthcare Staff toward the importance of Personal Protective Measures to Prevent Infection Transmission at 48 Model Hospital.

1.6.2 Specific Objectives

1. To identify the Demographic Characteristics of the Healthcare Staff.
2. To describe level of awareness of Healthcare Staff toward the importance of PPE.
3. To describe level of awareness of Healthcare Staff toward the correct ways of preventive measures and use of PPE.

4. To identify the relation between the demographic characteristics and level of awareness of Healthcare Staff toward the importance of PPE.
5. To identify the Relationship between the demographic characteristics and level awareness Healthcare Staff toward the correct ways of preventive measures and use of PPE.

1.7 Research Hypothesis

- ❖ H0: There is no a difference in the level of awareness of Healthcare Staff toward the importance of PPE and level awareness of the correct ways of preventive measures for use of PPE.

1.7.1 Sub hypothesis

H0.1: There is no relation between the demographic characteristics and level of awareness of Healthcare Staff toward the importance of PPE.

H0.2 : There is no relation between the demographic characteristics and level awareness of the correct ways of preventive measures for use of PPE.

1.8 Terminology

1.8.1 Health awareness The ability of the individual, his family, and his community to "access, understand and benefit from information in ways that promote and maintain good health.

1.8.2 HealthCare Workers: Any person delivering care to a patient at hospitals including surgeons, nurses, anesthesiologist, anesthesia technicians and other health professionals.

1.8.3 The importance of something is its quality of being significant,

valued, or necessary in a particular situation.

1.8.4 Personal Protective Equipment (PPE): Clothing or equipment worn for protection against hazards (Ontario Ministry of Health and Long -Term Care, 2011).

1.8.5 Standard Precautions (SPs): are evidence based clinical work practices published by the Centre of Disease Control (CDC) in 1996 and updated in (2007) that prevent transmission of infectious agents in healthcare settings.

1.8.6 Infection transmission is the passing of a pathogen causing communicable disease from an infected host individual or group to a particular individual or group, regardless of whether the other individual was previously infected. Esch, Gerald W.; Seed, J. Richard (2001).

1.9 The limits of the study

- **Objective limit:** The subject of the study was limited to the knowledge and Awareness of Healthcare Staff toward the Importance of Personal Protective Measures to Prevent Infection Transmission
- **Place Limit:** 48 Model Hospital, Sana'a City, Yemen
- **Human Limit:** The healthcare staff and Medical students: Doctor, nurse, Nursing - Level 4, Nursing - Level 3, Nursing - Excellence, Anesthesia technician, Technical operations, Other technicians, In the Medical departments at(48)Model Hospital –Sana'a City , Yemen.
- **Time limit:** - The study was conducted during (2022)AD

Chapter Tow:

Literature Review

2. Chapter tow: Literature review

2.1 Introduction

This chapter focuses on the literature review of the Awareness of Healthcare Staff toward the Importance of Personal Protective Measures to Prevent Infection Transmission. This chapter also the issue of infection control addresses the factors associated with the spread of infection within health care settings (whether from patient to patient, or from patients to hospital staff, or vice versa from staff to patients, or among members of the staff itself), including prevention (Whether through health measures of hand hygiene/hand washing, cleaning/disinfection/sterilization, vaccination, and surveillance), as well as procedures for controlling/investigating the spread of suspected infection within a health care delivery area (monitoring and spreading infection), as well as management (county) infection outbreaks).

2.2 Definition of nosocomial infection: Hospital acquired infections are infections that were not present prior to admission to the hospital. The following is a presentation of the most important concepts of the study

2.2.1 Health awareness.

Awareness is the state of being conscious of something. More specifically, it is the ability to directly know and perceive, to feel, or to be cognizant of events. Another definition describes it as a state wherein a subject is aware of some information when

that information is directly available to bring to bear in the direction of a wide range of behavioral actions.[1] (Hesse AAJ, Adu-Aryee NA, Entsua-Mensah K, Wu L ,2006).

2.2.2 Personal protective equipment PPE.

Personal protective equipment is the equipment or means used for occupational safety and includes clothing, helmets, goggles or any other equipment designed to protect the wearer's body from injury, infection, cuts, etc. (WHO, October 2014)

Personal protective equipment is the Equipment that is worn to reduce exposure to hazards that cause serious injury and disease in the workplace. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical or other hazards in the workplace. Personal protective equipment may include items such as gloves, goggles and protective shoes, earplugs, hard hats, respirators, or coats, jackets, and full body suits (Amina Ali and others, 2021).

2.2.3 Infection control:

the use of procedures and practices to reduce and or eliminate the contracting and spread of healthcare associated infections. Infection control practices utilize systems that include hygiene and protective clothing, disinfection and disposal techniques and standard precautions when dealing with any patient or client (Shaw, 2005).

The World Health Organization (WHO) defines Nosocomial Infection as an infection acquired in hospital or other health care

facility by patient who was admitted for reason other than the infection present during admission. This includes an infection acquired in the hospital, or other healthcare facility, but appearing after the patient's discharge (WHO, 2002).

2.2.4 nosocomial infections(NI)

According to The World Health Organization (WHO) definition Health care-associated infections (HCAIs) are infections that patients acquire while receiving treatment for medical or surgical conditions and are the most frequent adverse event during care delivery (WHO, 2011).

HCAI is a major problem for patient safety and its impact can result in prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobial agents, a massive additional financial burden for the health system, high costs for patients and their families, and excess deaths. The risk to acquire HCAI is universal and pervades every health-care facility and system worldwide, but the true burden remains unknown in many nations, particularly in developing countries (Johrapurakar.S R,2012).

Nosocomial infections, also called “hospital-acquired infections” are infections acquired during hospital cares which are not present or incubating at admission. Infections occurring more than 48 hours after admission are usually considered nosocomial (Johrapurakar.S R,2012).

2.3 Types of nosocomial infections (NI)

National Healthcare Safety Network with Centre for Disease Control (CDC) for surveillance has classified nosocomial infection sites into 13 types, with 50 infection sites, which are specific on the basis of biological and clinical criteria. The sites which are

common include urinary tract infections (UTI), surgical and soft tissue infections, gastroenteritis, meningitis and respiratory infections. A change regarding nosocomial infection sites can be easily detected with time due to the elevated use of high techniques for diagnostic and therapeutic purposes. The perfect example of this can be seen in the case of pneumonia as prevalence of nosocomial pneumonia increased from 17% to 30% during five years (Hassan Ahmed Khan, Aftab Ahmad, Riffat Mehboob. 2015).

2.4 Fundamental Principles of Infection Prevention:

Infection prevention and control involves implementing work practices that reduce the risk of transmission of infectious agents through a two-tiered approach:

- 1) Standard Precautions - routinely applying basic infection prevention and control strategies to minimize infection risks to both patients and healthcare workers.
- 2) Transmission Based Precautions – used in addition to standard precautions when managing patients suspected or known to be being infected with particular agents transmitted by the contact,

droplet or airborne routes (Department of Health and Human Services. 2014).

2.4.1 Standard Infection Control Precautions (SICPs)

2.4.1.1 Historical Background:

The CDC first published a document in 1983 entitled 'Guidelines for Isolation Precautions in Hospital', which contained a section on precautions for blood and body fluids. The section recommended preventive measures to be taken when a patient is known or suspected to be infected with blood borne pathogens (Garner J S, Simmons B P & Williams, 1983).

The Universal Precautions were developed in 1985 to protect essentially health care workers against blood-borne infections through needle-sticks and mucous membrane exposure to contaminated blood and body fluids. But the Universal Precautions did not apply to faeces nasal secretions; sputum sweat; tears; urine; or vomits unless they contained visible blood (Garner JS. : January, 1996).

In 1987, CDC published 'Recommendations for Prevention of HIV Transmission in Healthcare Settings'. In contrast to the 1983 guidelines, the Recommendations suggested that precautions be consistently used for all patients regardless of their blood-borne infection status. This extension became known as the Universal Precautions and it was defined by CDC (1996) as a set of precautions designed to prevent the transmission of HIV, HBV and other blood-borne pathogens when providing first aid or health care. Under the universal precautions, blood and certain body fluids of all patients were considered potentially

infectious for HIV, HBV and other blood-borne pathogens. Thus, universal precautions replaced and eliminated the need for the isolation category "blood and body fluid precautions" in the 1983 CDC Guidelines for Isolation Precautions in Hospitals (Garner J S, Simmons B P & Williams, 1983).

In 1987, a new system of isolation called 'Body Substance Isolation' (BSI) was proposed by a separate group of infection control infectious body substances (blood, faeces, urine, sputum, saliva and wound drain professionals. The Body Substance Isolation isolated all moist and potentially in age and other body fluids) from all patients regardless of their presumed infection status primarily through the use of gloves (Garner JS. : January, 1996).

BSI and UP shared many similar features designed to prevent the transmission of blood borne pathogens in hospitals. However, there was an important difference in the recommendation for glove use and hand washing. Under UP, gloves were recommended for anticipated contact with blood and specified body fluids, and hands were to be washed immediately after gloves were removed. Under BSI, gloves were recommended for anticipated contact with any moist body substance, but hand washing after glove removal was not required unless the hands visibly were soiled.

The lack of emphasis on hand washing after glove removal was cited as one of the theoretical disadvantages of BSI. Using gloves as a protective substitute for hand washing may have provided a false sense of security, resulted in less hand washing, increased the risk of nosocomial transmission of pathogens, because hands can become

contaminated even when gloves are used and are contaminated easily in the process of removing gloves, and contributed to skin problems and allergies associated with the use of gloves. On the other hand, proponents of BSI have noted that studies of hand washing have indicated that there is relatively low compliance by hospital personnel, that glove use may have been easier to manage than hand washing, and that frequent hand washing may have led to eczema, skin cracking, or, in some persons, clinical damage to the skin of the hands. Although use of gloves may have been better than no hand washing, the efficacy of using gloves as a substitute for hand washing has not been demonstrated there was much local variation in the interpretation and use of UP and BSI, and a variety of combinations was common. Further, there was considerable confusion about which body fluids or substances required precautions under UP and BSI. Many hospitals espousing UP really were using BSI and vice versa. Moreover, there was continued lack of agreement about the importance of hand washing when gloves were used and the need for additional precautions beyond BSI to prevent airborne, droplet, and contact transmission (Garner JS. : January, 1996).

Hence in 1996, the Centres for Disease Control, Atlanta addressed the issue by proposing a new set of guideline and recommended the Standard and Additional Precautions as a two-tier approach to infection control. This policy now replaces the previous Universal Precautions and reflects the current infection control practices in all health care settings (Ducel G , Fabry J, Nicolle L .2002).

The 2007 CDC Guidelines for Isolation Precautions in Hospitals

contains two tiers of precautions. In the first and most important tier, are those precautions designed for the care of all patients in hospitals regardless of their diagnosis or presumed infection status. Implementation of these -

Standard Precautions||- is the primary strategy for successful health care associated infection control. In the second tier are precautions designed only for the care of specified patients. These additional - Transmission-Based Precautions|| are used for patients known or suspected to be infected or colonized with epidemiologically important pathogens that can be transmitted by airborne or droplet transmission or by contact with dry skin or contaminated surfaces. Resulting from the Severe Acute Respiratory Syndrome (SARS) epidemic, further revision of these Guidelines indicates that Expanded Precautions has replaced Transmission-based (CDC.2007).

2.4.1.2 Definition of Standard Infection Control Precautions (SICPs):

According to World Health Organization (WHO) –Standard precautions are meant to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized sources. They are the basic level of infection control precautions which are to be used as a minimum, in the case of all patients (World Health Organization, 2007). Standard Precautions defined by (CDC) are the minimum infection prevention measures that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where healthcare is delivered. These evidence-based practices are designed to both protect healthcare personnel and prevent the spread

of infections among patients. Standard Precautions replaces earlier guidance relating to Universal Precautions and Body Substance Isolation (CDC,2007).

2.4.1.3 The elements of standard precaution: there are eight elements:

- Hand hygiene
- Use of personal protective equipment
- Prevention of occupational exposure
- Management of blood and body fluid spillage
- Cleanliness of care equipment
- Cleanliness of the environment
- Safe handling of linen
- Safe handling of waste

2.4.1.4 Occupational exposure:

In order to avoid occupational exposure to potentially infectious agents, particularly those microorganisms that may be found in blood and other body fluids, precautions are essential while providing care. It must always be assumed that every person encountered could be carrying potentially harmful microorganisms that might be transmitted and cause harm to others. Therefore, precautions to prevent exposure to these and subsequent harm in others receiving or providing care must be taken as standard. Occupational exposure management, including needle stick (or “sharps”) injury, is one of the elements of Standard Infection Control Precautions (SICPs), which should be applied in all healthcare settings (NHS Scotland,2010).

The main risk that is associated with infection comes from sharps contaminated with blood. Sharps include all objects and materials that pose a potential risk of injury and infection because of their puncture or cutting properties and these include syringes with needles, blades, wires, and broken glass. Syringes and needles should be disposed of immediately after use. The needle should not be recapped or removed from the syringe thus the whole combination should be inserted into the safety box directly after use. Sharps should be disposed of in safety boxes that are resistant to punctures and leakage and are designed so that items can be dropped in using one hand and no item can be removed. Sharps should not be handled unnecessarily to prevent needle prick injuries (Sado W E , Fawole AO, etal, 2006).

2.4.2 worker safety program:

The main principles of prevention of infection of healthcare workers
Develop an infection prevention and control program at the national level (Guidance for CDC, WHO,2014)

2.4.2.1 Education and training:

Effective education and training is a key measure in the prevention of hospital acquired infection but that the current provision falls below the basic requirement indicated in the Departmental guidance, namely that all staff should be provided with education in infection control procedures .A second infection control activity which infection control teams undertake to help prevent and control hospital acquired infection is the production and dissemination a written policies and procedures and guidelines for prevention and control of infection and that they are

reviewed regularly (Bourn J, 2000).

All new staff members shall be oriented to the health care facility infection prevention and control policies and guidelines and there shall be a facility wide on-going in-service education programmer on infection prevention and control well as compliance with infection prevention and control policies and guidelines. Periodic research shall be done in infection prevention and control, the findings used for review and adjustment as necessary and content on infection prevention and control shall be integrated into the curricula for education and training of all health care workers (Eunice W, Kamunge.2013).

2.4.2.2 Engineering Controls

engineering controls like negative pressure rooms for patients with airborne diseases such as TB (Amina Ali and others, 2021).

2.4.2.3 work practice controls such as not recapping needles

2.4.2.4 Personal protective equipment.

While PPE is last in the hierarchy of prevention, it is very important for protecting healthcare workers from disease transmission.

2.5 Personal Protective Equipment: -

The main purpose of wearing personal equipment and clothing, such as gloves, aprons, masks and eye protection, is to protect healthcare workers from blood-borne pathogens and prevent the transmission of microorganisms to both patients and staff (Weston D. 2008).

The selection of protective equipment must be based on a risk assessment of the risk of transmission of micro-organisms to the

patient or career, and the risk of contamination with blood, body fluids, secretions and excretions, but healthcare workers are often unsure when to wear PPE, and haphazard and inconsistent practices can place both staff and patients at hazard (Weston D. 2008).

2.5.1 Gloves:

Gloves should be worn when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, non-intact skin, or potentially contaminated intact skin, e.g. of a patient incontinent of stool or urine, could occur. Gloves with fit and durability appropriate to the task should be used. Disposable medical examination gloves should be worn for providing direct patient care such as wound dressing, phlebotomy, setting intravenous infusion etc.

For cleaning the environment or medical equipment, disposable medical examination gloves or re-usable utility gloves should be worn. Gloves should be removed after contact with a patient and/or the surrounding environment (including medical equipment) using proper techniques to prevent hand contamination

The same pair of gloves should not be worn for the care of more than one patient and gloves should not be re-used, because this practice has been associated with the transmission of pathogens. Gloves should be changed during patient care if the hands will move from a contaminated body site, e.g. perineal area, to a clean body site, e.g. face (Siegel, JD, Rhinehart, E, Jackson, M, Chiarello, L and the Health Infection Control Practices Advisory Committee. 2007)

Do's & Don'ts

DO'S AND DON'TS FOR WEARING GLOVES IN THE HEALTHCARE ENVIRONMENT

Types of gloves encountered in the healthcare setting

STERILE GLOVES

Indicated for performing any sterile procedure including but not limited to vaginal delivery, invasive radiological procedure, central vascular device dressing change, and accessing implanted central venous access ports.



NON-STERILE GLOVES

(e.g., nitrile, latex, medical vinyl)

Indicated in situations when there is potential for contact with infectious material (e.g., blood, other body fluids, microorganisms).



NON-MEDICAL GLOVES

(e.g., vinyl)

May be used for food handling and some housekeeping procedures (e.g., cleaning and disinfection).



UTILITY GLOVES

(e.g., facility, maintenance, central sterile processing)

Used for manual cleaning of instruments and decontamination with harsh chemicals.



Do

- ✓ **DO** wear gloves to reduce the risk of contamination or exposure to blood, other body fluids, hazardous materials, and transmission of infection.
- ✓ **DO** clean hands before putting on gloves for a sterile procedure (e.g., insertion of catheter or other invasive device).
- ✓ **DO** clean hands after removing gloves.
- ✓ **DO** clean hands and change gloves between each task (e.g., after contact with a contaminated surface or environment).
- ✓ **DO** make sure that gloves fit you properly before performing any tasks.
- ✓ **DO** ensure the correct type of glove is available if you have skin sensitivity or allergy issues.
- ✓ **DO** wear gloves in hemodialysis settings for any contact with the patient or the patient's equipment.
- ✓ **DO** follow your facility's policy on glove use and remember to consult CDC* and WHO* hand hygiene guidance.

Don't

- ✗ **DON'T** re-use or wash gloves (except for utility gloves after being properly cleaned).
- ✗ **DON'T** substitute glove use for hand hygiene.
- ✗ **DON'T** use non-approved hand lotions.
- ✗ **DON'T** use gloves if they are damaged or visibly soiled.
- ✗ **DON'T** touch your face when wearing gloves.
- ✗ **DON'T** wear the same pair of gloves from one patient to another.
- ✗ **DON'T** wear gloves in the hall; consult your facility's policy for exceptions.
- ✗ **DON'T** forget to remove and dispose of gloves properly.

Figure (2.1 Do's & Don'ts for wearing Gloves in the healthcare environment)

2.5.2 Eye goggles or face shields:

Eye goggles or a face shield should be worn to protect mucous membranes Of the eyes; nose; and mouth only when performing patient-care procedures that are likely to generate splashes of blood, body fluids, secretions and excretions. Examples of such procedures are irrigation and suction procedures, delivery and dental procedures etc.

2.5.3 Masks: -

Wear a mask to protect mucous membranes of the mouth and nose when undertaking procedures that are likely to generate splashes of blood, body fluids, secretions or excretions. Wear surgical masks rather than cotton material or gauze masks.

Surgical masks have been designed to resist fluids to varying degrees depending on the design of the material in the mask. Do not reuse disposable masks.

They should be disposed of according to the health care facility protocol (Balarabe S A, Joshua A I , Danjuma A, Dauda S A , Sunday O and Yusuf D H .2015).

2.5.4 Plastic aprons/gowns:

A separate disposable apron/gown should be worn for each patient. It is worn to prevent soiling of clothing when performing patient-care procedures that are likely to generate splashes of blood, body fluids, secretions or excretions (World Health Organization. 2010).

Do's & Don'ts

For wearing N95 respirators in non-surgical healthcare settings



N95 respirator

Tight-fitting cover that when properly fitted to the face protects the wearer from very small particles that float in the air, such as TB, measles, and chickenpox. It should fit the face tightly with no gapping. An N95 respirator is intended to provide more protection than a procedure mask by blocking at least 95 percent of very small (0.3 microns) particles. It is important to note that not all N95 respirators are tested for fluid resistance to be used as surgical N95s in the perioperative setting.

The Occupational Safety & Health Administration (OSHA) may update guidance related to masks as emerging pathogens arise and new recommendations are developed.

Be on the lookout for updates by visiting the OSHA website or consult your facility's infection prevention or occupational health department.

Learn more: www.osha.gov/SLTC/respiratoryprotection/guidance.html

Do

- ✓ Check to make sure the N95 respirator has no defects such as holes or torn straps.
- ✓ Wear for protection against very small particles that float in the air (e.g., TB, measles, or chickenpox).
- ✓ Follow manufacturer's instructions for donning and doffing of N95 respirator.
- ✓ Ensure proper fit—making sure nose and mouth are completely covered. The N95 respirator must have a complete seal all around. Complete face seal check after donning the respirator.
- ✓ Mold the respirator over the bridge of your nose when putting it on to help keep the N95 respirator on and fitting properly. It is also helpful to press all around the face seal to be sure it is tightly in place.
- ✓ Tilt head forward and remove the N95 respirator by pulling bottom strap over back of head, followed by the top strap without touching the front of mask. Keep straps tight during the removal process.
- ✓ Discard an N95 respirator by touching straps only. Perform hand hygiene before and after use of an N95 respirator or any type of personal protective equipment, such as your gloves and gown.
- ✓ Remove the N95 respirator when no longer in clinical space and the patient intervention is complete.

Don't

- ✗ DON'T wear if wet or soiled; get a new N95 respirator.
- ✗ DON'T reuse; toss it after wearing once.
- ✗ DON'T let patients or visitors wear N95 respirators unless they've been fit tested to wear them.
- ✗ DON'T wear an N95 respirator that hasn't been properly fit tested. Proper fit is essential.
- ✗ DON'T use the N95 respirator if air leaks around the respirator edges.
- ✗ DON'T touch the front of the N95 respirator as it is contaminated after use. DON'T snap the straps, as that may spread germs.
- ✗ DON'T share your N95 respirator with others; germs can spread that way.
- ✗ DON'T leave an N95 respirator hanging around your neck.



Figure. (2.2)Do's & Don'ts for wearing N95 respirator in non-surgical healthcare settings

Do's & Don'ts

DO'S AND DON'TS FOR WEARING GOWNS IN NON-SURGICAL HEALTHCARE SETTINGS

Gowns are a type of personal protective equipment (PPE) worn by healthcare personnel (HCP) to:

- Protect the HCP from contact with blood or body fluids.
- Protect the HCP from organisms in the environment, on equipment, or from an infected or colonized patient.
- Protect patient from organisms that could be passed from HCP during invasive procedures, such as a central line insertion or surgical procedure.

Gowns are classified by their ability to withstand penetration by blood or body fluids. They can be:



Isolation gowns:

A non-sterile gown used to keep clothing from getting contaminated. These are fluid resistant enough to keep body fluids away from clothing for a short period of time. Used for care of patients on contact precautions and for splash-generating procedures. May be disposable or non-disposable.

Procedure gowns:

A non-sterile, usually disposable gown that may be fluid resistant or fluid impermeable, depending on the amount of body fluids involved in the procedure. Some examples where impermeable gowns should be worn include during endoscopy or assisting in vaginal birth.



Gowns used in the healthcare settings are defined and classified by the Association for the Advancement of Medical Instrumentation (AAMI).

Do

- ✓ **DO** perform hand hygiene **before** donning any PPE used during patient care, including gloves, gowns, and masks.
- ✓ **DO** perform hand hygiene **after** doffing any PPE, including gloves, gowns, and masks.
- ✓ **DO** wear a gown if you may come in contact with blood or body fluids, are caring for a patient on contact precautions, or are performing a surgical or invasive procedure (e.g., central line insertion).
- ✓ **DO** secure the gown at the base of the neck and at the waist if design of gown allows or as indicated by manufacturer.
- ✓ **DO** make sure the gown completely covers your clothing—front to back—if design of gown allows, or as indicated by manufacturer.
- ✓ **DO** make sure the gown fits securely around your wrists with gloves pulled over the cuffs.
- ✓ **DO** remove the gown by slowly rolling it inside out and away from your body. Keep contaminated front and sleeves inside the bundle.
- ✓ **DO** remove a contaminated gown inside the patient's room or a designated area outside of the patient's room (anteroom).
- ✓ **DO** dispose of a contaminated gown in the designated trash or laundry receptacle (if reusable).
- ✓ **DO** follow the procedure for putting on gown tailored to the specific type of gown (e.g., over-the-head gown).

Don't

- ✗ **DON'T** re-use the gown for the same or different patient. Disposable and reusable gowns are single time use items and should always be promptly disposed of in the garbage or laundry when care is complete.
- ✗ **DON'T** push or roll gown sleeves up your forearm.
- ✗ **DON'T** allow contaminated gowns to hang out of the garbage.
- ✗ **DON'T** wear a contaminated gown outside of the patient care area (e.g., clean areas, nurses' stations, supply rooms, hallways).
- ✗ **DON'T** wear a non-sterile gown when performing an invasive procedure or surgery. **Sterile gowns must be worn in these circumstances.**



APIC

Association for Professionals in Infection Control and Epidemiology

Figure. (2.3) Do's & Don'ts for wearing Gown in non-surgical healthcare settings.

2.6 The General Principles of use PPE should be observed:

PPE is used to prevent contact with non-intact skin, blood, body fluid, excretions and secretions of the transmission of particular organisms that may be transmitted via the air, or by contact with intact skin.

- 1) PPE is only effective in infection control and prevention when applied, used, removed and disposed of properly.
- 2) Avoid any contact between contaminated PPE and surfaces, clothing or people outside the patient care area.
- 3) Discard used PPE in the appropriate disposal bags.
- 4) Do not share PPE.
- 5) Remove PPE completely and thoroughly perform hand hygiene each time you leave a patient to attend to another patient or move to a no patient care area.
- 6) The use of PPE does not replace the need for proper hand hygiene, which needs to be performed both before PPE is applied and after it is removed
- 7) It is essential to perform a risk assessment to determine the PPE needed (Infection Prevention & Control, 2016).

2.7 The important of the health worker's knowledge to use PPE:

There are a number of reasons for this approach:

PPE protects only the person using it, whereas measures controlling the risk at source can protect everyone at the workplace;

Theoretical maximum levels of protection are seldom achieved using PPE, and the real level of protection is difficult to assess (due to factors such as poor fit, or failure to wear it when required). Effective protection can only be achieved by equipment which is correctly fitted, maintained and properly used at all times;

PPE may restrict the wearer by limiting mobility, visibility or by requiring additional weight to be carried.

Use of PPE may alter employee's perception of the hazards they are dealing with.

In this context of a last resort control measure, PPE is critically important as it is generally only used where other measures are insufficient and as such it plays a crucial role in preventing and reducing many occupational fatalities, injuries and diseases (Giard Marine and others, 2016).

2.8 The importance of patient knowledge of personal protective equipment:

Currently, there is no evidence that those without respiratory symptoms should wear face masks. If a patient has cough, they are advised to practise good cough etiquette, which includes covering the nose and mouth with tissue whenever coughing or sneezing, to throw the tissue into proper trash bins immediately after use and to wash their hands with soap and water or use hand sanitizer frequently. If a tissue is not available, they are advised to use the fold of their elbow. These patients are also advised to wear a face mask.

PUIs who do not fulfil criteria for admission to hospital will be placed under home surveillance and be monitored daily by the district health office for 14 days. During this time they are strictly prohibited from leaving their home. Other measures prescribed are available in the home surveillance assessment tool.

GPs should also provide patient and family with ongoing support, education and monitoring. This can be done by using Health Alert Cards with information useful for patient and family and counselling on any concerns they may have. This Health Alert Card can be easily obtained from the COVID-19 Management Guidelines 2020 of Ministry of Health Malaysia.³ GPs can make photocopies of these cards to be given to patients who come to their clinics. (Giard Marine and others, 2016).

2.9 The reality of the health sector in Yemen using PPE

Despite the scarcity of recent data on health indicators and demographic trends in Yemen, the analysis of pre-crisis trends has already shown the weakness of the health system, especially with regard to the lack of personal protective equipment that threatens health workers, and due to the protracted conflict, there were no reports. It is notable that the health sector lacks occupational safety equipment, as reported by the World Health Organization.

From the reality we live in, we find an increase in awareness of the importance of personal equipment, especially after the Corona pandemic, where the media had a great role in spreading awareness of the importance of personal procedures, as well as personal equipment for personal protection, where the media played a major role in

spreading awareness about what procedures start with washing hands and wearing gowns and masks.

To social distancing, has contributed greatly to spreading awareness of measures and tools for personal protection, and many studies and research have referred to this issue, as well as the World Health Organization.

2.10 previous studies:

2.10.1 Study: (Amina Ali Saad AL-Hadad and others, 2021)

Entitled: awareness of healthcare staff toward the importance of personal protective measures to prevent infection transmission at al-thawra general hospital sana'a city –yemen 2021, cross-section study was conducted among healthcare workers to assess their awareness about infection control, fill a structured self-administered questionnaire, The sample number was 380 healthcare workers, healthcare staff were included in this study with a 98% response rate; and the participants had good knowledge towards PPE prevention, Level of education and work experience were significantly associated with safe-infection prevention (p-value <0.005)

2.10.2 Study: (Mohammad Ali Hossain, Md Utba Bin Rashi, & et al., 2020)

Entitled: Health Care Providers' Compliance with the Infection Control Practices in Hemodialysis Units – Gaza Governorates, The design of this study is a cross sectional: quantitative and qualitative analytical design with census sample. The data were collected using four tools questionnaire and checklist observational.

showed that the majority (91.88%) of the study participants agreed on the importance and necessity of Infection Prevention and Control protocol for the services provided in the hemodialysis unit. The majority of the study participants neither had adequate training (70.13%) nor had adequate knowledge (55.84%) about the Infection Prevention and Control protocol, The findings of the self-administered questionnaire showed that: the compliance with wearing uniform was 83.11%; hand washing score was 72.54%; wearing gloves score was 82.14%; using antiseptic and disinfectant score was 77.01%; and safe work practices 41.88% while the observed practices showed that: wearing uniform practices was 71.5%; hand washing was 52.24%; wearing gloves was 92.84%; using antiseptic and disinfectant was 67.11%; and safe work practices was 75.33%.

2.10.3 Study: (Ameen Sherah, Mohd Jaafar, 2015)

Entitled: Assessment of Infection Control among Health Care Workers in Healthcare Centers Sana'a, Yemen: A cross-sectional study was conducted in the health center to assess knowledge and practices regarding of infection control among 237 health workers in Sana'a city. The health care workers in public centers were (51.1%) and (48.9%) of them works in private centers. One hundred and seventeen (49.4%) respondents had poor infection control knowledge, 113 (43.5%) had fair knowledge, and 17 (7.2%) had good knowledge. The knowledge was significantly associated with type of center ($P < 0.018$), such that the public center had the highest proportion with poor knowledge.

2.10.4 Study (Yakob E, Lamaro T and Henok A, 2015)

Entitled: Knowledge, Attitude and Practice towards Infection Control Measures among Mizan-Aman General Hospital Workers, South West Ethiopia, was conducted at Mizan-Aman General Hospital, Southwest Ethiopia. Cross-sectional study design was employed. All HCWs (135) were included in the study. Self-administered questionnaire was used to collect data. Data was entered in to Epidata 3.1 and transported to SPSS version 17 for analysis, Out of 135 respondents, 57(42.2%) of HCWs think that they apply standard precaution always. About two-third (65.6%) of them had ever participated in training program. All of the respondents know that dirty needle and sharp materials could transmit disease causing agents. More than three fourth (76.3%) of health care workers think that they were at risk of acquiring HIV in their work place. Among HCWs 59(43.7%) of them disposed sharp materials in open pails, 91(67.4%) in sharp and liquid proof container without removing syringe. Ninety five (70.4%) HCWs know that gloves and gowns were required for any contact with patients. Among respondent 63(46.8%) of HCWs practice standard blood and body fluid precautions always. One hundred three (76.5%) of HCWs wear gloves last time while they took blood sample. Ninety two (68.7%) of HCWs wash their hands before examining the patients and 84(62.5%) of HCWs recap needle immediately after using them.

2.10.5 Study: (Saroji V, 2014)

Entitled Awareness and practice of standard precautions among Kerala State Health Services personnel in Neyyattinkara, used the cross-sectional study was done using a structured interview schedule among

78 doctors, 151 nurses, 80 nursing assistants and 16 lab technicians working in the State health service institutions of Neyyatinkara Taluk in 2014. The findings of the study show that 86.5 percent of the health care personnel (HCP) had good awareness in hand hygiene (HH), 64 percent in use of personal protective equipment (PPE), 78.8 percent in respiratory hygiene (RH), 93.5 percent in safe injection practices (SIP) and 18.5 percent in waste disposal and decontamination (WD). Good practice was seen in 9.2 percent of HCP for HH, 69.5 percent in PPE, 94.2 percent in RH, 86.8 percent in SIP and 97.8 percent for WD respectively. When all elements were analyzed together nurses were the most likely to have good awareness (15.9%) and doctors were the most likely to have good practice (8.97%). Significant association was noted between age and awareness in HH ($p=0.012$) and RH ($p=0.049$), between availability of resources and practice in RH ($p=0.004$), PPE ($p=0.042$) and HH ($p=0.045$) and between trainings received and practice in RH ($p=0.037$). Hepatitis B vaccination was taken by 68.6 percent of respondents only.

2.10.6 Study (Tarko S, Azazh A and Abebe A, 2014)

Entitled Assessment of the Knowledge, Attitude and Practice of Fourth, Fifth and Sixth Year Medical Students on Standard Precaution in Tikur Anbessa Specialized Hospital, Addis Ababa, A cross-sectional study carried out among 200 health workers in Nigeria Showed that majority 177(88.50%) of the respondents were aware of standard precaution and 83(41.50%) opined that standard precaution should be applied for all patients during treatment Attitude of the respondents shows that majority 172(86.0%) agreed that standard precaution can

prevent the spread of infectious diseases, while 183 (91.50%) affirmed that they would report to the hospital following a needle stick injuries and 133(66.50%) agreed that they will screen the patient for HIV following a needle stick injury.

2.10.7 Study: (Moyo M G, 2013)

Entitled factors influencing compliance with infection prevention standard precautions among nurses working at mbagathi district hospital, Nairobi, kenya, used the A cross-sectional survey of 90 nurses working in medical, surgical, pediatric and maternity wards was conducted in Nairobi in 2013, reached a number of results, the most important of which are: Only 17.8% (n=90) of the participants had adequate knowledge on the basic elements of infection prevention standard precautions, Gloves were the most utilized personal protective equipment by 88.9% (n=18) of the participants, gowns by 61.1% (n=18) and 5.6% (n=18) used mouth and eye protection. Non availability of infection prevention materials and lack of regular continuous medical education on infection prevention were the major reported causes for noncompliance with standard precautions.

2.10.8 Study (Jain M., Dogra V, Mishra B, Thakur A & Loomba P, 2012)

Entitled Infection control practices among doctors and nurses in a tertiary care hospital. Annals of Tropical Medicine and Public Health, The findings revealed that 55.3% of the respondents' had knowledge regarding standard precautions and 31.8% had knowledge on risks associated with needle stick injuries. The lack of knowledge and

practices regarding basic infection control protocols revealed in this study should be improved by way of educational intervention, in the form of formal training of doctors and nurses IP practices and reinforcement of the same.

2.10.9 Study (Ogoina D, Pondei K K, Adetunji B, Chima G,4 Isichei C, and Gidado S,2011)

Entitled Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria, A cross-sectional study was undertaken in 2011/among HCW in Nigeria to assess Knowledge, attitude and practice of standard precautions of infection control. (91.6%) of the study participants had previously heard about standard precautions of infection control. Ninety-seven per cent knew that standard precautions should be practiced on all patients and laboratory specimens irrespective of diagnosis. The majority of the participants (95.8%) knew that hands should be washed after touching a patient, while 96.5% knew that gloves should be worn before venipuncture. Seventy-three per cent knew that hands should be washed after touching a patient's surroundings. Most (95%) of the study participants believed that standard precautions will prevent them from acquiring infection from the hospital. About 98.9% agreed that gloves should always be worn before venipuncture. Thirty-nine per cent did not agree that sharps should never be recapped, while 13.4% felt that sharp needles can be bent or broken after use. With regard to the practice of hand hygiene, 58.5%, 28.1% and 63.6% always practiced hand hygiene after touching patients, after touching patients' surroundings and after

removing gloves, respectively. In relation to injection safety, 63.6% had always disposed of sharps/needles in puncture proof containers in the prior six months

2.10.10 Study: (Duminy M J, 2010)

Entitled An investigation into the knowledge and compliance with standard precautions amongst nurses in Tygerberg Hospital in the Western Cape, Study conducted at Tygerberg Hospital in 2010 among nurses'. The findings of the study showed that nurses have inadequate knowledge regarding standard precautions and the mean score of the nurses overall self-reported compliance of standard precautions was 87.5%. The results also showed that when patients are HIV positive nurses intend to over comply the use of personal protective equipment. No association was found between the nurses' knowledge and compliance regarding standard precautions. It is therefore important that every nurse should be educated about the basic principles of standard precautions and also the policies and protocols of infection control in order to prevent each nurse from getting infected. Training needs to be implemented starting in the wards through the unit manager to improve all the nurses' knowledge and practice.

2.10.11 Study: (Franklin E O, 2009)

Entitled The knowledge and practice of standard precautions among health care workers in public secondary health facilities in Abuja, Nigeria, used A quantitative descriptive survey was conducted in public secondary health facilities in Abuja, the Federal Capital Territory of

Nigeria in 2009 to examine the knowledge and practice of standard precautions among health care workers with 83 doctors and 194 nurses using a structured questionnaire. Findings show suboptimal knowledge and practice of the standard precautions among the health care workers. Knowledge of postexposure prophylaxis for HIV was low as well as hepatitis B immunization among the respondents. A lack or irregular supply of essential materials, such as personal protective equipment, was the main reason the respondents did not comply to the precautions. This report recommends the development and implementation of a comprehensive infection prevention and control program in health facilities in order to ensure compliance to the standard precautions by health care workers.

2.11 The study is distinguished from previous studies

After reviewing previous studies, the researchers found that this study agrees with previous studies in terms of the subject of the study, which is Awareness of Healthcare Staff toward the Importance of Personal Protective Measures to Prevent Infection Transmission.

However, it differs from previous studies, that it targeted all Healthcare Staff in the 48th Medical Model Hospital with a large sample size, and was conducted in a place where no study of this type was conducted. Also, this hospital has standards and policies on infection control and the staff is trained on them due to the fact that it practices the health quality system, It also differs from the previous study in the time in which it was conducted, as the time of conducting the study is an exception due to the circumstances that Yemen is going through.

Chapter Three:

Methodology

3. Chapter three: Methodology

3.1 Introduction

This chapter explains the research methods that guided the study from the onset till its completion. These include (study design , study setting , study population, sample size estimation, selection criteria, sampling method, data collection methods, data collection instrument, data analysis, ethical considerations, limitations of the study, rigors of research and dissemination of the findings).

3.2 Study design

This study was used curriculum descriptive cross-sectional study. To assess the Awareness of Healthcare Staff toward the importance of Personal Protective Measures to Prevent Infection Transmission.

3.3 Study setting

This study was conducted at 48 Model Hospital in Sana'a, city Yemen During the year (2022).

3.4 Study population

All Healthcare Staff (physicians, specialists, technicians and nurses) with various educational backgrounds and working at 48 Model Hospital in Sana'a, City, Yemen during the data collection period. The study community had (657) employees .A random sample was taken (259) Of HCWs. The sample size is determind using (Epicalc 2000).

3.5 Study sample and sampling methods

The simple random sample methods were taken to select the sample size (259). After official approvals was obtained from the previously selected settings, the researchers obtained lists of Healthcare Staff currently working in the study settings.

The list was reviewed and Healthcare Staff meeting the inclusion criteria was included in the study.

3.6 Sample size determination:

Sample size was determined using (Epicalc 2000). taking into

consideration the following; Healthcare Staff who are working at 48 Model Hospital in Sana'a, City, Yemen.

The sample size calculated as a follows: the population of the study was all Healthcare Staff working at 48 Model Hospital was (613) Staff, according to statistical office in each hospital (Info ...cdc), The final sample size was (259) Yemeni Healthcare Staff. Calculation the sample size from each ward in the hospital was prepared by the following Table:

Table 3 1: sample size

Name of ward	TOTAL	sample size =40%	% OF TOTAL
Department of Medical	41	16	6%
Department of Surgery	117	47	18%
children section	33	13	5%
Department of Neurology	52	20	8%
Women's Department	36	14	5%
Operations Department	37	14	6%
Intensive Care Departments (ICU).	176	70	27%
Emergency Department	54	21	8%
Other technical sections	111	44	17%
Total	657	259	100.00%

3.7 Inclusion and exclusion criteria

3.7.1 Inclusion criteria of cases:

The healthcare staff and Medical students: Doctor, nurse, Nursing - Level 4, Nursing - Level 3, Nursing - Excellence, Anesthesia technician, Technical operations, Other technicians, In the following departments at 48 Model Hospital –Sana'a City:

- 1 Department of Medical
- 2 Department of Surgery
- 3 children section
- 4 Department of Neurology
- 5 Women's Department
- 6 Operations Department
- 7 Intensive Care Departments (ICU).(5 units)
- 8 Emergency Department
- 9 Other technical sections

3.7.2 Exclusion criteria of cases:

1. Who refused voluntarily to participate in the study.
2. Who had foreign nationality

3.8 Data Collection technique and tools

3.8.1 Data Collection technique:

All Data were collected via a questionnaire tool that was prepared by researchers based on previous studies and it was modified according to the observations of the supervisor and arbitrators.

it contains (single choice questions) including closed-ended

questions and three branching (yes, no, I'm not sure).

The survey was divided into parts:

1. **First part:** Socio-demographic data: It contains the following data (age, sex, marital status, job qualification, location department, and years of experiences).
2. **Second part:** Questions about knowledge and awareness of the importance and preventive measures and their role in preventing transmission of infection.
3. **Third part:** Questions about knowledge and awareness of the correct way to use personal protective equipment and preventive measures.

3.8.2 **Data collection tools:**

Data was collected via a specially designed self-administered questionnaire that contains (single choice) questions including closed-ended questions and dichotomous (yes, no, I'm not sure).

The survey was divided into parts:

- ✓ section first: Socio-demographic data: It contains the following data (age, sex, marital status, job qualification, location department, and years of experiences).
- ✓ section second: Questions about knowledge and awareness of the importance and preventive measures and their role in preventing transmission of infection.
- ✓ section third: Questions about knowledge and awareness of the correct way to use personal protective equipment and preventive measures.

3.8.3 Validity and reliability:

The validity of the English and Arabic version of the questionnaires was reviewed by supervisor's amendments and the amendments of five arbitrators with academic degrees in the field of study from 21 September University and other Yemeni universities and depending on the several previous studies.

the reliability was using Cronbach's Alpha So, tool found to highly reliable for data collection.

3.9 Pilot study:

The pretest of the questionnaire was performed before data collection, a pilot study was done in study sitting on (10%) of sample Healthcare Staff working at 48 hospitals to assess reliability and validity of questionnaire to identify practical or local problems that might be potentially affect the research process.

Some questions WAS omitted, some added and others rephrased. The pilot study samples was exclude from the study samples.

3.10 Data processing and statistical analysis:

All data were processed using statistical package for social sciences (SPSS) program version 24. Quantitative data including normally distributed continuous variables were expressed as mean $\pm$ standard deviation (SD), The categorical variables were represented as frequencies and percentages. Comparisons between categorical variables were assessed for statistical significance using the chi

square test. 0.05 was considered statistically significant. Finally a descriptive measure, including frequency, prevalence rate, percentage, arithmetic mean and standard deviation, and p-value were presented.

3.11 Ethical considerations:

- 1) The approval was taken from ethical committee of 21 September University.
- 2) An official memorandum was taken from the university to the ministry of health then to the hospitals for the purpose of obtaining approval to conduct the research.
- 3) The official approval was obtained from the administration of the hospitals in which the studies were conducted.
- 4) Verbal consent was obtained from the health care staff toward who participated in this study.
- 5) The health care staff toward who refused to participate in the study were excluded and can be withdrawal from the study

Chapter Four:

Findings

1. Chapter four: Findings

4-1 Introduction

This chapter included a presentation of data analysis and testing hypotheses of the study, by answering the study questions and reviewing the most prominent results of the questionnaire, which were reached by describing and analyzing the characteristics of the study sample members, and the questionnaire items were analyzed using appropriate statistical methods such as frequency, percentage, and others.

4-2 Analysis of demographic characteristic

Distribution of the participated of health Healthcare Staff at (48) Model Hospital Sana'a City, Yemen according demographic characteristic (Age & Sex & Marital state & Educational status& Specialization& ward& training).

4-2-1 Description of the age variable of the sample

Table 4 1: Description of the sample according to age

Age	No.	%
Less than 25 years old	74	28.6%
From 26-30 years old	121	46.7%
Over 30 years old	64	24.7%
Total	259	100.0%

The result of the present study showed that (46.7%) of the participants their age from (26 - 30) -years-old, (28.6%)of the participants their age Less than(25) years old, (24.7%) of the participants their age Over (30) years' old. See figure (4.1). Because most of the hospital staff 48 are recent graduates. Also there are employees from the newly established (21st September) University.

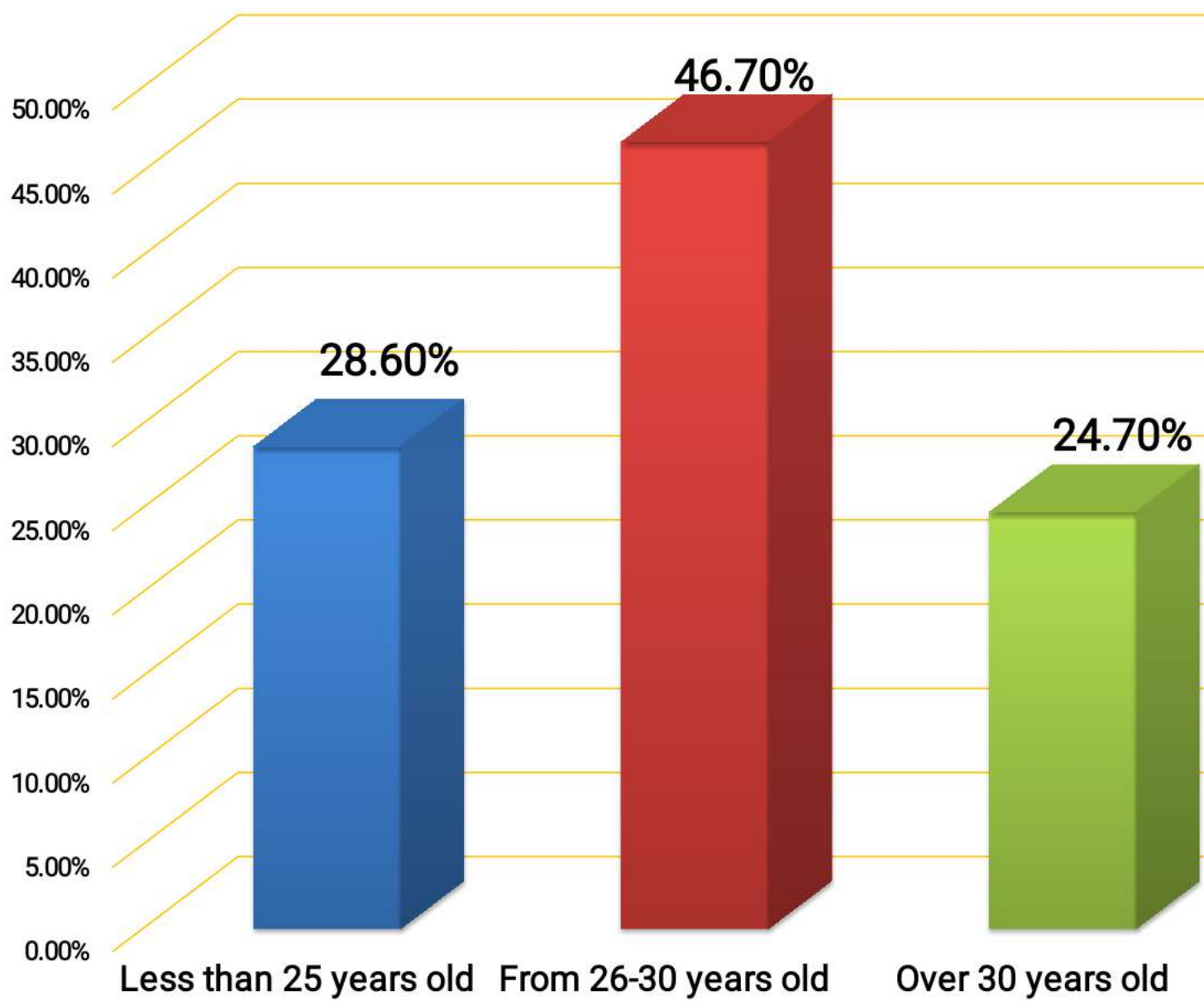


Figure 4 1: Description of the sample according to age

4-2-2 Description of the gender variable of the sample

The following table shows the frequencies and percentages of the gender variable for the sample members under study

Table 4 2: Description of the sample according to gender

Sex	No.	%
Male	193	74.5%
Female	66	25.5%
Total	259	100.0%

The table(4.2) shows that the majority of the participants was males with a percentage (74.5%), while the percentage of females was (25.5%), See figure (4.2) because the applicants to 48 Hospital are mostly men. And because of the (24) hour working system, it is difficult for women to work at night.

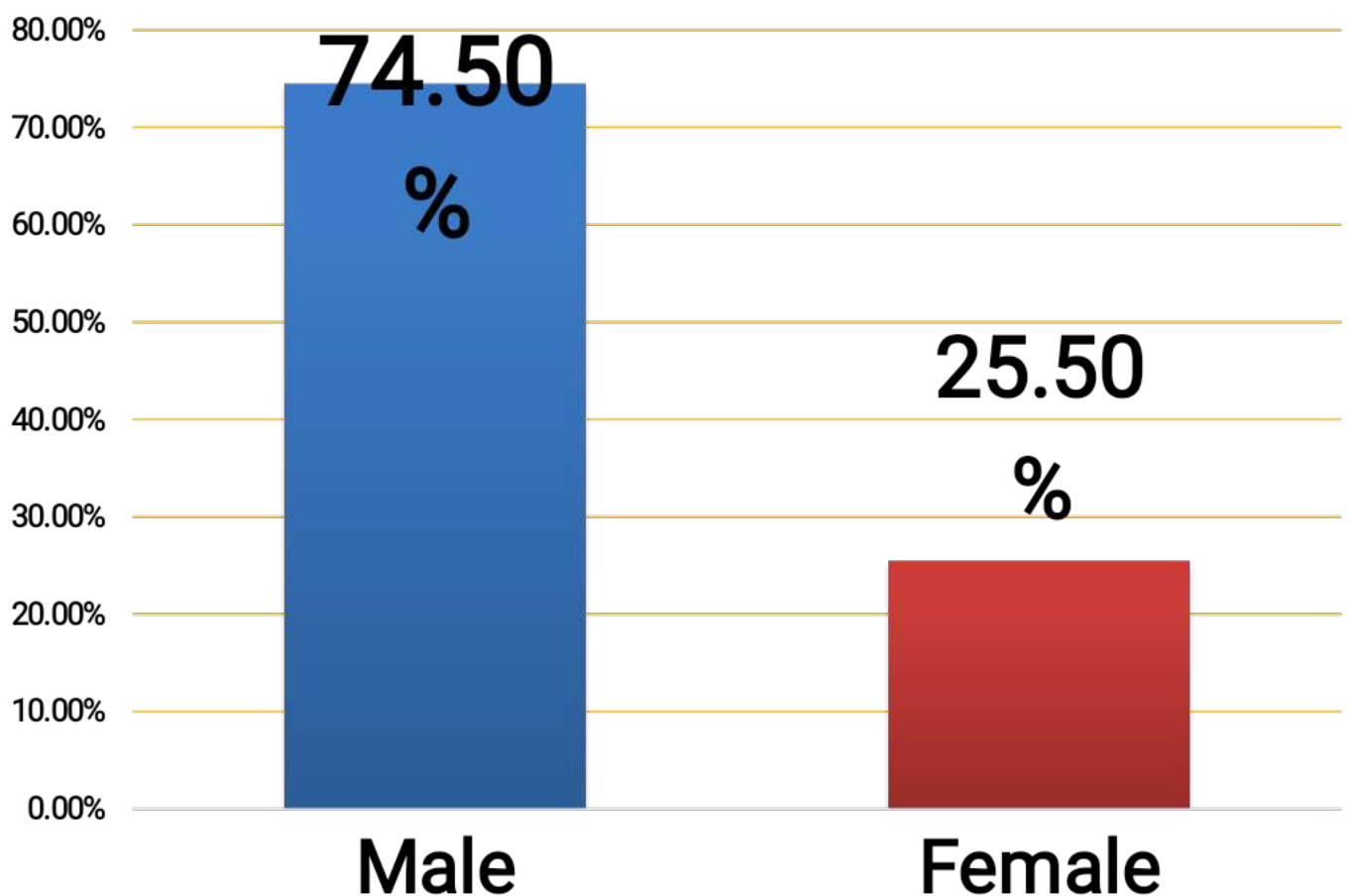


Figure 4 2: Description of the sample according to gender

4-2-3 Description of the Social status variable of the sample

The following table shows the frequencies and percentages of the social status variable for the sample members under study

Table 4 3: Description of the sample according to the Social status

Social state	No.	%
Married	155	59.8%
Single	95	36.7%
Divorced	5	1.9%
Widow	4	1.6%
Total	259	100.0%

The Table(4.3) shows that the majority of the participants their social status of Married by (59.8%), followed of the participants their social status of Single by (36.7%), (1.9%)of the participants their social status of Divorced, (1.6%) of the participants their social status of Widow, See figure (4.3)

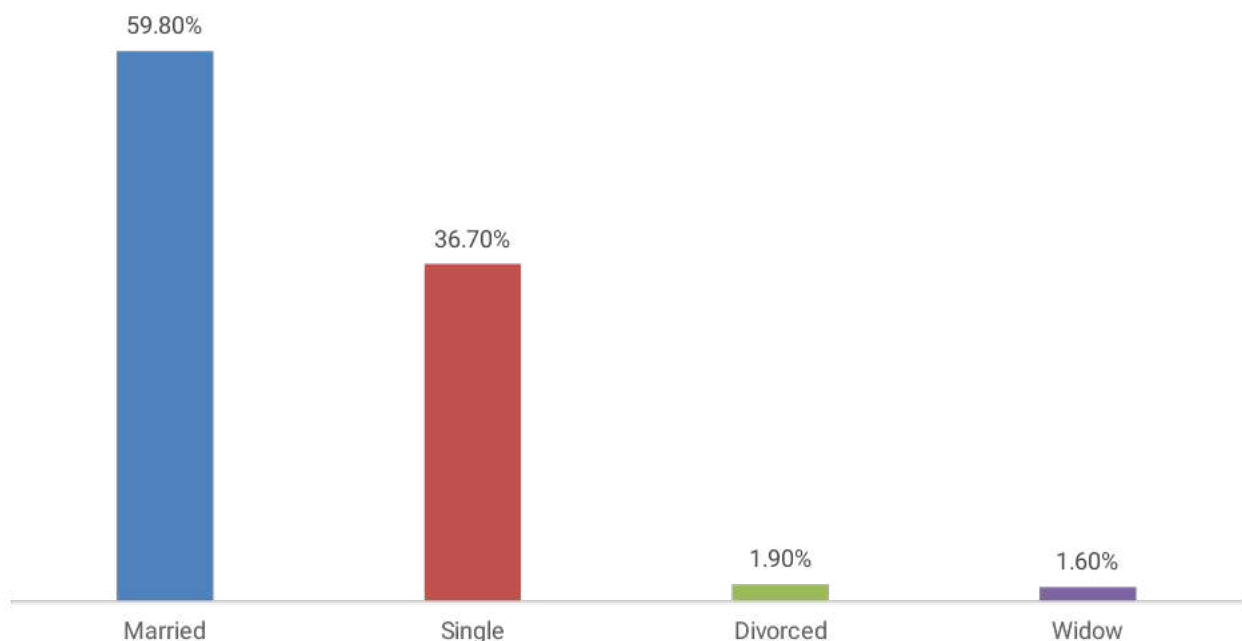


Figure 4 3:Description of the sample according to the Social status

4-2-4 Description of the educational level variable of the sample

The following table shows the frequencies and percentages of the educational level variable for the sample members under study

Table 4 4: Description of the sample according to the educational level

Educational status	No.	%
Diploma	100	38.6%
Bachelor's	132	51.0%
Master's	10	3.9%
board	10	3.9%
Other	7	2.6%
Total	259	100.0%

. The Table(4.4) shows that, the high percentage (51.0%) of the sample were educational level Bachelor's, (38.6%) of the sample were educational level diploma, (3.9%) of the sample were educational level (Master's, board), **see figure (4.4)** It was noted that most of the health staff at the 48th hospital have a bachelor's degree . Because the hospital applies comprehensive quality standards.

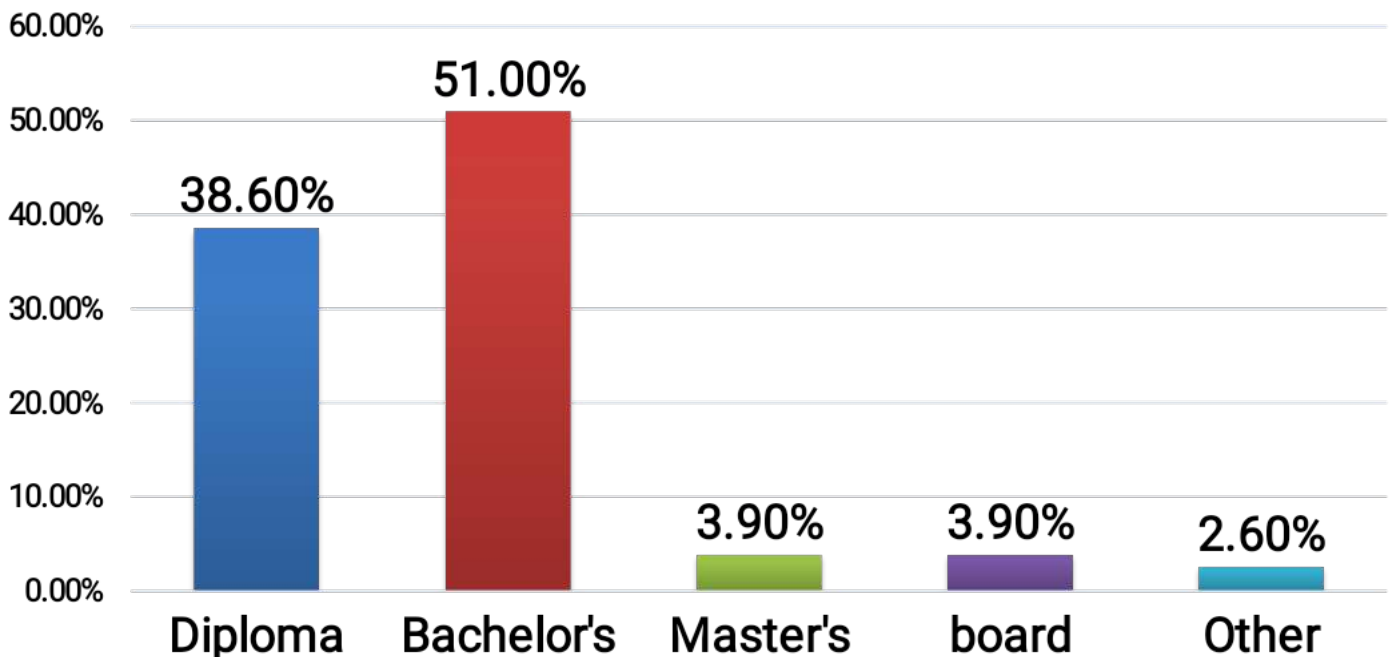


Figure 4 4: Description of the sample according to the educational level

4-2-5 Description of the Specialization variable of the sample

The following table shows the frequencies and percentages of the Specialization variable for the sample members under study

Table 4 5: Description of the sample according to the Specialization

Specialization	No.	%
Doctor	30	11.6%
Nurse	109	42.1%
Nursing - Level 4	20	7.7%
Nursing - Level 3	27	10.4%
Nursing - Excellence	8	3.1%
Anesthesia Technician	7	2.7%
Technical Operations	5	1.9%
Technical Others	53	20.5%
Total	259	100.0%

The Table(4.5) shows that, the high percentage (42.1%) of the sample were Specialization Nurse, (20.5%) of the sample were Specialization Others, (11.6%) of the sample were specialization Doctor, (10.4%) of the sample were Specialization Nursing - Level 3, *see figure (4.5)* In most hospitals, the nursing staff is larger than the rest of the health staff. In order to take care of the patient and monitor his health condition.

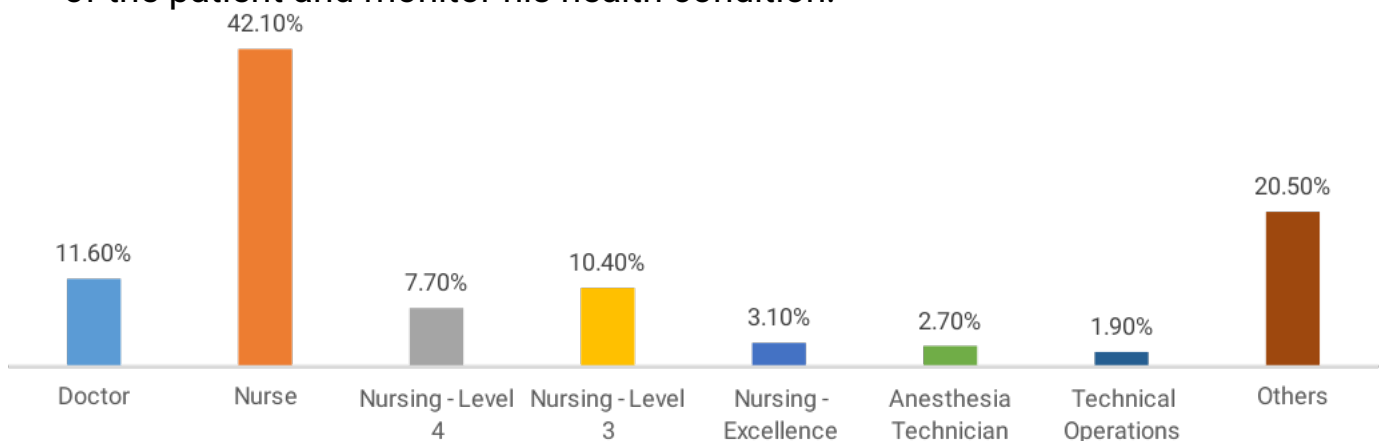


Figure 4 5: Description of the sample according to the Specialization

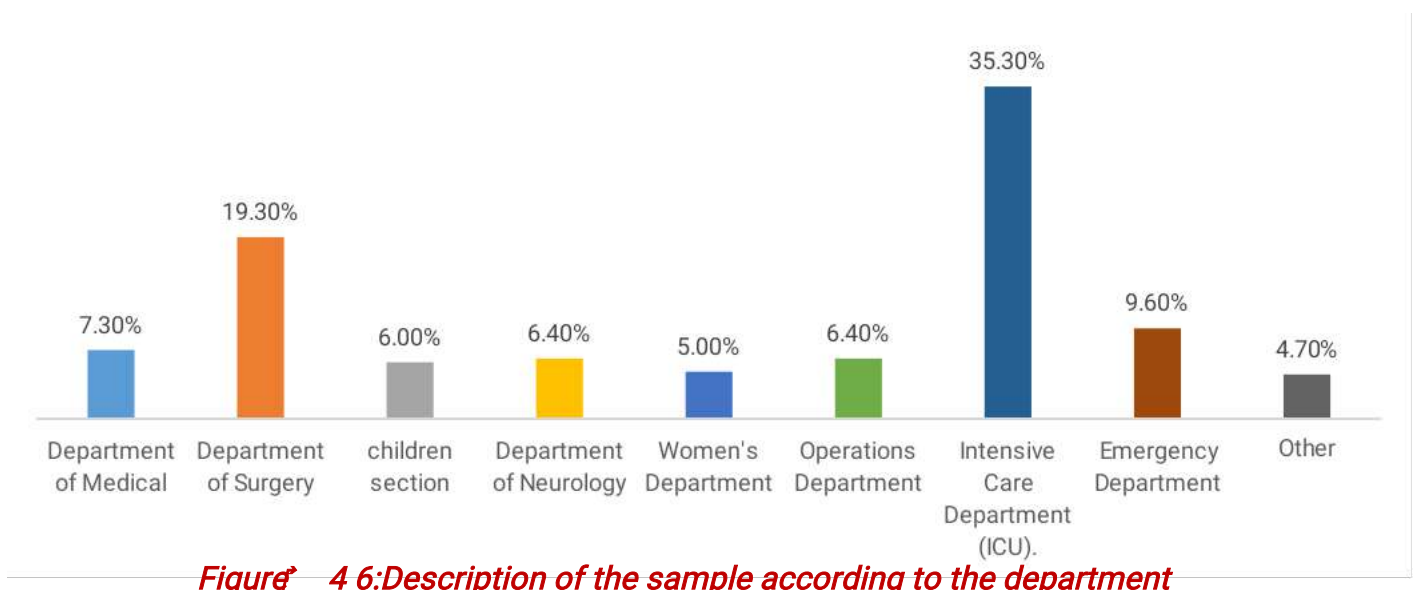
4-2-6 Description of the department variable of the sample

The following table shows the frequencies and percentages of the department variable for the sample members under study

Table 4 6: Description of the sample according to the department

department	No.	%
Department of Medical	16	7.3%
Department of Surgery	42	19.3%
Department of children	13	6.0%
Department of Neurology	14	6.4%
Women's Department	11	5.0%
Operations Department	14	6.4%
Intensive Care Department (ICU).	77	35.3%
Emergency Department	21	9.6%
Lab Department	10	4.7%
Total	259	100.0%

The Table(4.6) shows that, the high percentage (35.3%) of the sample were form ICU units, (19.3%) of the sample were Department of Surgery, (9.6%) of the sample were Emergency Department, (7.3%) of the sample were Department of Medical, [see figure \(4.6\)](#). It was noted that the Intensive Care Department is the largest because of the pressure of work. And because the cases need intensive care.



4-2-7 Description of the years of experience variable of the sample

The following table shows the frequencies and percentages of the years of experience variable for the sample members under study.

Table 4 7: Description of the sample according to years of experience

Years of experience	No.	%
Less than 5 years	127	49.0%
From 5 - 10 years	71	27.4%
More than 10 years	61	23.6%
Total	259	100.0%

the Table(4.7) shows that, the high percentage (49.0%) of the sample were Years of experience Less than 5 years, (27.4%) of sample were Years of experience Less from (5 - 10) years, (23.6%) of the sample were Years of experience More than (10 years), *see figure(4.7)* Because the hospital is near 48 from the September 21 Applied Medical University, it accommodates graduates from the university.

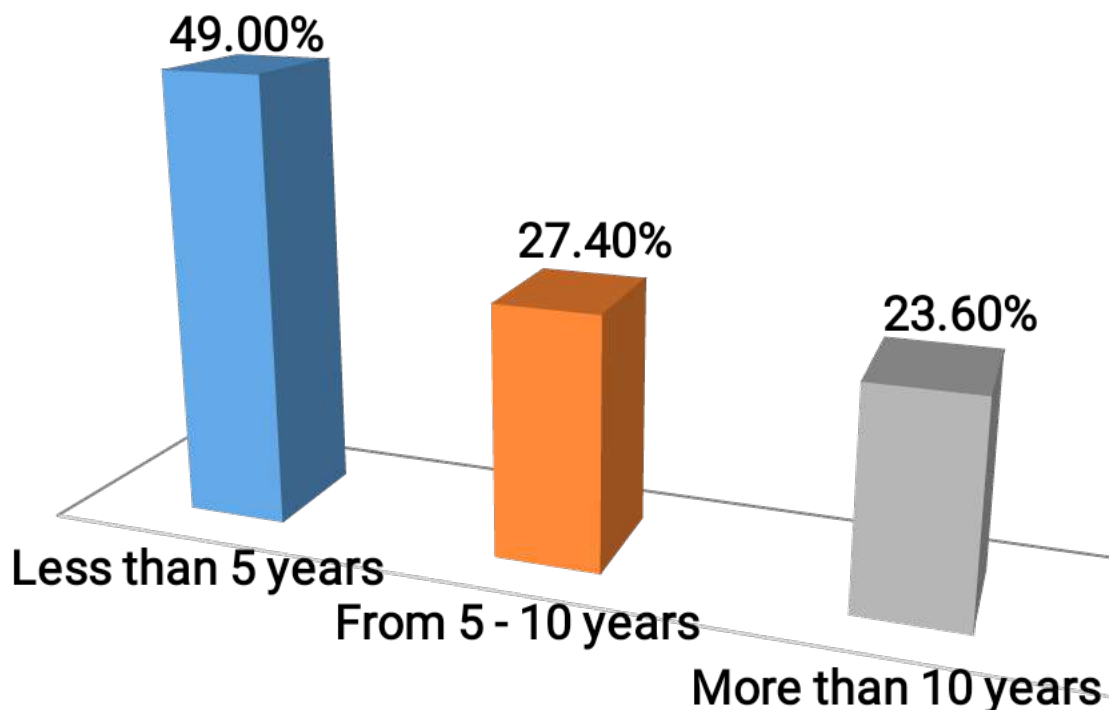


Figure 4 7: Description of the sample according to years of experience

4-3 Knowledge and Awareness of Preventive Tools and Measures and Their Role in Preventing Transmission

4.3.1 knowledge about the importance of preventive measures appropriate

The following table shows the frequencies and percentages of question (Is your level of knowledge about the importance of preventive measures appropriate)

Table 4 8: level of knowledge of the importance of personal protective equipment according to respondents' opinion

Is your level of knowledge about the importance of preventive measures appropriate	No.	%
Yes	231	89.2%
No	3	1.2%
I'm not sure	25	9.6%
Total	259	100.0%

table(4.8) above shows that most of sample by (89.2%) believe they have knowledge of the importance of personal protection appropriate, (1.2%) don't believe, (9.6%). don't know sure. **see figure (4.8)** because hospital 48 Applies comprehensive quality standards also It does not receive any health personnel or trainees from medical colleges except after quality lectures , infection control , and safety procedures. This increases their awareness.

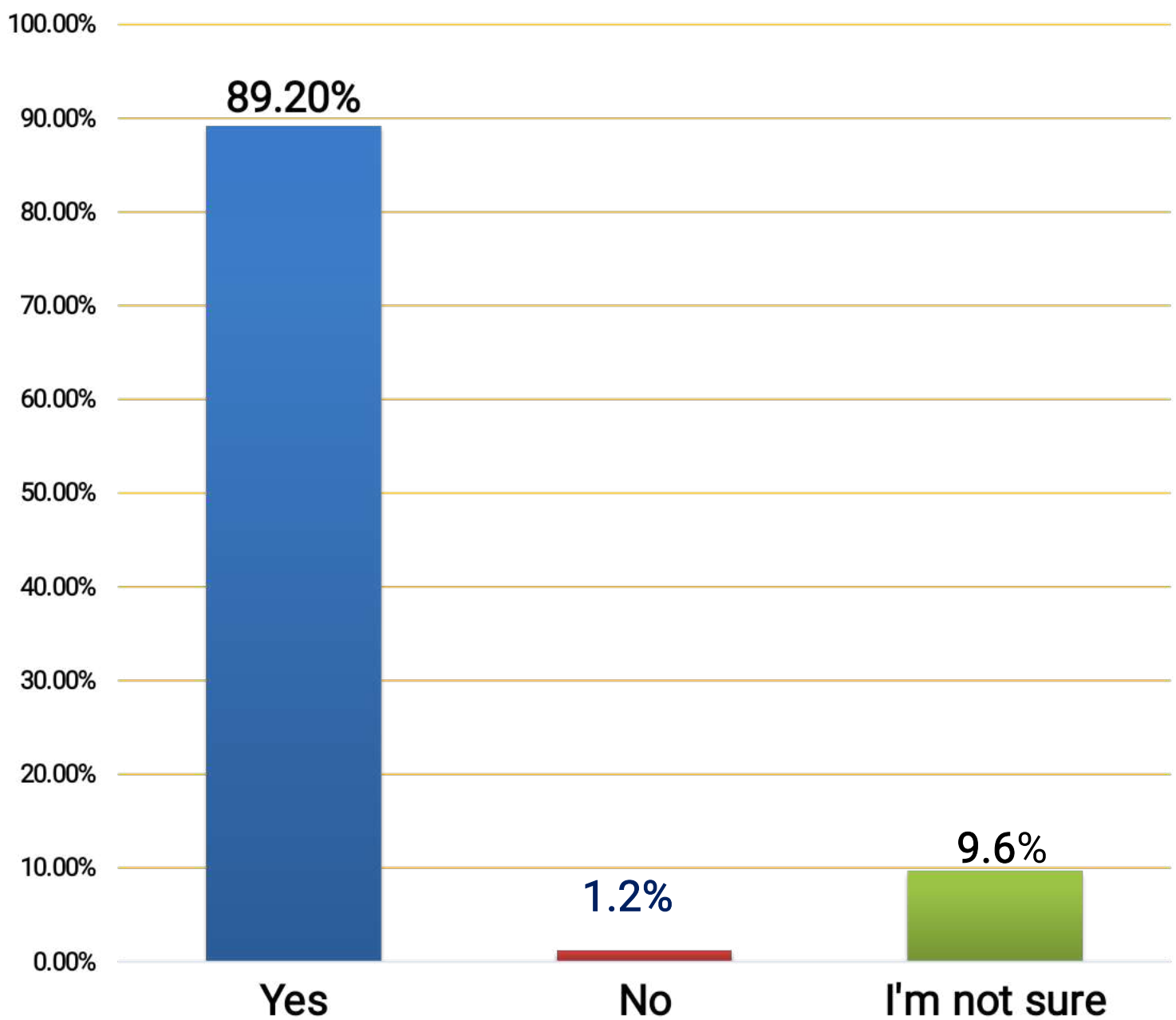


Figure 4 8: level of knowledge of the importance of personal protective equipment according to respondents' opinion

4.3.2 Training in the use of personal protective equipment

The following table shows the frequencies and percentages of question (Have you ever taken PPE courses)

Have you ever taken PPE courses	No.	%
Yes	184	71.0%
No	68	26.3%
I'm not sure	7	2.7%
Total	259	100.0%

Table 4 9: Training in the use of personal protective equipment

From above table we can say (71.0%) of sample have PPE courses, 26.3% have not PPE courses, and not sure with a percentage of (2.7%). **see figure (4.9)**. Because 48 hospital appraises lectures are taken on infection control , quality, safety procedures before approval HCWs.

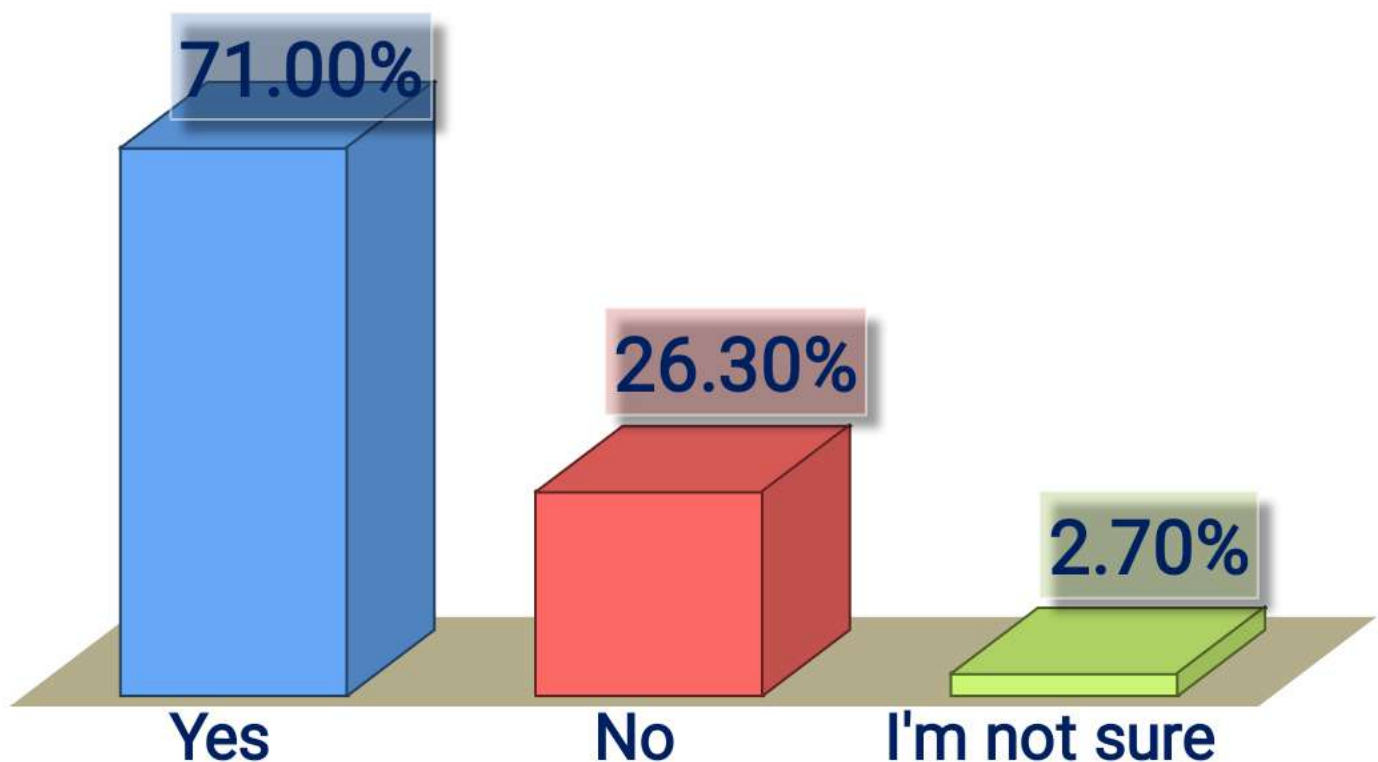


Figure 4 9: Training in the use of personal protective equipment

4.3.3 Knowledge of PPE Importance among surveyed HCWs

The following table shows the frequencies and percentages of Knowledge of PPE importance among surveyed HCWs.

Table 4 10: Knowledge of PPE use among surveyed HCWs

N	Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.	Yes		No		I'm not sure	
		N	%	N	%	N	%
1	Do you know what is meant by PPE?	231	89.2%	6	2.3%	22	8.5%
2	It shall be avoided for the polluted protective articles to contact with the surface of other articles, the clothes or the staff outside of the ward?	232	89.6%	24	9.3%	3	1.1%
3	Washing and disinfecting the hands immediately if contacting any blood, body fluid, secretion, excretion, or dirty substance?	254	98.1%	4	1.5%	1	0.4%
4	Is personal protective equipment (PPE) available in your work environment?	183	70.7%	55	21.2%	21	8.1%
5	Has your level of awareness of the importance of preventive measures (PPE) increased after a pandemic/ Corona?	225	86.9%	21	8.1%	13	5.0%
6	Do you think that the available personal protective equipment is effective in preventing infectious diseases?	181	69.9%	47	18.1%	31	12.0%
7	Does the type of personal protective equipment chosen depend on the type of exposure and the procedure / Infectious diseases?	203	78.4%	30	11.6%	26	10.0%
8	Do you know if the gloves that are worn protect you from some infectious disease pathogens?	215	83.0%	22	8.5%	22	8.5%
9	Is wearing an N95 mask important when dealing with airborne infections?	214	82.6%	24	9.3%	21	8.1%
10	Does the diagnosis of the patient you interact with influence your decision to choose What type of personal protective equipment?	202	78.0%	41	15.8%	16	6.2%
11	Are the hands of health workers a means of transmitting pathogens in hospitals?	229	88.4%	21	8.1%	9	3.5%
12	Are you ready to attend awareness and guidance courses and seminars to learn about the importance of personal protective equipment And preventive measures and ways to use them?	212	81.9%	22	8.5%	25	9.6%
13	The gloves shall be worn in the operation of blood drawing , venous puncture , ..etc	243	93.8%	10	3.9%	6	2.3%
14	The gloves shall be worn in the operation might contact with the secretion and excretion of patient?	248	95.8%	10	3.9%	1	0.3%
15	Since the gloves can prevent from the pollution for the hands there is no need to wash hands after taking of the	62	23.9%	189	73.0%	8	3.1%

N	Knowledge and awareness of the	Yes		No		I'm not sure	
	gloves?						
	Total	209	80.7%	35	13.5%	15	5.8%

The table (4-10) showed that overall Knowledge of health workers was (80.7%) this indicating at there are Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection with high level.

The result showed that the Highest answer about Knowledge that Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection is (Washing and disinfecting the hands immediately if contacting any blood, body fluid, secretion, excretion, or dirty substance), Where 254 (98.1%) Most of the participants indicated by necessity washing and disinfecting hands immediately, when contacting any blood, body fluid, secretion, excretion, or dirty substance.

The result showed also that Most of the participants 248 (95.8%) have high knowledge of the necessity of the gloves worn in the operation might contact with the secretion and excretion of patient.

explained 232 (89.6%) that their know that avoid for the polluted protective articles to contact with the surface of other articles, the clothes or the staff outside of the ward, 231 (89.2%) of respondents indicated that they know what PPE, 229 (88.4%) of respondents indicated that the hands of health workers a means of transmitting pathogens in hospitals.

225 (86.9%) of respondents indicated The level of awareness of the importance of using personal protective equipment has increased, after a pandemic/ Corona, and 215 (83.0%) know that worn of the gloves protect from some infectious disease pathogens, 214 (82.6%) of respondents indicated wearing an N95 mask important when dealing with airborne infections.

the study results indicated that [n=209; (80.7%)] health working have

Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection, [n=35; (13.5%)] don't Knowledge, [n=15; (5.8%)].

The following table describes Descriptive Statistics of total knowledge level for health working regarding Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.

level of total knowledge regarding Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection were (114) of responders by percentage (44.0%) had knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection at the High level (High knowledge), (93) of responders by percentage (35.9%) had knowledge at the Good level (Good knowledge), followed Poor knowledge by percentage (20.1%).

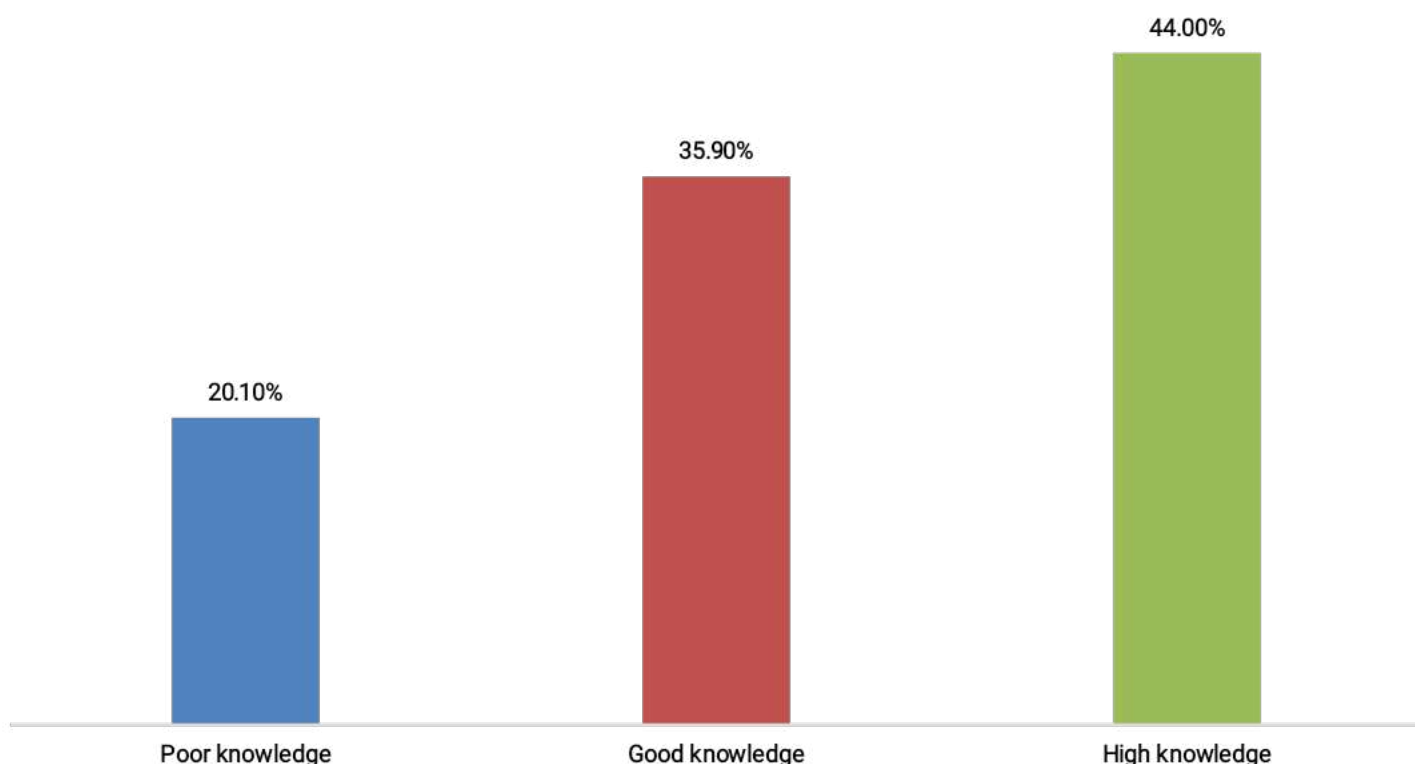


Figure 4 10: Knowledge of PPE use among surveyed HCWs

The following table describes Descriptive Statistics of total regarding Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.

Table 4 11: Descriptive Statistics of total Knowledge of HCWs regarding importance of PPE

awareness of the correct way of preventive measures and use of PPE	
items	Number
N	259
Minimum	0.4
Maximum	1
Mean	0.8067
Std. Deviation	0.1268

the results have shown that the level of total knowledge regarding Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection was at the high level (M =0.80, SD=0.12) with the minimum scores of (0.40) and the maximum scores (1.00)

4.3.4gain knowledge about preventive measures

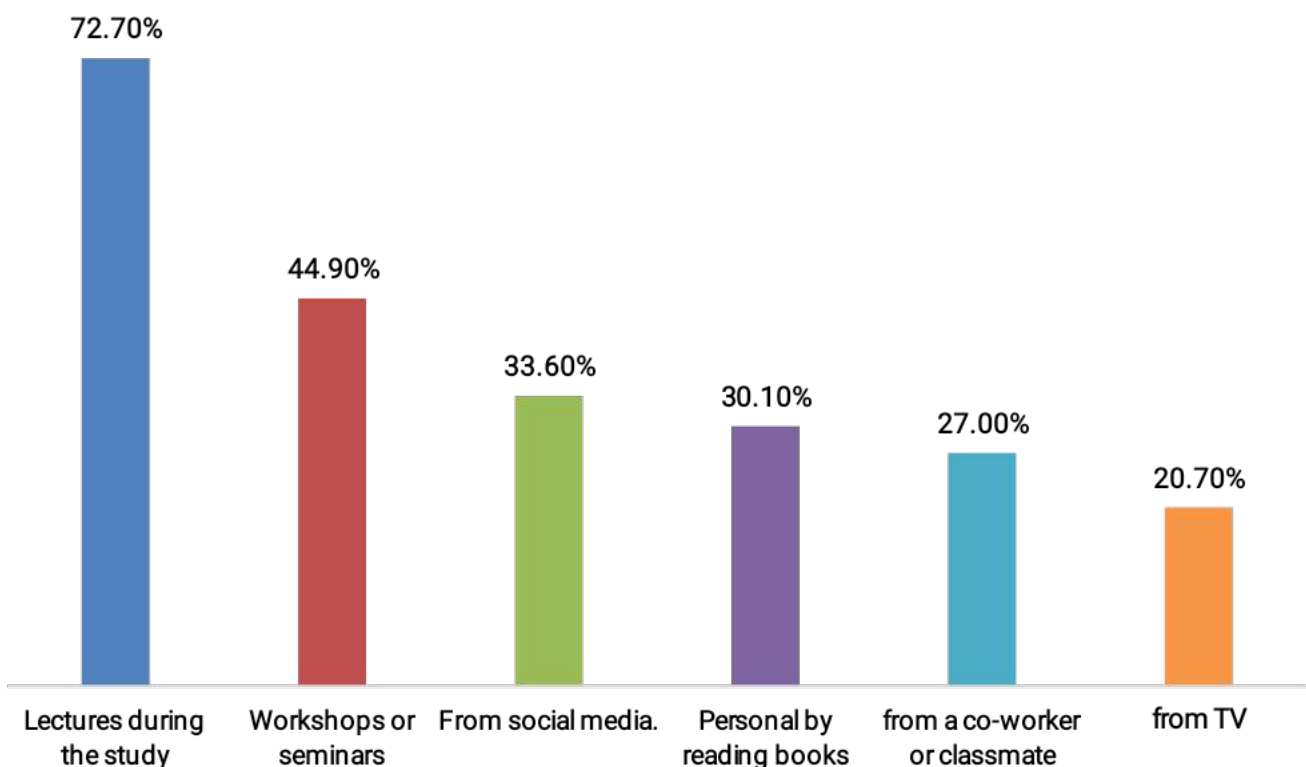


Figure 4 11: gain knowledge about preventive measures

From above figure we say (72.7%) you heard or training about PPE from lecture, (44.9%)from workshop or seminar, (33.6%)from social media, (30.1%)from reading books, and (27.0%)from co-worker or classmate, (20.7%) from TV.

4.3.5 personal protective equipment

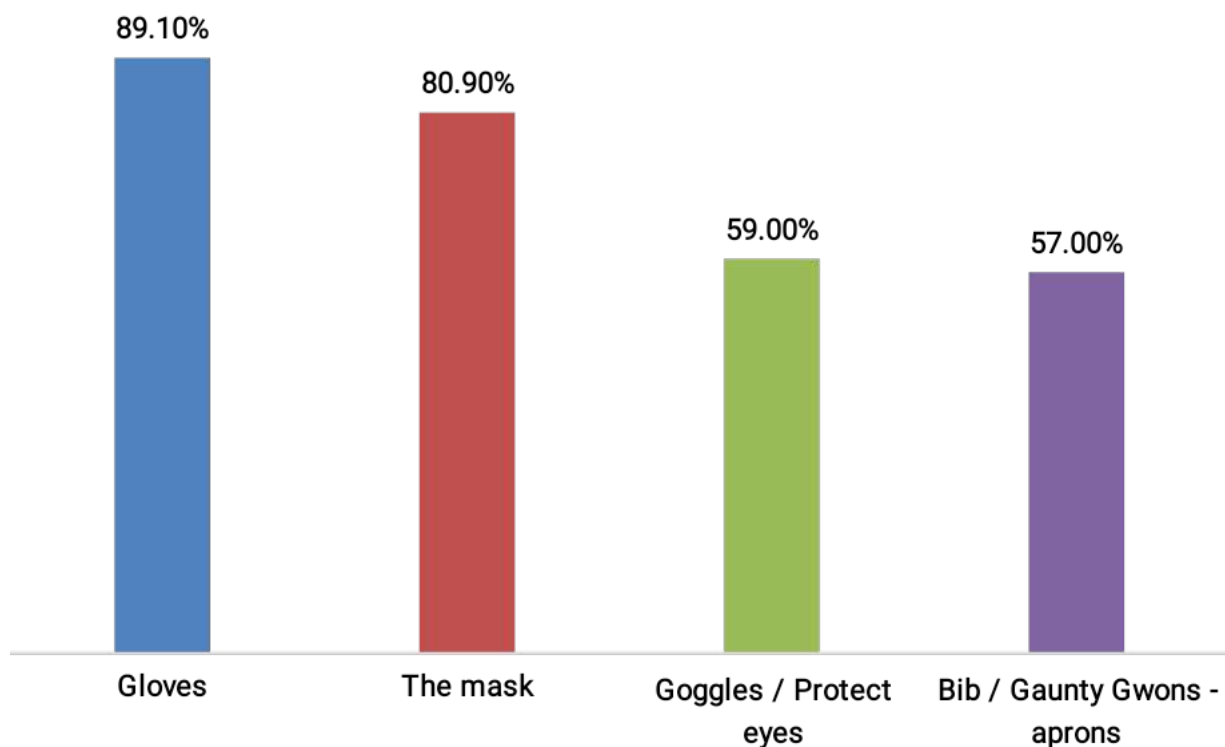


Figure 4 12: personal protective equipment

From above figure we can say (89.1%) yes Gloves are considered personal protection tools and (11.9%) say no, Mask (80,9%), say yes a considered personal protection tools and (19,1%) say no. Goggles or Protect eyes (59.0%), is considered a personal protection and (41.0%) say no. Aprons or gowns, (57.0%), say yes which are considered personal protection tools and (43.0%) say no.

4.3.6 important is the use of personal protective equipment

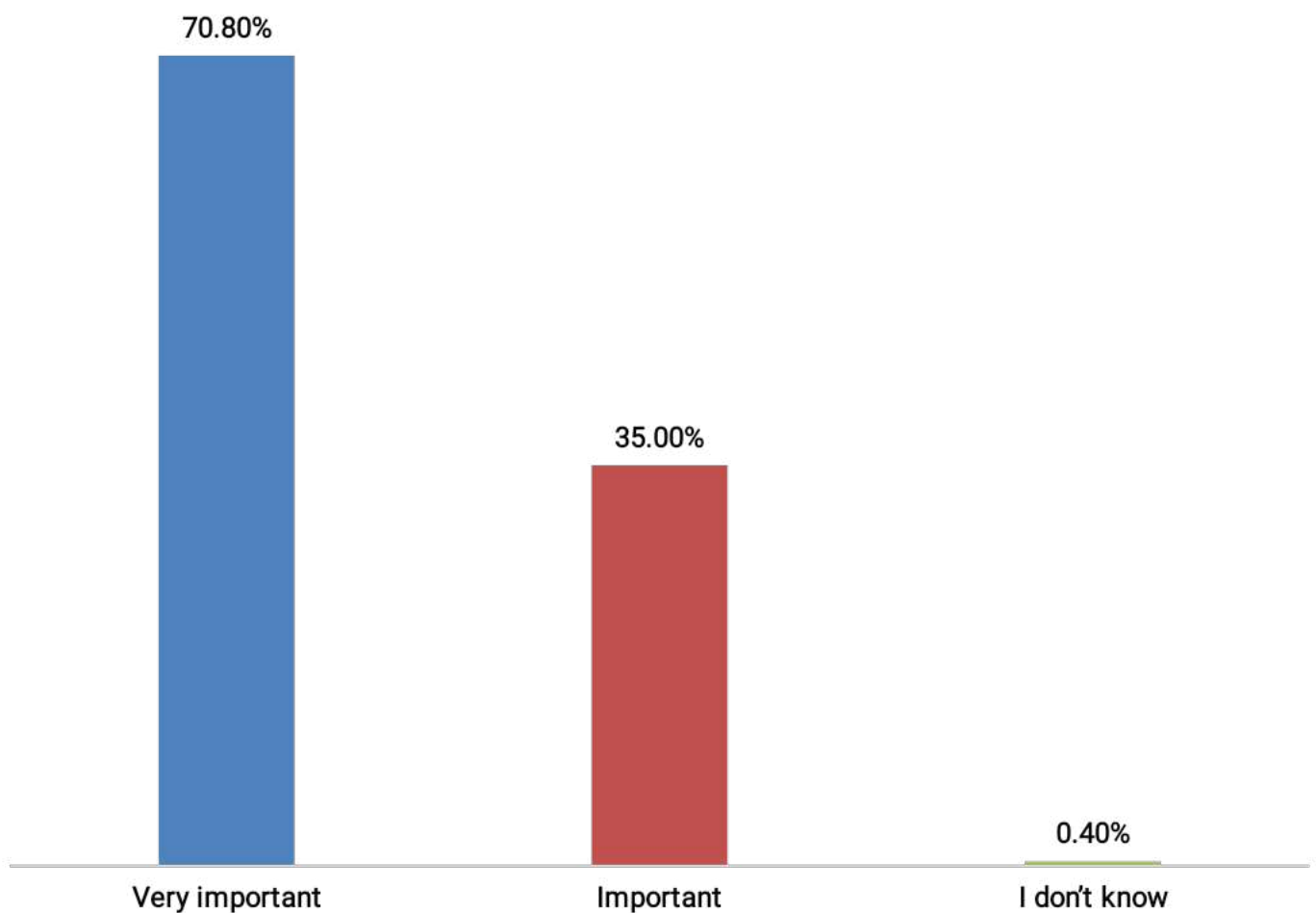


Figure 4 13: important is the use of personal protective equipment

From above figure shows that (70.8%) they see use of personal protective equipment is very important, (35%) they see use of personal protective equipment is important only, (0.40%) don't know.

4-4 Knowledge and awareness of the correct way use of PPE

The following table shows the frequencies and percentages of Knowledge and awareness of the correct way of preventive measures and use of PPE.

Table 4 12: Knowledge and awareness of the correct way of preventive measures and use of PPE

N	Knowledge and awareness of the correct way of preventive measures and use of PPE	Yes		No		I'm not sure	
		N	%	N	%	N	%
1	Do you think that the wrong use of PPE contributes to transmission of infection ?	244	94.2%	9	3.5%	6	2.3%
2	Do you know the correct ways to use PPE ?	210	81.1%	15	5.8%	34	13.1%
3	When wearing PPE, should gloves be the last thing to wear?	143	55.2%	92	35.5%	24	9.3%
4	Are you wearing and removing PPE by the correct way ?	211	81.5%	16	6.2%	32	12.3%
5	Can PPE such as gloves, masks, etc. be reused more than once?	70	27.1%	184	71.0%	5	1.9%
6	Should hand hygiene be carried out regularly before contacting the patient ?	235	90.7%	20	7.7%	4	1.6%
7	Should hand hygiene between patient and other ?	243	93.8%	9	3.5%	7	2.7%
8	According to the hand-washing protocol, is it necessary to wash hands for more than 60 seconds ?	152	58.7%	79	30.5%	28	10.8%
9	If the hands are visibly dirty, is rubbing the hands with alcohol or Is sanitizer enough?	113	43.6%	134	51.7%	12	4.7%
10	Should you wash your hands before and after wearing medical gloves ?	212	81.9%	35	13.5%	12	4.6%
11	Do preventive measures completely prevent the spread of infection in health facilities ?	157	60.6%	79	30.5%	23	8.9%
12	Can contaminated needles and sharps transmit infectious pathogens ?	234	90.3%	25	9.7%	0	0.0%
13	Is adherence to preventive measures only aimed at protecting the health team?	75	29.0%	184	71.0%	0	0.0%
14	Are personal protective equipment only required of some health workers?	54	20.8%	199	76.8%	6	2.4%
15	Should personal protective equipment be worn in necessary and contagious cases/ Only ?	72	27.8%	181	69.9%	6	2.3%
16	Can the hepatitis C agent be transmitted through contaminated needles and sharp objects ?	227	87.6%	25	9.7%	7	2.7%
17	Can it be transmitted? The causative agent of HIV/AIDS through contaminated needles and sharp objects ?	233	90.0%	18	6.9%	8	3.1%
18	Can it be transmitted? The causative agent of Corona (coved19) by mode spray ?	247	95.4%	11	4.2%	1	0.4%
19	In the absence or non-compliance with the preventive measures, can the health worker be a source of infection and epidemics ?	240	92.7%	14	5.4%	5	1.9%
20	In the case of urgency, can the same medical gloves be used for the same patients? Without changing it ?	61	23.6%	194	74.9%	4	1.5%
21	Can a face mask be used when caring for more than one patient ?	180	69.5%	56	21.6%	23	8.9%
22	Should gloves be changed? Between different tasks and procedures on the same patient ?	172	66.4%	80	30.9%	7	2.7%
	total	172	66.43%	75.41	29.11%	11.55	4.46%

The table (4.12) showed that overall Knowledge of health workers was (66.43%) this indicating at there are Knowledge and awareness of the correct way of preventive measures and use of PPE with Intermediate level.

The result showed that the Highest answer was (transmitted The causative agent of Corona (coved19) by mode spray), Where Most of the participants indicated 247 (95.4%) that The causative agent of Corona (coved19) Can it be transmitted by mode spray.

Regarding the wrong use of personal protective equipment, most of the participants 244 (94.2%) indicated that the wrong use of personal protective equipment contributes to the transmission of infection.

243 (93.8%) of the participants indicated that Should hand hygiene between patient and other, 240 (92.7%) of the participants indicated that In the absence or non-compliance with the preventive measures, can the health worker be a source of infection and epidemics, (90.7%) of the participants know that Should hand hygiene be carried out regularly before contacting the patient, (90 %) of the participants know that Can contaminated needles and sharps transmit infectious pathogens and that The causative agent of HIV/AIDS Can it be transmitted through contaminated needles and sharp objects.

The result showed that also (87.6%) of the participants know that The causative agent of (hepatitis C) Can it be transmitted through contaminated needles and sharp objects, (81%) of the participants know that Should you wash hands before and after wearing medical gloves, as well wearing and removing PPE by the correct way. In addition to know the correct ways to use PPE.

The result showed that More than half of the participants (56.4%) don't know If the hands are visibly dirty, is rubbing the hands with alcohol or Is sanitizer enough, (55 %) of the participants don't know When wearing PPE,

should gloves be the last thing to wear.

Almost half of the participants by (48%) don't know According to the hand-washing protocol, is it necessary to wash hands for more than 60 seconds.

more than a third of the participants by (40%) of the participants don't know Do preventive measures completely prevent the spread of infection in health facilities, third of the participants by (34%) don't know Should gloves be changed Between different tasks and procedures on the same patient.

level of total knowledge regarding Knowledge and awareness of the correct way of preventive measures and use of PPE were (77) of responders by percentage (29.7%) had Knowledge and awareness of the correct way of preventive measures and use of PPE at the High level (High knowledge), (120) of responders by percentage (46.3%) had knowledge at the Good level (Good knowledge), followed Poor knowledge by percentage (23.9%).

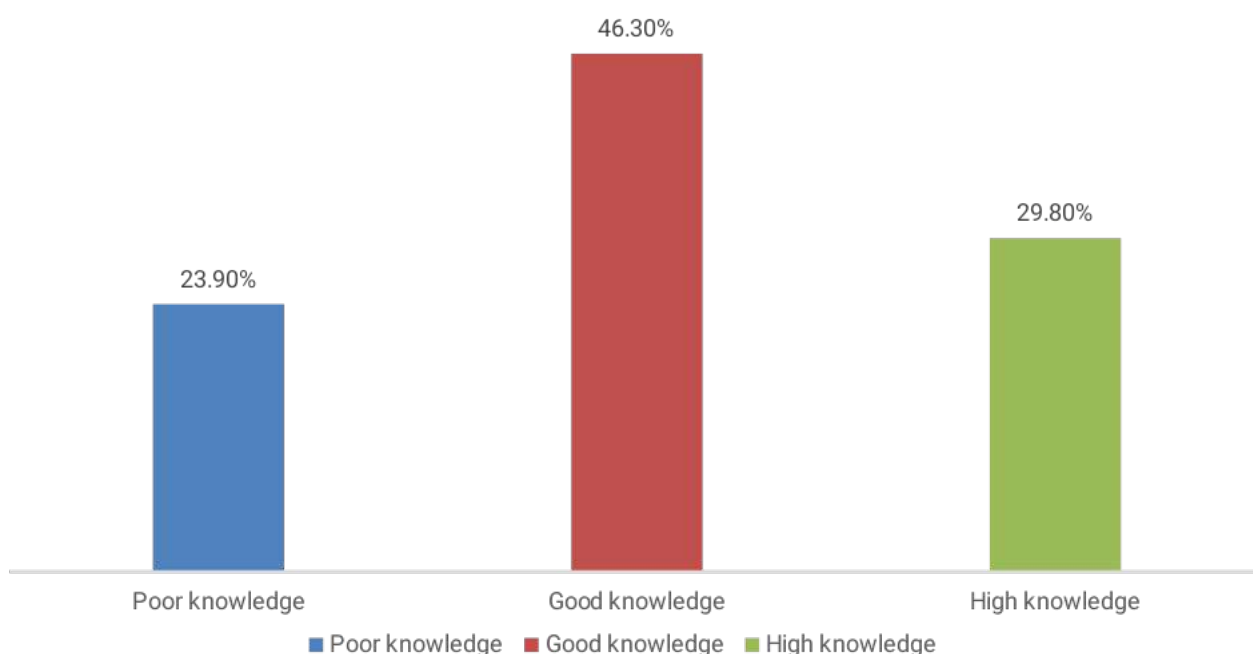


Figure 4 14: Knowledge and awareness of the correct way of preventive measures and use of PPE

The following table describes Descriptive Statistics of total regarding Knowledge and awareness of the correct way of preventive measures and use of PPE

Table 4.13 Descriptive statistics of total knowledge of HCWs regarding correct use of PPE

awareness of the correct way of preventive measures and use of PPE	
items	Number
N	259
Minimum	0.32
Maximum	1
Mean	0.7713
Std. Deviation	0.11269

the results have shown that the level of total knowledge regarding Knowledge and awareness of the correct way of preventive measures and use of PPE was at the moderate level ($M = 0.77$, $SD = 0.11$) with the minimum scores of (0.32) and the maximum scores (1.00)

4.4.1 the most effective measure to reduce transmission of infection

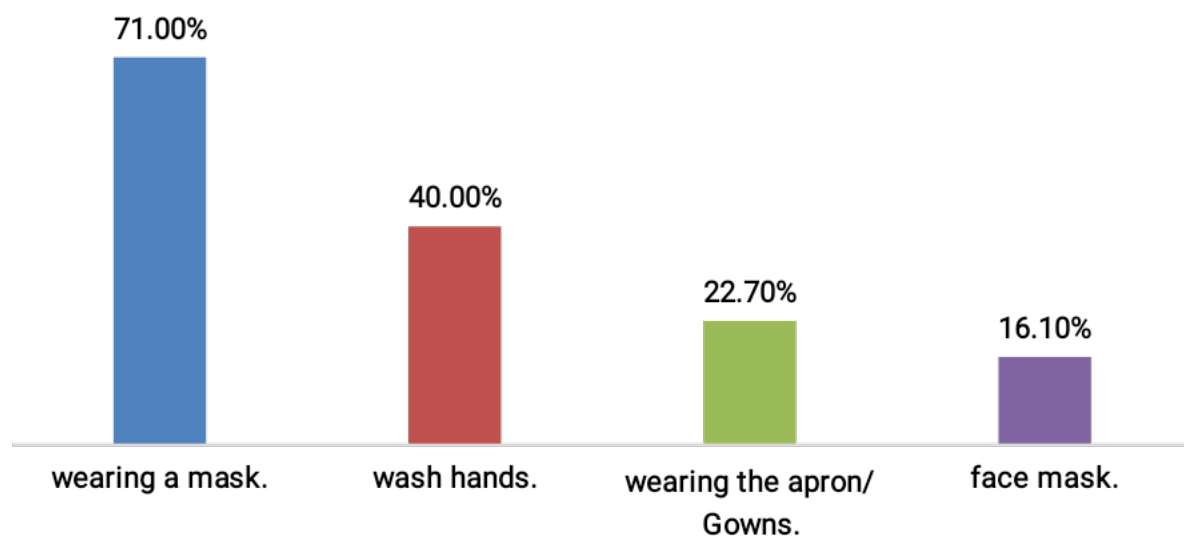


Figure 4 15: most effective measure to reduce transmission of infection

From above figure about (71%) say wearing mask is the most effective measure to reduce transmission of infection, (40%) say the wash hands and (22.7%) say wearing the apron/ gowns, (16.10) say the face mask.

4.4.2 Time of use PPE

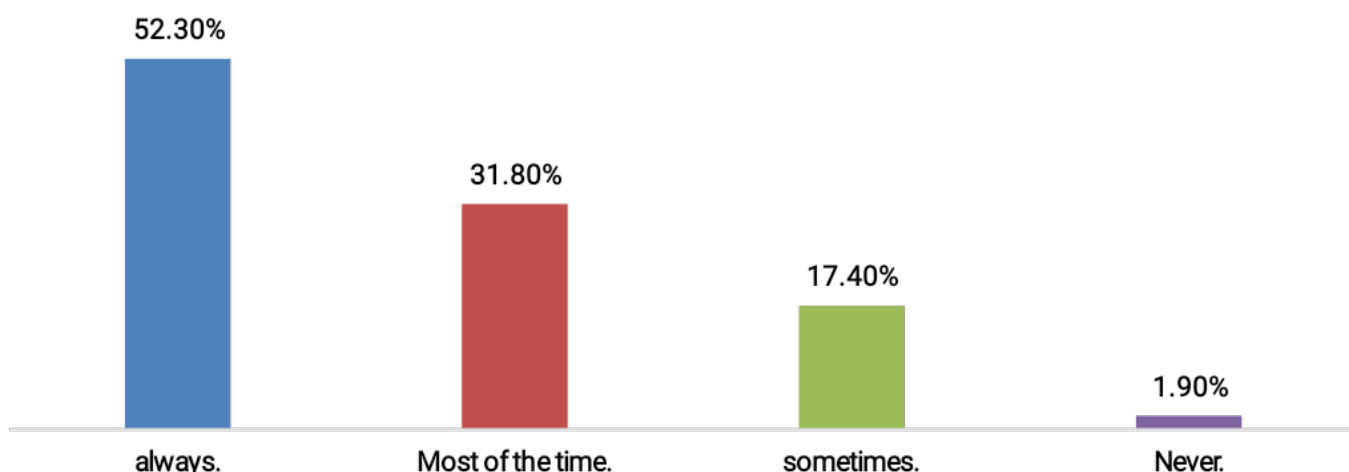


Figure 4 16: Time of use PPE

From above figure (52.3%) of people say using use PPE always, (31.8%) using PPE most of the time, (17.4%) using PPE most sometimes, (1.9%) not using PPE never.

4.4.3 Use Of PPE When Risk Of Body Fluids Or Blood Splashing

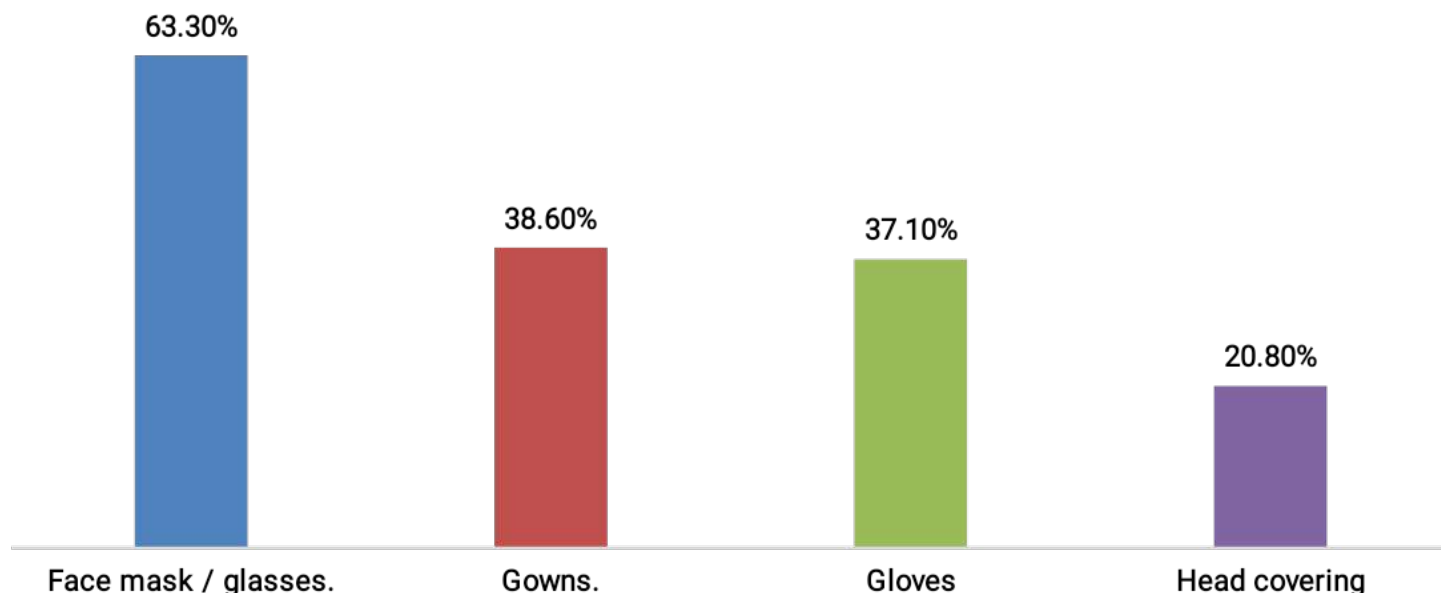


Figure 4 17: use of PPE when risk of body fluids or blood splashing

From above figure about (63.3%) say wearing face mask is the most effective for protection when there is a risk of the spray splashing blood or anybody fluid, (38.6%) say the gowns and (37.1%) say the gloves, (20.8) say the head Covering

4.4.4 factors that motivate you to adhere to the use of personal protection tools

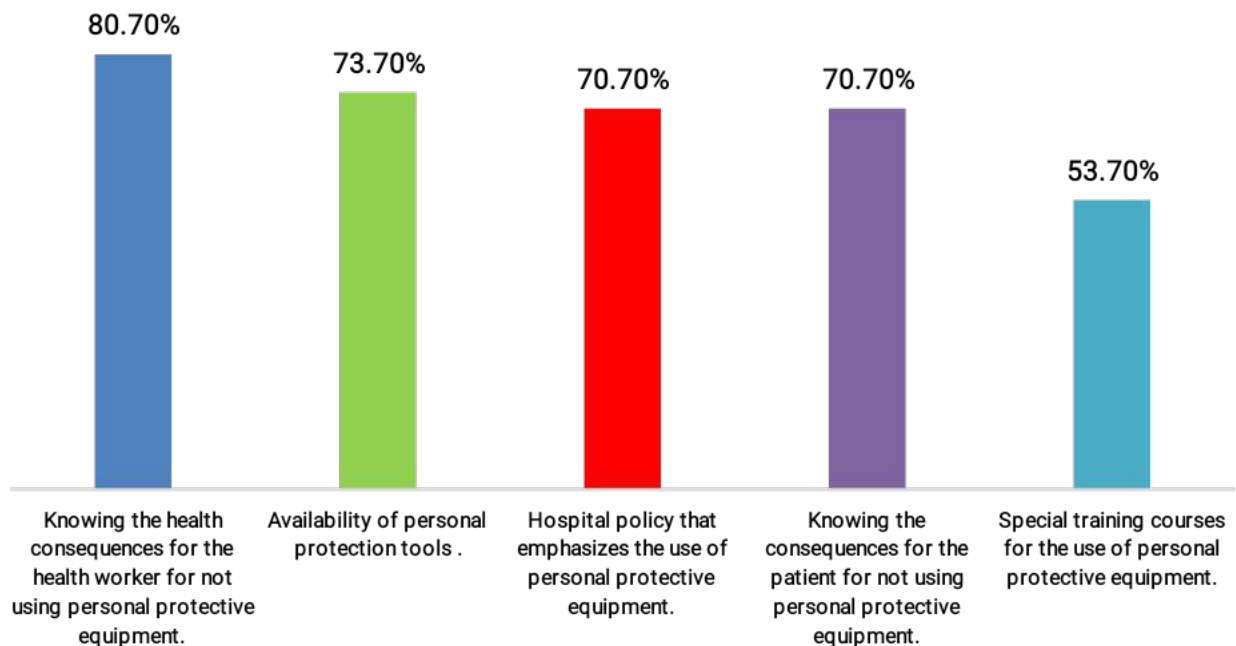


Figure 4 18: factors that motivate you to adhere to the use of personal protection tools

From above figure about (80.7%) say Knowing the health consequences for the health worker for not using personal protective equipment is more factors that motivate to adhere to the use of personal protection tools, (73.7%) say Availability of personal protection tools, (70.7%) say the Hospital policy that emphasizes the use of personal protective equipment and Knowing the consequences for the patient for not using personal protective equipment., (53.7) say the Special training courses for the use of personal protective equipment.

4.4.5 factors that enable you to adhere to the use of personal protection tools

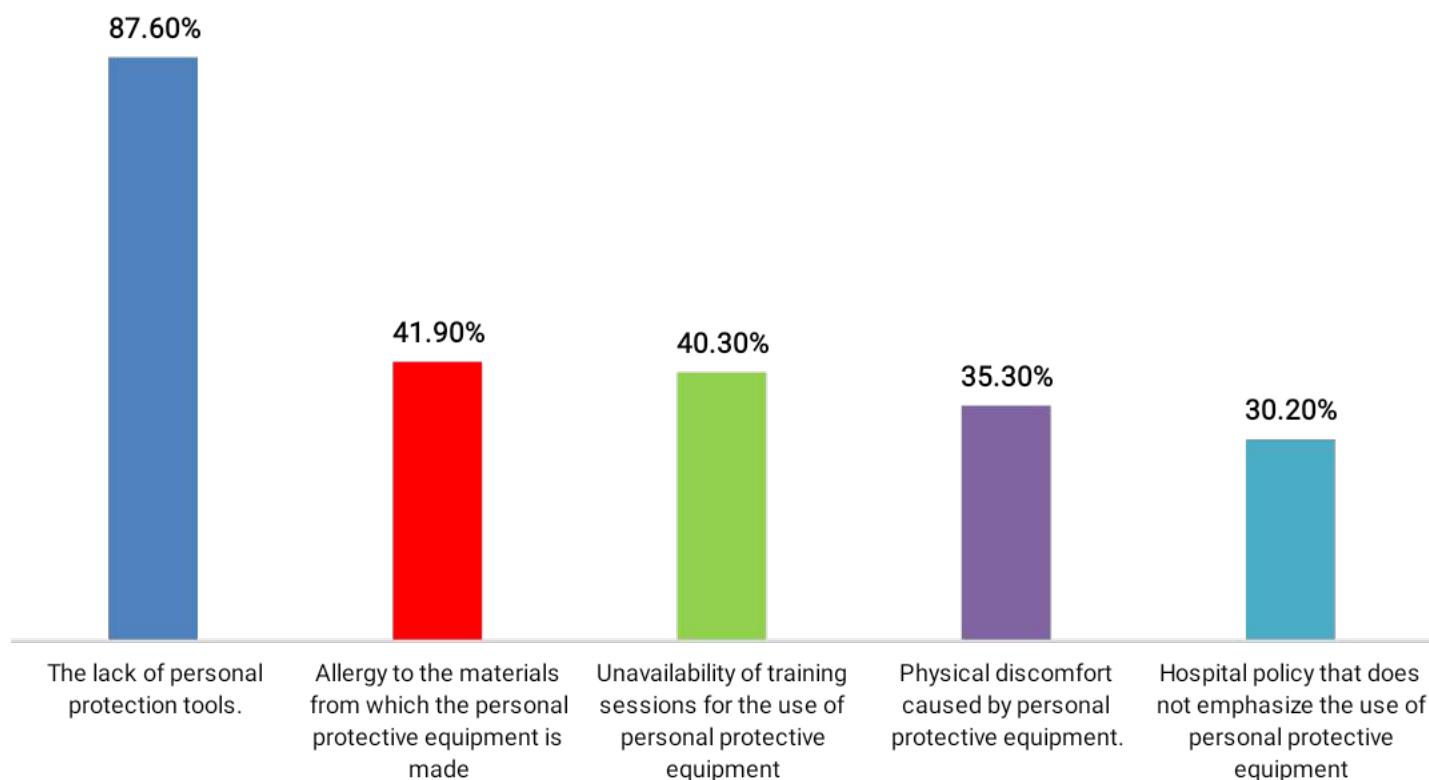


Figure 4 19: factors that enable you to adhere to the use of personal protection tools

From above figure about (87.6%) say The lack of personal protection tools is more the factors that enable you to adhere to the use of personal protection tools, (41.9%) say Allergy to the materials from which the personal protective equipment is made, (40.3%) say Unavailability of training sessions for the use of personal protective equipment, (35.3%) say Physical discomfort caused by personal protective equipment, (30.2) say Hospital policy that does not emphasize the use of personal protective equipment.

About Relationship between awareness of the importance of PPE and its role in preventing the transmission of infection and awareness of the correct way of preventive measures and use of PPE The following table shows that.

Table 4 14: Relationship between awareness of the importance of PPE and awareness of the correct way use of PPE

Relationship		awareness of the correct way of preventive measures and use of PPE						Chi-Square	P-Value
		Poor knowledge		Good knowledge		High knowledge			
		N	%	N	%	N	%		
awareness of the importance of PPE and its role in preventing the transmission of infection	Poor knowledge	24	46.2%	15	28.8%	13	25.0%	20.193a	.000
	Good knowledge	21	22.6%	43	46.2%	29	31.2%		
	High knowledge	17	14.9%	62	54.4%	35	30.7%		
Total		62	23.9%	120	46.3%	77	29.8%		

Table (4-14) shows the association Relationship between awareness of the correct way of preventive measures and use of PPE and awareness of the importance of PPE and its role in preventing the transmission of infection, Results showed there are association between Relationship between awareness of the correct way of preventive measures and use of PPE and awareness of the importance of PPE and its role in preventing the transmission of infection when (Chi-square: 20.193a; p-value: 0.000).

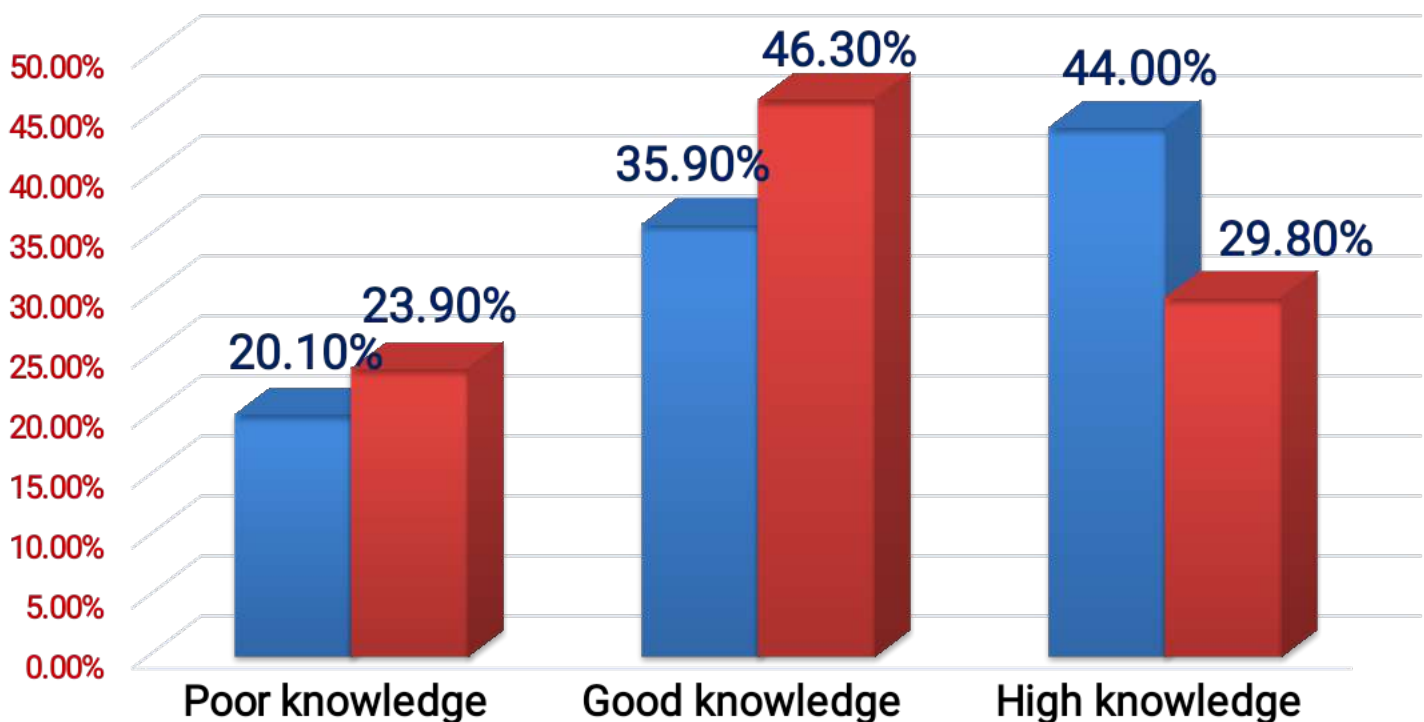


Figure 4 20: Relationship between awareness of the importance of PPE and awareness of the correct way use of PPE

4-5 Factors influencing knowledge towards importance use of PPE

4.5.1 Demographic data of HCWs and their level of knowledge towards importance of PPE

There is a statistically significant relationship at the level (0.05) between demographic data of HCWs and their level of knowledge and awareness towards the importance of PPE and its role in preventing the transmission of infection.

Table 4 15: relationship between demographic data of HCWs and their level of awareness towards the importance of PPE

awareness of the importance of PPE and its role in preventing the transmission of infection		Poor knowledge		Good knowledge		High knowledge		Chi-square	Sig.
		N	%	N	%	N	%		
Age	Less Than 25 Years Old	11	14.9%	28	37.8%	35	47.3%	17.023	0.002
	From 26-30 Years Old	18	14.9%	52	43.0%	51	42.1%		
	Over 30 Years Old	23	35.9%	13	20.3%	28	43.8%		
Sex	Male	41	21.2%	67	34.7%	85	44.1%	0.813	0.666
	Female	11	16.7%	26	39.4%	29	43.9%		
Marital status	Married	30	19.3%	53	34.2%	72	46.5%	2.768	0.837
	Single	19	20.0%	37	38.9%	39	41.1%		
	Divorced	2	40.0%	1	20.0%	2	40.0%		
	Widow	1	25.0%	2	50.0%	1	25.0%		
Educational level	Diploma	16	16.0%	44	44.0%	40	40.0%	16.018	0.042
	Bachelor's	26	19.7%	40	30.3%	66	50.0%		
	Master's	2	20.0%	4	40.0%	4	40.0%		
	Board	6	60.0%	2	20.0%	2	20.0%		
	Other	2	28.5%	3	42.9%	2	28.6%		
Specialization	Doctor	13	43.3%	4	13.3%	13	43.4%	38.916	0.000
	Nurse	10	9.2%	39	35.8%	60	55.0%		
	Nursing - Level 4	3	15.0%	7	35.0%	10	50.0%		
	Nursing - Level 3	7	25.9%	12	44.4%	8	29.7%		
	Nursing - Excellence	0	0.0%	4	50.0%	4	50.0%		
	Anesthesia Technician	3	42.9%	4	57.1%	0	0.0%		
	Technical Operations	0	0.0%	2	40.0%	3	60.0%		
	Others	16	30.2%	21	39.6%	16	30.2%		

The department in which you work	Department Of Medical	3	18.7%	4	25.0%	9	56.3%	15.817	0.466
	Department Of Surgery	7	16.7%	19	45.2%	16	38.1%		
	Children Section	2	15.3%	6	46.2%	5	38.5%		
	Department Of Neurology	5	35.7%	7	50.0%	2	14.3%		
	Women's Department	1	9.1%	3	27.3%	7	63.6%		
	Operations Department	5	35.7%	3	21.4%	6	42.9%		
	Intensive Care Department (Icu).	12	15.6%	26	33.8%	39	50.6%		
	Emergency Department	4	19.0%	7	33.3%	10	47.7%		
	Other	2	20.0%	2	20.0%	6	60.0%		
Years of experience	Less Than 5 Years	19	15.0%	50	39.3%	58	45.7%	11.189	0.025
	From 5 - 10 Years	22	31.0%	26	36.6%	23	32.4%		
	More Than 10 Years	11	18.0%	17	27.9%	33	54.1%		

The table (4-15) showed that the level of significance for the demographic variables (sex, marital status, the department in which you work) were ($p = 0.666, 0.837, 0.466$), respectively, which is greater than (0.05), which indicates that there is no relationship between the variables demographics (sex, marital status, the department in which you work) and level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection

it was also found that the significance level of the variables (Age, Educational level, Specialization, Years of experience) was ($p = 0.002, 0.042, 0.000, 0.025$), which is less than (0.05), which indicates the existence of a relationship between of variables (Age, Educational level, Specialization, Years of experience) and the level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.

based on what was previously explained, the results of the validity of the hypothesis led to the acceptance of the hypothesis that states that there is a relationship between of variables (Age, Educational level, Specialization, Years of experience) and the level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection, and rejecting the hypothesis that states that there is a relationship between

the variables demographics (sex, marital status, the department in which you work) and level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.

4.5.2 Demographic data of HCWs and their level of awareness about of the correct use of PPE

There is a statistically significant relationship at the level (0.05) between Demographic characteristics of HCWs and their level of knowledge and awareness towards of the correct way of preventive measures and use of PPE.

Table 4 16: demographic data of HCWs and their level of awareness towards of the correct use of PPE

awareness of the correct way of preventive measures and use of PPE		Poor knowledge		Good knowledge		High knowledge		Chi-square	Sig.
		N	%	N	N	%	N		
Age	Less than 25 years old	15	20.3%	39	52.7%	20	27.0%	5.971	0.201
	From 26-30 years old	27	22.3%	51	42.1%	43	35.6%		
	Over 30 years old	20	31.2%	30	46.9%	14	21.9%		
Sex	Male	47	24.3%	88	45.6%	58	30.1%	0.169	0.919
	Female	15	22.7%	32	48.5%	19	28.8%		
Marital status	married	42	27.1%	73	47.1%	40	25.8%	7.620	0.267
	single	17	17.9%	45	47.4%	33	34.7%		
	divorced	1	20.0%	1	20.0%	3	60.0%		
	widow	2	50.0%	1	25.0%	1	25.0%		
Educational level	Diploma	22	22.0%	49	49.0%	29	29.0%	4.529	0.807a
	Bachelor's	30	22.7%	62	47.0%	40	30.3%		
	Master's	3	30.0%	3	30.0%	4	40.0%		
	board	4	40.0%	4	40.0%	2	20.0%		
	Other	3	42.8%	2	28.6%	2	28.6%		
Specialization	doctor	8	26.7%	14	46.6%	8	26.7%	26.383	0.023a,*
	nurse	23	21.1%	57	52.3%	29	26.6%		
	Nursing - Level 4	2	10.0%	7	35.0%	11	55.0%		
	Nursing - Level 3	6	22.2%	10	37.1%	11	40.7%		
	Nursing - Excellence	0	0.0%	7	87.5%	1	12.5%		

awareness of the correct way of preventive		Poor knowledge		Good knowledge		High knowledge		Chi-square	Sig.
	Anesthesia technician	3	42.9%	4	57.1%	0	0.0%		
	Technical operations	0	0.0%	3	60.0%	2	40.0%		
	Others	20	37.7%	18	34.0%	15	28.3%		
The department in which you work	Department of Medical	5	31.2%	5	31.3%	6	37.5%	17.704	0.342a
	Department of Surgery	10	23.8%	20	47.6%	12	28.6%		
	children section	3	23.1%	7	53.8%	3	23.1%		
	Department of Neurology	3	21.4%	3	21.4%	8	57.2%		
	Women's Department	1	9.1%	9	81.8%	1	9.1%		
	Operations Department	2	14.3%	8	57.1%	4	28.6%		
	Intensive Care Department (ICU).	16	20.8%	43	55.8%	18	23.4%		
	Emergency Department	5	23.8%	7	33.3%	9	42.9%		
	Other	2	20.0%	5	50.0%	3	30.0%		
Years of experience	Less than 5 years	28	22.1%	61	48.0%	38	29.9%	4.246	0.374
	From 5 - 10 years	17	23.9%	28	39.4%	26	36.7%		
	More than 10 years	17	27.9%	31	50.8%	13	21.3%		

The table (4-16) showed that the level of significance for the demographic variables (age, sex, marital status, educational level, years of experience, department) were ($p = 0.201, 0.919, 0.267, 0.342, 0.374$), respectively, which is greater than (0.05), which indicates that there is no relationship between the variables demographics (age, sex, marital status, educational level, years of experience, department) and level knowledge and awareness of the correct way of preventive measures and use of PPE.

it was also found that the significance level of the variable (Specialization) was ($p = 0.023$), which is less than (0.05), which indicates the existence of a relationship between of variable (Specialization) and the level knowledge and awareness of the correct way of preventive measures and use of PPE.

based on what was previously explained, the results of the validity of the hypothesis led to the acceptance of the hypothesis that states that there is a relationship between of variable (Specialization) and the level knowledge and awareness of the correct way of preventive measures and use of PPE , and rejecting the hypothesis that states that there is a relationship between the variables demographics (age, sex, marital status, educational level, years of experience, department) and level knowledge and awareness of the correct way of preventive measures and use of PPE.

Chapter Five: Discussion and Conclusion

2. Chapter five: Discussion and Conclusion

5.1 Introduction

This chapter presents a summary of the findings from the study, the conclusions that have been arrived at, the recommendations made by the researcher based on the findings and suggestions on the areas the researcher felt may require further investigation through research activity.

5.2 Results of socio demographic characteristics

Results of socio demographic characteristics A total of (259) health care workers participated in the study at 48 Model Hospital Sana'a City, Yemen. Most of the respondents were (74.5%) male, while the percentage of females was (25.5%)

Most of participants (46.7%) their age was age group (26 - 30)year-old, majority of the participants their social status of Married by 59.8%, majority of the participants their educational level Bachelor's (51.0%), (38.6%) diploma,

The profession of nurses (42.1%) were the most involved,(10.4%) Doctor, it agreed with all previous studies, and (35.3%) of the sample were form ICU units, (19.3%) of Department of Surgery, it this no agreement with study (Biniyam Sahiledengle) which showed that majority of the participants in study of his was from the department emergency.

most of HWCs, (49.0%) have 5 years or less of work

experience less of work experience in healthcare field which is in agreement with previous studies such as (Razieh Mokhtari, Ali Safdari, Benítez study, Mohammad Ali Hossain)

5.3 Knowledge and Awareness of important is the use of personal protective equipment

Knowledge and Awareness of Preventive Tools and Measures and Their Role in Preventing Transmission, the study results indicated most of sample (89.2%) they have knowledge of the importance of personal protection appropriate from infection in hospital, (71.0%) They received training courses on how to use personal protective equipment, (72.7%) heard or training about use personal protection tools by lectures, (44.9%) from workshop or seminar, (33.6%) from social media, (30.1%) from reading books, and (27.0%) from co-worker or classmate, (20.7%) from TV.

(89.1%) of the sample Gloves are considered personal protection tools, (80,9%) they see that Mask considered personal protection tools. (59.0%) Goggles or Protect eyes, (57.0%) Aprons or gowns which are considered personal protection tools, is considered a personal protection, this is similar to the results with the study of (Amina Ali and others,2021) and (Kashkash Raid Naser/ Gasa) which indicated to The majority of the sample considered that gloves are personal safety tools, followed by the mask, aprons or a cloak, followed by the face or eye cover.

(70.8%) they see use of personal protective equipment is very

important, which is in agreement with previous studies.

the study results indicated there are Knowledge and awareness have of HCWs with high level toward of the importance of PPE and its role in preventing the transmission of infection with an average of $\bar{x}=0.80$, $SD=0.12$, with the minimum scores of (0.40) and the maximum scores (1.00), and it was (44.0%) of the participants had knowledge with level high, (35.9%) had knowledge with level Good, (20.1%) had knowledge with level poor. The result of the current study was in contrast with the findings of study (Schwartz, et al. 2014) who found that found that PPE was higher among HCWs with higher tested and self-perceived knowledge.

the result of the present study contrast to the study conducted in India by (LAKSHMI, et al. 2016) and (abdelmuhammed, 2021) which found that the level of knowledge of HCWs toward use of appropriate PPEs was poor.

the study results indicated also that Most of the participants (98.1%) have high knowledge high by necessity washing and disinfecting hands immediately, when contacting any blood, body fluid, secretion, excretion, or dirty substance, (95.8%) have high knowledge of the necessity of the gloves worn in the operation might contact with the secretion and excretion of patient, (89.6%) their know that avoid for the polluted protective articles to contact with the surface of other articles, the clothes or the staff outside of the ward, (88.4%) know that the hands of health workers a means of transmitting pathogens in hospitals, These results are in

agreement with the results study (Amina Ali and others,2021) which indicated to direct contact with health care providers leads to the spread of infection and disease between HWCs and patients, taking some personal protective equipment used in the house or dwelling is very harmful.

(89.2%) they know what PPE, indicated (86.9%) of respondents that The level of awareness of the importance of using personal protective equipment had increased, after a pandemic/ Corona, and (83.0%) know that worn of the gloves protect from some infectious disease pathogens, (82.6%) of respondents indicated wearing an N95 mask important when dealing with airborne infections.

In study (Amina Ali and others,2021) indicated that Use of personal protective equipment completely eliminate risk of infection and that HCWs knowledge of increased after corona pandemic and that When dealing with air born infection wearing N95 mask is important.

5.4 Knowledge and awareness of the correct way use of PPE

the study results indicated there are Knowledge and awareness have of HCWs with moderate level toward of the correct way of preventive measures and use of PPE with Intermediate level with an average of =66.43%, SD=0.11, with the minimum scores of (0.32) and the maximum scores (1.00), and it was (29.8%) of the participants had knowledge with level high,

(46.3%) had knowledge with level Good, (23.9%) had knowledge with level poor. This result is consistent with the results of the study (Kamakshi Garg and others,2020) that HCWs have good knowledge with regard to the correct way of preventive measures and use of PPE.

The result showed that (95.4%) of the participants had knowledge that The causative agent of Corona (coved19) Can it be transmitted by mode spray, (94.2%) of the participants had knowledge that the wrong use of personal protective equipment contributes to the transmission of infection. (93.8%) of the participants had know that Should hand hygiene between patient and other, (92.7%) know that In the absence or non-compliance with the preventive measures, can the health worker be a source of infection and epidemics, (90.7%) know that Should hand hygiene be carried out regularly before contacting the patient, (90 %) know that Can contaminated needles and sharps transmit infectious pathogens and that The causative agent of HIV/AIDS Can it be transmitted through contaminated needles and sharp objects, The result showed that also (87.6%) of the participants know that The causative agent of (hepatitis C) Can it be transmitted through contaminated needles and sharp objects, (81%) know that Should you wash hands before and after wearing medical gloves, as well wearing and removing PPE by the correct way. In addition to know the correct ways to use PPE.

This result is consistent with the results of the study (Hema Kanathila^{1*}, Meekha Peter¹ , Mahantesh Bembalagi¹ , Rahul S Jaiswal, 2021) Which showed that exposure health workers to injury by the causative against of Hepatitis C viruses, H.I.V(AIDS), malaria and T.B , it is the result of exposure to contaminated needles.

The result showed that More than half of the participants 56.4% don't know If the hands are visibly dirty, is rubbing the hands with alcohol or Is sanitizer enough, 55 % of the participants don't know When wearing PPE, should gloves be the last thing to wear, and Almost half of the participants by 48% don't know According to the hand-washing protocol, is it necessary to wash hands for more than 60 seconds,

This result is consistent with the results of the study (Mohammad Ali Hossain and other , 2021) Which showed that that of HCWs not knowing If the hands are visibly dirty, is rubbing the hands with alcohol or Is sanitizer enough, not knowing When wearing PPE, should gloves be the last thing to wear, and Almost half of the participants, not knowing According to the hand-washing protocol, is it necessary to wash hands for more than (60) seconds, The reason for this is that they are not trained on global and national protocols and monitor compliance with them.

more than a third of the participants by (40%) of the participants don't know Do preventive measures completely prevent the spread of infection in health facilities, third of the

participants by 34% don't know Should gloves be changed Between different tasks and procedures on the same patient, this result is consistent with the results of the study (Amina Ali and others,2021) indicated that HCWs believe that hand hygiene should be performed regularly before contacting the patient and should change the gloves in caring between different patient .

about (71%) know that wearing mask is the most effective measure to reduce transmission of infection, (40%) wash hands (22.7%) wearing the apron/ gowns, (16.10) the face mask. this result is consistent with the results of the study (Ruth Barratt,2020) indicated that masks is which protect clinical staff from infections transmitted via respiratory droplets, such as influenza, meningococcal disease or via smaller aerosolised particles.

(52.3%) of sample using use PPE always, (31.8%) using PPE most of the time, (17.4%) using PPE most sometimes, (1.9%) not using PPE never, and this shows poor attitudes towards the use of PPE, this rates is lower than the (55.0%) compliance found among Chinese HCWs during the (2009) pandemic, the (52%) compliance reported by (McGaw et al, 2012), among physicians, and the (65%) compliance among nurses in (Jamaica ,2012). The poor attitudes for HCWs towards using PPE are concerning will have negative cones.

about (63.3%) say wearing face mask is the most effective for protection when there is a risk of the spray splashing blood or

anybody fluid, (38.6%) say the gowns and (37.1%) say the gloves, (20.8) say the head covering.

about (80.7%) say Knowing the health consequences for the health worker for not using personal protective equipment is more factors that motivate to adhere to the use of personal protection tools, (73.7%) they see it Availability of personal protection tools, (70.7%) they see it the Hospital policy that emphasizes the use of personal protective equipment and Knowing the consequences for the patient for not using personal protective equipment., (53.7) they see it the Special training courses for the use of personal protective equipment.

about (87.6%) say The lack of personal protection tools is more the factors that enable you to adhere to the use of personal protection tools, (41.9%) they see it Allergy to the materials from which the personal protective equipment is made, (40.3%) they see it Unavailability of training sessions for the use of personal protective equipment, (35.3%) they see it Physical discomfort caused by personal protective equipment, (30.2) they see that Hospital policy that does not emphasize the use of personal protective equipment.

5.5 Demographic data of HCWs and their level of knowledge towards importance of PPE

The table (4-14)result showed that the level of significance for the demographic variables (sex, marital status, the department in

which you work) were ($p = 0.666, 0.837, 0.466$), respectively, which is greater than (0.05), which indicates that there is no relationship between the variables demographics (sex, marital status, the department in which you work) and level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection, and this result is consistent with the results of the study (Amina Ali and others, 2021) indicated that there is no relationship between the variables demographics (sex, marital status, department work) and level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection, and no consistent with the results of the study (Mohammad Ali Hossain and other, 2021) indicated that there no relationship.

it was also found that the significance level of the variables (Age, Educational level, Specialization, Years of experience) was ($p = 0.002, 0.042, 0.000, 0.025$), which is less than (0.05), which indicates the existence of a relationship between of variables (Age, Educational level, Specialization, Years of experience) and the level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection, is consistent with the results of the study (Ruth Barratt, 2020) indicated that there are relationship between Demographic data and level knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.

5.6 Demographic data of HCWs and their level of awareness about the correct use of PPE

The table (4-15) showed that the level of significance for the demographic variables (age, sex, marital status, educational level, years of experience, department) were ($p = 0.201, 0.919, 0.267, 0.342, 0.374$), respectively, which is greater than (0.05), which indicates that there is no relationship between the variables demographics (age, sex, marital status, educational level, years of experience, department) and level knowledge and awareness of the correct way of preventive measures and use of PPE.

it was also found that the significance level of the variable (Specialization) was ($p = 0.023$), which is less than (0.05), which indicates the existence of a relationship between of variable (Specialization) and the level knowledge and awareness of the correct way of preventive measures and use of PPE. and this result this result is consistent with the results of the study (Bharath Rao K ande others, 2020) Which indicated that specialization has an impact on the degree of commitment to the correct use of personal protective equipment in hospitals, as nursing is more committed than doctors.

5.7 summary of results

After reviewing the results in detail, the study was summarized into points:

- There is high level of knowledge of HCWs regarding importance of PPE and its role in preventing the transmission of infection.
- there is an modrate level of knowledge of health workers regarding the correct way of preventive measures and use of PPE.
- There is an effect of both Age, Educational level, Specialization, Years of experience On the level knowledge of HCWs regarding importance of PPE and its role in preventing the transmission of infection.
- There is an effect of specialization at the level of knowledge of HCWs regarding the correct way of preventive measures and use of PPE in favor of nursing.
- Awareness-raising Knowledge of the use of personal protective equipment for infection and the correct use of it is not sufficient without adequate provision of personal equipment, compliance monitoring and continuous training.

5.8 Conclusion

There is high level of knowledge of HCWs regarding importance of PPE and its role in preventing the transmission of infection, there is an average level of knowledge of health workers regarding the correct way of preventive measures and use of PPE.

There is an effect of both Age, Educational level, Specialization,

Years of experience On the level knowledge of HCWs regarding importance of PPE and its role in preventing the transmission of infection.

There is an effect of specialization at the level of knowledge of HCWs regarding the correct way of preventive measures and use of PPE in favor of nursing. Awareness-raising Knowledge of the use of personal protective equipment for infection and the correct use of it is not sufficient without adequate provision of personal equipment, compliance monitoring and continuous training.

5.9 Recommendations

- Continuing to raise the awareness of health workers about the use of personal protection methods through continuous training and awareness of safety and infection control standards issued by the Ministry of Health and the competent authorities globally.
- Continuous and complete provision of personal protective equipment in hospitals
- Continuous monitoring of workers to ensure their compliance and adherence to policies and procedures for using personal protective equipment to combat infection
- Conducting more studies and research on the commitment of workers to use personal protective equipment in the hospital under study and other hospitals

REFERENCES

1. John Bourn .2000 .The Management and Control of Hospital Acquired Infection in Acute NHS Trusts in England: National Audit office.
2. CDC. 2011.Basic infection control and prevention plan for outpatient oncology setting.
3. Bouallègue O, Naija W, Said H, Nouria A, Jaidane N, Dhidah L, and Boujaafar N, (2013): Incidence of ICU acquired nosocomial infections in University Hospital of Sahloul (Sousse-Tunisia). Antimicrobial Resistance and Infection Control 2(supple 1):P 233.
4. - CDC. 2011. [http: www.cdc.gov / Vital Signs](http://www.cdc.gov/VitalSigns) (on line) march 2011.
5. - World Health Organization. 2009. WHO Guidelines on Hand Hygiene in Health Care.
6. - Truong Anh Thu, Nguyen Quocanh, Ngo Quy Chau and Nguyen Viet Hung. 2012. Knowledge, Attitude and Practices Regarding Standard and Isolation Precautions among Vietnamese Health Care Workers: A Multicenter Cross-Sectional Survey.
7. - World Health Organization.2002. Prevention of hospital-acquired infections: A practical guide.2nd edition.
8. Libyan Journal of Medicine.2006. Clinical Microbiology Services are Essential for Diagnosis, Treatment and Prevention of MRSA and other Nosocomial Pathogens in Libyan Healthcare Facilities.
9. - World health organization. May 2015. Public health risk assessment and interventions : Humanitarian crisis in Libya .
- 10.WHO. August 2014.Situation report no. 1 : Eastern Mediterranean
- 11.Kamunge W. 2013. Exploring Knowledge, Attitudes and Practices of Registered Nurses Regarding the Spread of Nosocomial Infections. Seton Hall University.
- 12.World Health Organization (WHO), 2002. Prevention of Hospital Acquired Infections: A Practical Guide, 2nd Edition.
- 13.World Health Organization (2011) Report on the Burden of Endemic Health Care-Associated Infection Worldwide. WHO: Geneva .
- 14.Johrapurakar, S R.2012. Manual of Operating Room Discipline and Protocol. New delhi : jaypee .
- 15.Hassan Ahmed Khan, Aftab Ahmad, Riffat Mehboob. 2015. Nosocomial infections and their control strategies: Asian Pacific Journal of Tropical Biomedicine. www.elsevier.com/locate/apjtb.
- 16.CDC. 2012a. Principles of epidemiology in public health practice (3rd ed.): an introduction to applied epidemiology and biostatistics: lesson 1: introduction to epidemiology. Atlanta: U.S. Department of Health and Human Services. Retrieved from <http://www.cdc.gov>.
- 17.Gary A. Noskin, Lance R. Peterson. 2001. Engineering Infection Control through Facility Design., Emerging Infectious Diseases journal - CDC, pp. 18. 354-357.
- 19.Yasmin A, Mustafa B A, Nasir H Z , Hassan R, Abdul Molok H, Jantan T, Jantan S C.2002 .Standard precaution . AIDS / STI ECTION MINISTRY OF HEALTH Malaysia)
- 20.- NGHHA. GCC-CIC.2013. Infection Prevention and Control Manual: Kingdom of Saudi Arabia.
- 21.- National Health Service .2016. Infection Prevention and Control Manual.
- 22.Ducel G , Fabry J, Nicolle L .2002. Prevention of hospital-acquired infections. Malta : World Health Organization .

23. Department of Health and Human Services. 2014. Transmission Based Precautions A guide for healthcare workers .Tasmanian Government: Version 2.
24. Garner J S, Simmons B P & Williams WW. September 1983. CDC guideline for isolation precautions in Hospitals and CDC guideline for Infection control in hospital personnel. 83 -8314 .
25. Garner JS. : January, 1996. The CDC Hospital Infection Control Practices Advisory Committee: <http://www.cdc.gov/hicpac/pubs.html>.
26. 25-(CDC.2007. Guidelines for Isolation Precautions: Preventing
27. Transmission of Infectious Agents in Healthcare Settings.
28. World Health Organization. 2007. Standard Precautions in Health Care:
29. Available from: www.who.int/csr/resources/publications/EPR_AM2_E7.pdf. 27-
- CDC.2011. Basic Infection Control and Prevention Plan for Outpatient Oncology Setting. For Emerging and Zoonotic Infectious Diseases
30. National Health Service. 2016. Standard Infection Prevention and Control Guidelines Clinical Governance. Highland.
31. Siegel, JD, Rhinehart, E, Jackson, M, Chiarelo, L and the Health Infection Control Practices Advisory Committee. 2007. Guideline for isolation precaution: preventing transmission of infectious agents in health care setting.
32. World Health Organization. 2004. Practical Guidelines for Infection Control in Health Care Facilities. Regional Office for Western Pacific, Manila. Regional Office for South-East Asia, New Delhi.
33. (NHS Scotland. (November 2010) .Standard Infection Control Precautions Clinical Governance.
34. Canadian Committee on Antibiotic Resistance. 2007. Infection Prevention and Control Best Practices for Long Term Care, Home and Community Care including Health Care Offices and Ambulatory
35. Clinics.www.ccar-ccra.org.
36. Weston D. 2008. Infection Prevention and Control: Theory and Clinical Practice for Healthcare Professionals.
37. Balarabe S A, Joshua A I , Danjuma A, Dauda S A , Sunday O and
38. Yusuf D H .2015 . Knowledge of Healthcare Workers on Nosocomial Infection in Selected Secondary Health Institutions in Zaria, Nigeria., World Journal of Preventive Medicine,, Vol. 3, pp. 1-6.
39. World Health Organization . 2010. Technical paper Infection prevention and control in health care: time for collaborative action. Geneva: World Health Organization.
40. Infection Prevention & Control. September 2016. Clinical best practice guideline.
41. Sado W E , Fawole AO, etal . (2006). Practice of universal precautions among health care workers. Journal of the National Medical Association, 98: 102-10.). -31.
42. Franklin E O .2009. The knowledge and practice of standard precautions among health care workers in public secondary health facilities in Abuja, Nigeria.
43. Ministry of Health.2011. manual Infection Prevention and Control Policies and Guidelines for Health Care Services. Second Edition. Trinidad and Tobago.
44. Best Practice Advocacy Centre New Zealand.2014. Exposure to body fluids: keeping the primary healthcare team safe)

45. National Services Scotland .2016. Standard Infection Control Precautions Literature Review: Management of care equipment.
46. Friedman C, Newsom W. 2011. International Federation of Infection Control: 2nd Edition.
47. Engenderhealth.2001. Infection prevention: A reference booklet for health care providers. New Yourk. NY, USA -37.
48. CDC. March 2016. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care .
49. Public Health England. October 2016. Infection control precautions to minimize transmission of acute respiratory tract infections in healthcare settings. Version 2: Available at www.gov.uk/phe.
50. CDC.2008.Guideline for Disinfection and Sterilization in Healthcare
51. Facilities.
52. Royal College of Nursing. 2005. Good practice in infection prevention and control Guidance for nursing staff: 20 Cavendish Square London, W1G 0RN.
53. Tietjen L, Bossemeyer D. (2004). Infection prevention guidelines for health care facilities with limited resources, USA.
54. Moyo M G. 2013. Factors influencing compliances with infection prevention standard precaution among nurses working at mbagathi district hospital, Nairobi, Kenya.
55. Infection Prevention & Control. 2016. Clinical Best Practice Guide Line .
56. CDC. 2017. Recommended Vaccines for Healthcare Workers.
57. CDC. 1997. Immunization of health care workers: recommendations of advisory committee on immunization practices (ACIP) and the hospital infection control practices advisory committee (HICPAC). MMWR 1997 46 (RR-18): 1–42.
58. Bourn J. 2000. The Management and Control of Hospital Acquired Infection in Acute NHS Trusts in England: email: nao@gt.net.
59. Eunice W, Kamunge.2013. Exploring Knowledge, Attitudes and Practices of Registered Nurses Regarding the Spread of Nosocomial infections: Seton Hall University.
60. Saroji V .2014. Awareness and practice of standard precautions among Kerala State Health Services personnel in Neyyatinkara Taluk.
61. Duminy M J.2010. An Investigation into the Knowledge and Compliance with Standard Precautions among nurses in Tygerberg Hospital in the Western Cape.
62. Motamed N, BabaMahmoodi F, Khalilian A, Peykanheirati M, Nozari M. 2006. Knowledge and practices of health care workers and medical students towards universal precautions in Mazandaran province. Eastern Mediterranean Health Journal 12(5): 1205.
63. Sharma S, Gupta A, Arora A. (2010) . Knowledge, attitude and practices on needle stick and sharps injuries in tertiary care cardiac hospital: a survey; Indian J Med Sci; 64:396-401.
64. Kermode M , Jolley D, Langkham B, Thomas M S, Holmes W., Gifford S M. (2005). Compliance with Universal/Standard precautions among health care workers in rural North India. American Journal of Infection Control, 33(1), 27-33. Retrieved July 17, 2009, from Science Direct database.
65. Kolude, OO, Omokhodion, FO, Owoaje, ET. 2004. Universal Precaution: Knowledge, Compliance and perceived risk of infection among

- doctors at a University Teaching Hospital. Int. conf. AIDS; Abstract no MoPed 3676.)
67. Yakob E, Lamaro T and Henok A. 2015. Knowledge, Attitude and Practice towards Infection Control Measures among Mizan-Aman General Hospital Workers, South West Ethiopia: Journal of Community Medicine & Health Education.
 68. Talaat E, Shamia E. (2010) Developing a control action plan for infection prevention at the endoscopy unit. Journal of international Academic research. Jjuly; 2(4): 412-420.)
 69. Jain M., Dogra V, Mishra B, Thakur A & Loomba P. (2012). Infection control practices among doctors and nurses in a tertiary care hospital. Annals of Tropical Medicine and Public Health; 5:29-33.)
 70. Paudyal P, Simkhada P, Bruce. (2008). Infection control knowledge, attitude, and practice among Nepalese health care workers. US National Library of Medicine National Institutes of Health; 36(8):595-7.
 71. Abd elaziz M & BAKR M. (2009). Assessment of knowledge, attitude and practice of hand washing among health care workers in Ain Shams University hospitals in Cairo. J PREV MED HYG 2009; 50: 19-25 .
 72. Gulilat K, Tiruneh G. 2012. Assessment of knowledge, attitude and practice of health care workers on infection prevention in health institution Bahir Dar city administration: Science Journal of Public Health 2014; 2(5): 384-393 published online August 10, 2014 .
 74. Danchaivijitr S, Tantiwatanapaiboon Y, Chokloikaew S, Tangtrakool T, Suttisanon L, Chitreechuer L. 1993. Universal precautions : knowledge, compliance and attitudes of doctors and nurses. Journal of the Medical Association of Thailand. 1995 Jul; 78 Suppl 2:S112-7. Available from: <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=search&DB=pubmed>
 75. Kermode M, Jolley D, Langkham B, Thomas MS, Holmes W, Gifford SM. 2005. Compliance with universal/standard Precautions among health care workers in rural north India. American Journal of Infection Control 33: 27–3)
 76. Ogoina D, Pondei K K , Adetunji B, Chima G, Isichei C, and Gidado S .2011. Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria.
 77. Otovwe A , Adidatimi O P .2017. Knowledge, Attitude and Practice of standard precaution among Health Care Workers in Federal Medical Centre Yenagoa, Nigeria : Journal of Pharmacy and Biological Sciences (IOSRJPBS) e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 12, Issue 4 Ver. III (Jul – Aug 2017), PP 79-86
 78. Wilson E. Sadoh, et al. 2006. Practice of universal precautions among healthcare workers Journal of the National Medical Association; 98(5): 722–726
 79. Tarik, tawfikamin, et al. 2013. Standard Precautions and Infection Control, Medical Students' Knowledge and Behavior at a Saudi University:
 80. The Need for., Global Journal of Health Science; Vol. 5, No. 4.

81. Abduiraheem et al. 2012. Knowledge, Awareness and Compliance with Standard Precautions among Health Workers in North Eastern Nigeria, Community Med Health Edu.
82. AAJ Hesse, et al. 2006. Knowledge, Attitude and Practice Universal Basic Precautions by Medical Personnel in a Teaching Hospital, Ghana Med J. 40(2): 61–64.
83. Tarko S, Azazh A and Abebe A .2014. Assessment of the Knowledge, Attitude and Practice of Fourth, Fifth and Sixth Year Medical Students on Standard Precaution in Tikur Anbessa Specialized Hospital, Addis Ababa ,
84. Ethiopia: Journal of Nursing & Health Sciences. Published date: 25/08/ 2015.
85. Kothari R C. 2004. Research, methodology Methods and Techniques
86. .second revised edition. New Age International ISBN (13): 978-81-2242488-1.
87. Anthony M , Wanjohi .2014. Social Research Methods Series proposal writing guide. Kenya Projects Organization (KENPRO). ISBN 978-9966069-15-3.
88. Macklin R, Double .2004. standards in medical research in developing countries. Cambridge: Cambridge University Press.
89. World Health Organization. 2007. Ethical challenges in study design and informed consent for health research in resource-poor settings.
- 90.- Atif M L, et al. 2013. Awareness of standard precautions for 4439 health professionals in Institutions in France. Med Mal Infect. 2013 Jan; 43:10-6.
- 91.- (Tai JWM, Mok ESB, Ching PTY, Seto WH , Pittet D. (2009) Nurses and Physicians' Perceptions of the Importance and Impact of Healthcare Associated Infections and Hand Hygiene: a Multi-Center Exploratory Study in Hong Kong . Infection; 37(4):320-333.
- 92.- AAJ Hesse , et al .2006. Knowledge, attitude and practice universal basic precaution by medical personal in a teaching hospital, Ghana. Med J. 40 (2):61-64.
- 93.- Okhiai O et al .2014. A study on knowledge, attitude and practice of standard precautions among theatre personal in Irrua Specialist Teaching Hospital, Irrua, EDO, State. International Journal of Basic, Applied and Innovative Research IJBAIR, 2014, 3(4): 147 – 153 www.arpjournals.com; www.antrescentpub.com
- 94.- Ministry of Public health and sanitation and Ministry of medical services, (2010). National Infection Prevention and Control Guidelines, Kenya
95. Ogoina D, et al .2015. Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. Journal of Infection Prevention: 2015, Vol. 16(1) 16– 22
96. kocic B. 2008. Professional Risk , Knowledge, Attitudes and practice of Healthcare Personal in Serbia with Regard to HIV AND AIDS : Cent Eur J Public Health 2008;16 (3): 134–137.

Appendix A: English questionnaire

Questionnaire

Awareness of Healthcare Staff toward the Importance of
Personal Protective Measures to Prevent Infection
Transmission at 48 Model Hospital Sana'a City –Yemen

No	Paragraph
First: Personal Information	
1)	Age ? ☐ Less than 25 years old. ☐ From 26-30 years old. ☐ Over 30 years old.
2)	Sex ? ☐ male. ☐ Female.
3)	Marital status ? ☐ married. ☐ single . ☐ divorced . ☐ widow.
4)	Educational level ? ☐ Diploma. ☐ Bachelor's. ☐ Master's. ☐ board. ☐ Other
5)	Specialization ? ☐ Nursing - Level 4 . ☐ Nursing - Level 3. ☐ Nursing - Excellence. ☐ A medical student. ☐ nurse. ☐ doctor. ☐ Anesthesia technician. ☐ Technical operations. ☐ Others.
6)	The department in which you work ? ☐ Department of Surgery. ☐ children section. ☐ Department of Neurology. ☐ Women's Department. ☐ Operations Department. ☐ Intensive Care Department (ICU). ☐ Emergency Department. ☐ Other
7)	Years of experience ? ☐ Less than 5 years. ☐ From 5 - 10 years. ☐ More than 10 years.
8)	Is your level of knowledge about the importance of preventive measures appropriate? ☐ Yes. ☐ No. ☐ I'm not sure

9)	Have you ever taken PPE courses? () Yes. () No. () I'm not sure			
Second : Knowledge and awareness of the importance of PPE and its role in preventing the transmission of infection.		Yes	No	I'm not sure
1)	Do you know what is meant by PPE ?			
2)	It shall be avoided for the polluted protective articles to contact with the surface of other articles , the clothes or the staff outside of the ward?			
3)	Washing and disinfecting the hands immediately if contacting any blood , body fluid , secretion , excretion, or dirty substance?			
4)	Are personal protective equipment (PPE) available in your work environment ?			
5)	Has your level of awareness of the importance of preventive measures (PPE) increased after a pandemic/ Corona?			
6)	Do you think that the available personal protective equipment is effective in preventing infectious diseases ?			
7)	Does the type of personal protective equipment chosen depend on the type of exposure and the procedure / Infectious diseases ?			
8)	Do you know if the gloves that are worn protect you from some infectious disease pathogens?			
9)	Is wearing an N95 mask important when dealing with airborne infections?			
10)	Does the diagnosis of the patient you interact with influence your decision to choose What type of personal protective equipment ?			

11)	Are the hands of health workers a means of transmitting pathogens in hospitals ?			
12)	Are you ready to attend awareness and guidance courses and seminars to learn about the importance of personal protective equipment And preventive measures and ways to use them ?			
13)	The gloves shall be worn in the operation of blood drawing , venous puncture , ..etc?			
14)	The gloves shall be worn in the operation might contact with the secretion and excretion of patient?			
15)	Since the gloves can prevent from the pollution for the hands there is no need to wash hands after taking of the gloves?			
16)	Where did you gain knowledge about preventive measures (you can choose more than one source)? ☐ Lectures during the study. ☐ From social media. ☐ from TV. ☐ Workshops or seminars. ☐ from a co-worker or classmate. ☐ Personal by reading books			
17)	Which of the following is a personal protective equipment ?(you can choose more than one) ☐ Gloves. ☐ Goggles / Protect eyes . ☐ The mask. ☐ Bib / Gaunty Gwons - aprons.			
18)	How important is the use of personal protective equipment? ☐ Important. ☐ Very important. ☐ I don't know. ☐ Not important.			
Third: Knowledge and awareness of the correct way of preventive measures and use of PPE		Yes	No	I'm not sure
1)	Do you think that the wrong use of PPE contributes to transmission of infection ?			
2)	Do you know the correct ways to use PPE ?			

3)	When wearing PPE, should gloves be the last thing to wear?			
4)	Are you wearing and removing PPE by the correct way ?			
5)	Can PPE such as gloves, masks, etc. be reused more than once?			
6)	Should hand hygiene be carried out regularly before contacting the patient ?			
7)	Should hand hygiene between patient and other ?			
8)	According to the hand-washing protocol, is it necessary to wash hands for more than 60 seconds ?			
9)	If the hands are visibly dirty, is rubbing the hands with alcohol or Is sanitizer enough?			
10)	Should you wash your hands before and after wearing medical gloves ?			
11)	Do preventive measures completely prevent the spread of infection in health facilities ?			
12)	Can contaminated needles and sharps transmit infectious pathogens ?			
13)	Is adherence to preventive measures only aimed at protecting the health team?			
14)	Are personal protective equipment only required of some health workers?			
15)	Should personal protective equipment be worn in necessary and contagious cases/ Only ?			
16)	Can the hepatitis C agent be transmitted through contaminated needles and sharp objects ?			
17)	Can it be transmitted? The causative agent of HIV/AIDS through contaminated needles and sharp objects ?			
18)	Can it be transmitted? The causative agent of Corona (coved19) by mode spray ?			

27)	What are the factors that enable you to adhere to the use of personal protection tools ? (you can choose more than one method). ☐ The lack of personal protection tools. ☐ Hospital policy that does not emphasize the use of personal protective equipment ☐ Unavailability of training sessions for the use of personal protective equipment ☐ Allergy to the materials from which the personal protective equipment is made ☐ Physical discomfort caused by personal protective equipment.
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Appendix B: Arabic questionnaire

Republic of Yemen

21 September University
Of Medical & Applied
Sciences
Faculty of High nursing



الجمهورية اليمنية.
وزارة التعليم العالي والبحث العلمي.
جامعة 21 سبتمبر للعلوم الطبية والتطبيقية.
كلية التمريض العالي.

أستبيان بعنوان :

"مدى وعي الكادر الصحي حول أهمية التدابير الوقائية الشخصية لمنع إنتقال العدوى
في مستشفى 48 الطبي النموذجي بمحافظة صنعاء - اليمن."

Awareness of health staff about the importance of personal
preventive measures to prevent transmission of infection in 48
Model Medical Hospital in Sana'a City -Yemen.



الموافقة الرسمية

الأخت: نحن طلاب باحثون من كلية التمريض العالي
جامعة 21 سبتمبر للعلوم الطبية والتطبيقية نقوم
بعمل دراسة بحثية بعنوان:

"مدى وعي الكادر الصحي حول أهمية التدابير
الوقائية الشخصية لمنع إنتقال العدوى في
مستشفى 48 الطبي النموذجي بمحافظة صنعاء
- اليمن"

ونحن نجري هذا البحث بموافقة كلية التمريض
بجامعة 21 سبتمبر للعلوم الطبية والتطبيقية.

نهدف من خلال بحثنا هذا التحري ومعرفة مدى
وعي الكادر الصحي حول أهمية التدابير الوقائية
الشخصية لمنع إنتقال العدوى

المعلومات التي سنأخذها منكم ستحاط بالسرية
التامة وفقا لأخلاقيات البحث العلمي ، ولن يتم
إستخدامها إلا في البحث العلمي.

و الآن ، هل توافقاي على المشاركة في هذا البحث؟

نعم أوافق ☐ ← ملئ الاستبيان

لا أوافق ☐ ← أنهي المقابلة

القسم :-

الملاحظات :-

أكد أن الاستبيان تم تعبئته بالكامل

التاريخ :- / /

إسم المقابل :-

التوقيع :-



الفقرة	No.
أولا : المعلومات الشخصية	
1 العمر ؟ () أقل من 25 سنة. () من 26 - 30 سنة. () أكثر من 30 سنة.	1
2 الجنس ؟ () ذكر. () أنثى.	2
3 الحالة الإجتماعية ؟ () متزوجة. () عازبة. () مطلقة. () أرملة.	3
4 المستوى التعليمي ؟ () دبلوم. () بكالوريوس. () ماجستير. () بورد. () أخرى.	4
5 التخصص ؟ () طبيب. () تمريض-مستوى. () تمريض-مستوى. () فني عمليات. () ممرضة. () تمريض-إمتياز. () فني تخدير. () أخرى.	5
6 القسم الذي تعمل فيه ؟ () قسم الباطنية. () قسم الأطفال. () قسم النسائية. () قسم العناية المركزه (ICU). () قسم الجراحة. () قسم الأعصاب. () قسم العمليات. () قسم الطوارئ.	6
7 سنوات الخبرة ؟ () أقل من 5 سنوات. () من 5 - 10 سنوات. () أكثر من 10 سنوات.	7
8 هل مستوى معرفتك بأهمية الإجراءات الوقائية مناسب ؟ () نعم. () لا. () لست متأكد.	8
9 هل اخذت دورات من قبل حول ادوات الوقاية الشخصية PPE ؟ () نعم. () لا. () لست متأكد.	9



الفقره				No.
لست متأكد	لا	نعم	ثانيا : المعرفة والوعي بأهمية أدوات الوقاية الشخصية PPE و دورها في منع إنتقال العدوى.	
			هل تعرف ما المقصود بادوات الوقايه الشخصية PPE ؟	①
			هل يجب تجنب ملامسة المواد الواقية الملوثة مع سطح الأشياء الأخرى أو الملابس أو الموظفين خارج القسم ؟	②
			هل يجب غسل اليدين وتطهيرهما مباشرة في حالة ملامسة أي دم أو سوائل بالجسم أو إفرازات أو مادة ملوثة ؟	③
			هل أدوات الوقاية الشخصية متوفرة في بيئة عملك ؟	④
			هل مستوى وعيك بأهمية الإجراءات الوقائية (أدوات الوقاية الشخصية PPE) زاد بعد جائحة كورونا ؟	⑤
			هل تعتقد أن أدوات الوقاية الشخصية المتاحة فعالة في الوقاية من الأمراض المعدية ؟	⑥
			هل يعتمد نوع أدوات الوقاية الشخصية المختارة على نوع التعرض و الإجراءات الطبية ؟	⑦
			هل تعلم ما إذا كانت القفازات التي يتم ارتدائها تقيك من بعض مسببات الأمراض المعدية ؟	⑧
			هل يعد ارتداء كاماة N95 امر1 مهما عند التعامل مع العدوى التي تنتقل عن طريق الهواء ؟	⑨
			هل يؤثر تشخيص المريض الذي تتعامل معه على قرارك في إختيار نوع أدوات الوقاية الشخصية ؟	⑩
			هل تعد أيدي العاملين الصحيين وسيلة لنقل مسببات الأمراض في المستشفيات ؟	⑪
			هل أنت مستعد لحضور دورات وندوات توعوية وإرشادية للتعرف على أهمية أدوات الحماية الشخصية و الإجراءات الوقائية وطرق إستخدامها ؟	⑫
			هل يجب ارتداء القفازات في عملية سحب الدم ، والبزل الوريدي ، .. إلخ ؟	⑬
			هل يجب ارتداء القفازات في العملية التي قد تتلامس فيها مع سوائل وإفراز المريض ؟	⑭
			بما أن القفازات يمكن أن تمنع تلوث اليدين فلا داعي لغسل يديك بعد اخذ القفازات ؟	⑮
			من أين أكتسبت المعرفة حول الإجراءات الوقائية (يمكنك إختيار اكثر من مصدر) ؟	⑯
			() محاضرات أثناء الدراسة. () من التلفاز. () من زميل في الدراسة أو العمل. () من وسائل التواصل الإجتماعي. () ورش عمل او ندوات. () شخصى من خلال قراءة كتب.	
			أي من الوسائل التالية يعتبر من ادوات الوقاية الشخصية (يمكنك اختيار أكثر من وسيلة) ؟	⑰
			() النظارات او غطاء الوجه Goggles / Protect eyes . () المرئال / الجاونتى Gwons - aprons () القفاز Gloves. () الكمامه Mask.	
			ما مدى أهمية استخدام أدوات الحماية الشخصية ؟ () مهمة. () لا أعرف. () مهمة جدا. () غير مهمة.	⑱

الفقره				No.
لست متأكد	لا	نعم	ثالثا : المعرفة والوعي بالطريقة الصحيحة للإجراءات الوقائية و استخدام معدات الوقاية الشخصية PPE .	
			1) هل تعتقد أن الإستخدام الخاطئ لأدوات الحماية الشخصية يساهم في إنتقال العدوى ؟	
			2) هل تعرف جيدا الطرق الصحيحة لإستخدام أدوات الوقاية الشخصية PPE ؟	
			3) عند إرتداء أدوات الوقاية الشخصية هل يجب أن تكون القفازات اخر ما يجب ارتداؤه ؟	
			4) هل تقوم بإرتداء وإزالة أدوات الوقاية الشخصية بالطريقة الصحيحة؟	
			5) هل يمكن إعادة إستخدام أدوات الوقاية الشخصية مثل القفازات والكمامات وغيرها أكثر من مره ؟	
			6) هل يجب اجراء نظافة اليدين بانتظام قبل الإتصال بالمريض ؟	
			7) هل يجب إجراء نظافة اليدين بين مريض وآخر ؟	
			8) وفقا لبروتكول غسل اليدين هل يجب غسل اليدين لمدة تزيد عن 60 ثانية ؟	
			9) إذا كانت اليدين متسخة بشكل واضح هل يعد فرك اليدين بالكحول او المطهر كافيا ؟	
			10) هل يجب غسل اليدين قبل وبعد ارتداء الكفوف الطبية ؟	
			11) هل تمنع الإجراءات الوقائية بشكل كامل إنتشار العدوى في المرافق الصحية ؟	
			12) هل يمكن أن تنقل الإبر الملوثة والمواد الحادة مسببات الأمراض المعدية ؟	
			13) هل يهدف الإلتزام بالإجراءات الوقائية إلى حماية الفريق الصحي فقط ؟	
			14) هل أدوات الوقاية الشخصية مطلوبة فقط من بعض العاملين الصحيين ؟	
			15) هل يجب ارتداء أدوات الحماية الشخصية في الحالات الضرورية والمعدية فقط ؟	
			16) هل يمكن أن ينتقل العامل المسبب لإلتهاب الكبد الوبائي من خلال الابر الملوثة والأدوات الحادة ؟	
			17) هل يمكن أن ينتقل العامل المسبب لنقص المناعة البشرية الإيدز من خلال الإبر الملوثة والأدوات الحادة ؟	
			18) هل يمكن أن ينتقل العامل المسبب لمرض كورونا (كوفيد19) عن طريق الرذاذ ؟	
			19) في غياب او عدم الإلتزام بالإجراءات الوقائية هل ممكن أن يكون العامل الصحي مصدر للعدوى والأوبئة المرضية ؟	
			20) في حالة الإستعجال هل يمكن إستعمال نفس الكفوف الطبية لنفس المرضى بدون تبديلها؟	
			21) هل يمكن استعمال قناع الوجه عند العناية بأكثر من مريض ؟	
			22) هل يجب تغيير القفازات بين مختلف المهام والإجراءات على نفس المريض ؟	
			23) ما هو الإجراء الأكثر فعالية للحد من إنتقال العدوى (يمكنك إختيار تدبير واحد فقط) ؟	
			() لبس الكمامة. () لبس المربال Gowns / Aprons.	
			() غسل اليدين. () قناع الوجه.	



24)	متى تستخدم أدوات الحماية الشخصية ؟ () دائما. () أحيانا. () معظم الوقت. () أبدا.
25)	عندما يكون هناك خطر تطاير سوائل الجسم او رذاذ الدم اي من الأدوات التالية يجب ارتداؤها ؟ () غطاء الرأس. () القفازات. () المريال (Gown). () قناع الوجه \ النظارات.
26)	ما هي العوامل التي تحثك على الإلتزام باستخدام أدوات الحماية الشخصية (يمكنك اختيار اكثر من وسيلة)؟ () توفر ادوات الحماية الشخصية. () سياسه المستشفى التي تؤكد على إستخدام ادوات الحماية الشخصية. () الدورات التدريبية الخاصه باستعمال ادوات الحماية الشخصية. () معرفة العواقب الصحية التي يتعرض لها العامل الصحي لعدم إستخدام ادوات الحماية الشخصية. () معرفة العواقب التي يتعرض لها المريض لعدم إستخدام ادوات الحماية الشخصية.
27)	ما هي العوامل التي تمنعك من الإلتزام باستخدام أدوات الحماية الشخصية (يمكنك اختيار اكثر من وسيلة) ؟ () عدم توفر ادوات الحماية الشخصية. () سياسة المستشفى التي لا تؤكد على إستخدام أدوات الحماية الشخصية. () عدم توفر الدورات التدريبية الخاصة باستخدام أدوات الحماية الشخصية. () الحساسية تجاه المواد التي تصنع منها أدوات الحماية الشخصية. () عدم الإرتياح الجسدي الذي تسببه أدوات الحماية الشخصية.



الدكتور/ عبد الملك الصلبي

مدير عام مستشفى ٤٨ النموذجي

الموضوع: تسهيل مهمة بحث

تهديكم رئاسة جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية أطيب تحياتها وتقديرها وإشارة إلى الموضوع أعلاه تكرموا مشكويين بالتوجيه الى من يلزم بتسهيل مهمة بحث طلاب كلية التمريض العالي ندينا بالجامعة لعدد (٢٠) طالب بحسب عنون البحث الموضح قرين أسمائهم.

وهم:-

الاسم	عنوان البحث
١. عماد نبيل أحمد الحداد ✓	
٢. اسامة علي مقل عنبر ✓	
٣. عز الدين مسعد حسن جابر ✓	
٤. عصمت عبده محمد الخربة ✓	
٥. مصطفى محمد محمد أبو طالب	
٦. حمدي محمد عبد الله الحوش ✓	
٧. أسعد يحيى أحمد جابر	
٨. بكيل يحيى أحمد جابر	
٩. يحيى علي حمود عمران	
١٠. منصر قاسم منصر عليوهان	
١١. عبد العزيز ناسر علي الفقيه ✓	
١٢. أحمد يحيى أحسن عمران	
١٣. عبد الله ناسر حسين العظلي	
١٤. ربيع ناسر يحيى عوضه	
١٥. أيوب أحمد علي المعازي	
١٦. عبد الغني عبد الله عبده هبه	
١٧. محمد حميد علي مهاوش	
١٨. الزبير حفظه الله حسين محمد ✓	
١٩. صالح علي صالح علي تبيح	
٢٠. يوسف حمود عبد الله عمران	

مدى وعي الكادر الصحي بأهمية التدابير الوقائية
الشخصية لمنع انتقال العدوى في المستشفى

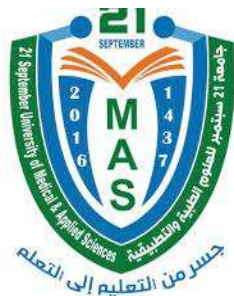
... تفضلوا بقبول خالص تحياتي وعميق احترامي ...

استاذ دكتور/

مهاجد علي معصار
رئيس الجامعة

30 MAR 2022





مدى وعي الكادر الصحي بأهمية التدابير الوقائية الشخصية لمنع انتقال

العدوى في مستشفى 48 الطبي النموذجي بمحافظة صنعاء-اليمن

"بحث مقدم الى كلية التمريض العالي بجامعة 21 سبتمبر للحصول على درجة

"البكالوريوس في مجال التمريض

مقدم من الطلاب

- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | عماد نبيل احمد الحداد | 2 | عزالدين مسعد حسن جابر |
| 3 | عصمت عبده محمد الخربه | 4 | اسامه علي مقبل عنبر |
| 5 | حمدي محمد عبدالله الحوش | 6 | عبدالعزیز ناصر علي الفقيه |
| 7 | بكيل يحيى احمد جابر | 8 | عبدالله ناصر حسين العظهي |
| 9 | يحيى علي حمود عمران | 10 | مصطفى محمد محمد ابو طالب |
| 11 | اسعد يحيى عبدالله العزيب | 12 | احمد يحيى احسن عمران |
| 13 | الزبير حفظ الله حسين محمد | 14 | عبدالغني عبدالله عبده هبه |
| 15 | منصر قاسم منصر علبوهان | 16 | محمد حميد علي مهاوش |
| 17 | ربيع ناصر يحيى احمد عوضه | 18 | ايوب احمد علي عبدالله المعازي |
| 19 | صالح علي صالح تبيح | 20 | يوسف حمود عبدالله عمران |

إشراف/

الدكتور/ حوريه عبد الرقيب الصبري

2022