Deanship of Graduate Studies

Al- Quds University

Evaluation of Nurses Compliance to The National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate.

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Evaluation of Nurses Compliance to The National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate.

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Dedication

I would like to dedicate this work to the most cherished people in my life, who have been the pillars of my strength and support at every step.

To my dear parents, my father Essa and my mother Fatima, whose wisdom, sacrifices, and endless support have been my greatest blessings. I thank Allah for blessing me with both of you, and I raise my hands in gratitude for your constant presence in my life.

To my beloved wife, Israa, who has been a constant source of inspiration. Your love, patience, and encouragement motivate me every single day. You are my strength and my best friend.

To my precious daughters, Orjwan, Jory, Jana, and Ghena, you are the light of my life and the reason I strive for more. Every moment of my life is for you, and every step I take is for you.

This work is a humble tribute, a small token of my immense appreciation and love for all of you.

Mohammad Essa Rasheed

Declaration

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Name: Mohammad Essa Rasheed

Signature: 

Date: 6/03/2025

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Mohammad Essa Rasheed

Abstract:

Healthcare-associated infections (HAIs) pose a significant global public health challenge, particularly in resource-limited settings like Palestine. This descriptive-analytical cross-sectional study aimed to assess nurses' compliance level with the National Palestinian Infection Prevention and Control Protocol in governmental hospitals in Hebron Governorate. The study evaluated compliance levels, identified barriers to adherence, and explored factors influencing IPC practices. The research was conducted across five governmental hospitals in Hebron Governorate, representing diverse healthcare environments. A simple random sampling method was employed to select 212 nurses from a total population of 442. Data were collected using a structured questionnaire distributed, achieving a high response rate of 96%. Results revealed a high overall compliance rate of 88.3% among nurses with the National Palestinian IPC Protocol. Specific practices such as hand hygiene (95.8%), personal protective equipment use (94%), and safe disposal of sharp waste (93.9%) demonstrated particularly strong adherence. Nurses exhibited very high knowledge levels (88.7%) and positive attitudes (90% agreement) towards IPC practices. Despite high compliance, several barriers were identified. The most significant challenges included lack of time and work overload (62.7%), insufficient knowledge and education (61.3%), and shortages of critical materials like N95 masks (available in only 17% of departments). While 76% of nurses were aware of the Palestinian IPC protocol, only 59% had access to a copy of National Palestinian Infection Prevention and Control Protocol in their ward. Environmental factors such as inadequate infrastructure (47.6%) and lack of specialized isolation rooms (53%) further complicated adherence to IPC protocols. Organizational support varied, with 68% of nurses acknowledging management's adoption of supportive policies. However, only 20% reported receiving regular IPC training, highlighting a need for more consistent educational programs. Supervision and monitoring systems were present but inconsistent, with 78% reporting the existence of infection control committees but 45% unaware of surveillance systems for infection rates. The study found positive relationships between compliance and factors such as knowledge, attitudes, training, availability of resources, and supportive policies. Nurses working morning shifts, those in closed departments (e.g., ICUs), head nurses, and those vaccinated against Hepatitis-B exhibited higher compliance with IPC protocols. Based on these findings, the study recommends implementing regular, structured IPC training sessions, improving resource management to ensure access to essential materials, strengthening supportive policies including continuous auditing and feedback mechanisms, and investing in infrastructure improvements. Additionally, optimizing work conditions, promoting continuous education, and enhancing supervision and monitoring systems are crucial for sustaining and improving IPC compliance. This comprehensive assessment of IPC compliance in Hebron Governorate's governmental hospitals provides valuable insights for healthcare administrators and policymakers. By addressing the identified barriers and leveraging existing strengths, targeted interventions can be developed to enhance IPC practices, ultimately reducing the burden of HAIs and improving patient safety in Palestinian healthcare settings.

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List of Abbreviation

CDC Central of Disease and Control

COVID Coronavirus Disease of 2019

ER Emergency Room

HAIs Healthcare-Associated Infections or Hospital an Acquired Infection

HCPs Health Care Professionals

HIV Human Immune-Deficiency Virus

ICU Intensive Care Unit

IPC Infection Control and Prevention

KAP Knowledge, Attitudes, and Practices

MOH Ministry of Health

PPE Personal Protective Equipment

SARS-COV Middle East Respiratory Syndrome Coronavirus

SPH Sub Public Health Research

SPSS Statistical Package for the Social Sciences

WHO World Health Organization

Chapter One

Introduction

1.1 Background

One of the most prevalent and significant issues in healthcare facilities worldwide is infection. It poses a major challenge to patient safety and healthcare quality, leading to increased morbidity, mortality, and healthcare costs. Effective infection prevention and control measures are essential to mitigate its impact and ensure a safer healthcare environment(Yazie et al., 2019).

A healthcare-associated infection (HAI) is an infection that develops in a patient while they are receiving treatment in a hospital or other healthcare facility and was not present or incubating at the time of admission. It is also known as a "nosocomial" or "hospital" infection. In addition to affecting patients while they are receiving care, HAI can also manifest itself after a is discharged. Moreover, they comprise staff occupational illnesses(CDC, 2024a).

HCAIs can occur in various parts of the body and are often associated with invasive procedures, surgical sites, and the use of medical devices such as catheters and ventilators(Magill et al., 2014).

HAIs are a significant global issue, impacting countries at all stages of development. Regardless of disparities in healthcare infrastructure and resources, the prevalence of HAIs remains a universal concern, emphasizing the necessity for comprehensive infection prevention and control measures to lessen their impact on public health(Ghorbanmovahhed et al., 2023).

HAIs, continue to present a significant threat in medical facilities worldwide, contributing to increased morbidity, mortality, and healthcare costs(Raoofi et al., 2023). According to more recent studies, the rate of HAIs has been consistently rising, particularly in resource-

limited settings and high-risk hospital wards, such as intensive care units(Cook et al., 2025). This highlights the importance of robust infection prevention and control (IPC) measures to combat their widespread impact. The prevalence of HAIs globally varies by region, but they remain a substantial financial and clinical burden (Raoofi et al., 2023).

HAIs represent a significant global public health challenge, contributing substantially to morbidity and mortality rates among patients undergoing medical care(Storr et al., 2017).

The economic impact of HAIs is substantial because of its link to extended hospital stays and indirect expenses including missed work, isolation requirements, higher medication use, and additional laboratory or diagnostic test usage. Patients who are susceptible, including the elderly, those with underlying medical conditions, and those undergoing chemotherapy, are more likely to become infected(Khazaei et al., 2018).

HAIs continue to be a major issue in the United States, impacting millions of patients annually. Recent studies estimate that over 1.7 million people develop HAIs each year, with approximately 99,000 resulting in death. The economic impact of these infections is staggering, with costs ranging from $28 billion to $45 billion annually. Despite these high costs, a large proportion of HAIs are preventable through proper infection control practices. Preventive measures, including hand hygiene, appropriate use of personal protective equipment (PPE), and environmental sterilization, can significantly reduce HAI rates (Cagle et al., 2022).

The WHO estimates that in both industrialized and developing countries, HAIs affects 7% and 10% of hospitalized patients, respectively. This demonstrates a substantial endemic burden, particularly in countries with low or middle incomes(WHO, 2016).

Global health organizations have reported that out of the two million individuals who have hospital-acquired infections (HAIs) every year, about 100,000 of them die as a result of these diseases. Serious infections like Hepatitis B (HBV), Hepatitis C (HCV), and the Human Immunodeficiency Virus (HIV) have been related to healthcare professionals' noncompliance with infection prevention and control (IPC) methods. As a result, healthcare workers are in the front lines of infection prevention, guarding against potentially fatal diseases for both themselves and their patients.(CDC, 2020; WHO, 2021).

The most frequent infections found in intensive care units (ICUs) remain primarily associated with multidrug-resistant organisms (MDROs) such as *Acinetobacter baumannii*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*(Jiang et al., 2023). These pathogens contribute significantly to (HAIs), particularly in critically ill patients who are more vulnerable due to factors like compromised immune systems and invasive treatments. Recent studies underscore the role of antimicrobial resistance in exacerbating the threat posed by these infections, especially in regions where infection control is challenging(Sartelli et al., 2024).

The most frequent infections found in the intensive care unit (ICU) were Acinetobacter baumannii, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Staphylococcus aureus, and Streptococcus pyogenes. The urinary tract was the most often occurrence (44.4%), pneumonia (10.7%), bronchitis (7.4%), and wound infections (29.4%) were next, in the ICU, a Baumannii exhibited greater resistance to antimicrobial than other HAIs bacteria. Therefore, it is imperative to address HAIs (Mythri et al, 2014).

Nurses play a critical role in infection prevention and control (IPC) due to their direct involvement in patient care, making their adherence to IPC protocols essential in reducing (HAIs). Compliance with key practices such as hand hygiene, use of personal protective equipment (PPE), and sterilization is vital for ensuring a safe healthcare environment. Recent research has shown that targeted programs, such as infection control link nurse (ICLN) initiatives, can significantly improve nurses' compliance with standard precautions like hand hygiene, reducing HCAIs by up to 70% in some cases(Ghorbanmovahhed et al., 2023).

Maintaining efficient infection prevention and control methods is a critical duty for healthcare professionals. In addition to advocating for the safety and well-being of patients, medical personnel, and the healthcare environment, they are allowed to identify, evaluate, analyze, and manage potential hazards.(Hughes et al., 2020).

Infection prevention and control strategies must be followed to provide safe and high-quality patient care in all healthcare settings (CDC, 2022).

Many HAIs can be prevented through the implementation of cost-effective, evidence-based infection prevention and control (IPC) practices. These include following recommended protocols, particularly with regard to hand hygiene and the appropriate use of gloves. Additionally, ensuring proper cleaning, decontamination, and sterilization of medical equipment is essential, alongside the implementation of high-level disinfection procedures. Furthermore, enhancing safety in operating rooms (ORs) and other high-risk areas where significant exposure to infectious agents occurs is critical for reducing infection risks (Tartari, Bellissimo-Rodrigues, et al., 2024).

In particular, studies highlight that motivating nurses, fostering habits, and reinforcing social norms around IPC can drive higher compliance rates, leading to reduced patient infections and improved health outcomes(Sands & Aunger, 2020).

For more on this, the World Health Organization (WHO) has emphasized the importance of effective IPC practices in preventing infections and reducing antimicrobial resistance, further underlining the critical role of nurses in this domain(WHO, 2019).

Nurses in Palestine, working under stressful conditions with limited resources, are often required to balance high patient loads, which may impact their ability to consistently follow IPC protocols(Al-Ramahi et al., 2018).

Studies in Palestinian regions, such as Gaza and the North West Bank, have shown gaps in compliance due to insufficient training, lack of awareness, and resource shortages(Al-Ramahi et al., 2018).

In Palestine, healthcare systems face chronic challenges such as resource limitations, overcrowded healthcare facilities, and the ongoing political instability. These factors make the implementation of standardized IPC protocols difficult, increasing the likelihood of HCAIs. According to local studies, healthcare facilities in Palestinian territories often lack essential medical supplies and infrastructure, complicating efforts to maintain strict infection control measures(Tabash et al., 2018).

The National Palestinian Infection Prevention and Control Protocol was developed in 2004 by the Palestinian Ministry of Health as a national effort to combat the spread of (HAIs)in healthcare facilities. This protocol sets guidelines for healthcare workers, including hand hygiene, waste management, patient isolation, and sterilization procedures. It aims to reduce infection rates and improve patient safety across both governmental and non-governmental

healthcare facilities, protocol's success largely depends on the compliance of healthcare workers, particularly nurses. However, compliance rates have been suboptimal due to factors such as lack of awareness, limited access to training, and shortages of necessary supplies, as noted in studies from Gaza and the West Bank(Eljedi & Dalo, 2014)

While there have been evaluations of IPC compliance in other parts of Palestine, such as Gaza and the North of West Bank, limited research exists that focuses specifically on the Hebron Governorate. Hebron Governorate, located in the southern part of the West Bank, is the biggest governate area and population 822435 population(Palestinian Central Bureau of Statistics 2017.) it's home to five governmental hospitals out of eighteen government hospitals in the West Bank and 452 out of 1898 beds in the West Bank (MOH, 2023). And its healthcare system, like other regions in Palestine, faces considerable strain due to ongoing political and economic challenges

Despite the implementation of the National Palestinian IPC Protocol, there has been limited research evaluating the compliance of nurses in governmental hospitals in Hebron Governorate. This study aims to fill that gap by assessing nurse compliance and identifying barriers that may affect the successful implementation of infection control measures.

1.2 Justification

Hospital-associated infections (HAIs) constitute a critical public health concern due to their high prevalence, associated morbidity and mortality, and substantial burden on patients, healthcare workers (HCWs), and health systems(Storr et al., 2017).

Hospital-acquired infections are a major source of morbidity and death and a global public health problem. (Revelas, 2012).

The inability to effectively prevent the spread and transmission of infectious illnesses is caused by inadequate awareness and noncompliance with recommended practices and standards(Lopez, 2021).

A 2022 study highlights that unexpected infections acquired during healthcare, known as HAIs, continue to significantly affect mortality and morbidity rates worldwide, stressing the need for improved adherence to IPC protocols by healthcare professionals. This research further demonstrates the critical role healthcare workers, particularly in infection-prone settings, play in minimizing the incidence of HAIs through proper hygiene and care practices (Tartari, Garlasco, et al., 2024).

According to academic research, among every 100 patients admitted to acute-care hospitals, approximately seven patients in high-income countries and 15 patients in low- and middle-income countries are expected to develop at least one health care-associated infection (HAI) during their hospitalization. It is noteworthy that, on average, one out of every ten affected patients will succumb to their (HAIs).(WHO, 2022).

HAIs are a significant global challenge affecting patient safety and healthcare quality in hospitals worldwide(WHO, 2020).

In the Arab world, similar concerns regarding HAIs and IPC compliance persist. Research in this region has highlighted the need for standardized IPC protocols and enhanced compliance among healthcare workers to combat HAIs (Al-Rawajfah et al., 2013).

Within Palestine, the conversation on IPC compliance and HAIs is particularly relevant due to the unique healthcare challenges faced by the Palestinian population. Limited resources, political instability, and geographical constraints impact healthcare delivery and IPC practices in Palestinian hospitals(Fashafsheh et al., 2015).

A 2015 research was conducted in the West Bank revealed the following limitations: insufficient training programs (49.6%), insufficient resources (55.0%), and unclear protocols (44.1%)(Al-Ramahi et al., 2018).

In Palestine the Ministry of Health's development plans, which called for standardizing policies across all Ministry of Health facilities and improving the services offered to ensure patient health and safety through the caliber of services provided and their impact on maintaining the health of health care professionals, led to the publication of the first edition of the Palestinian guide for the prevention and control of infection in healthcare facilities(Khalil, 2023) .

Unexpected infections acquired during healthcare treatment, usually known as HAIs, have major consequences for patient health outcomes, frequently resulting in significant mortality and morbidity.(Fashafsheh et al., 2015).

These infections not only prolong hospital stays but also necessitate additional diagnostic and therapeutic interventions, thereby amplifying the financial burden on patients already grappling with underlying diseases(Alhumaid et al., 2021).

Infection prevention and control strategies must be followed to provide safe and high-quality patient care in all healthcare settings(CDC, 2022).

HAIs are widely recognized as adverse events that compromise the quality of patient care and pose significant patient safety concerns. Given that a portion of these infections are preventable, their occurrence serves as a critical indicator for evaluating the effectiveness of infection prevention measures and overall healthcare quality (Elmadhoun, 2015).

Despite the ongoing evolution of infectious diseases such as COVID-19 and the implementation of national protocols alongside relevant training programs, the absence of recent studies raises concerns regarding the ongoing evaluation of infection prevention and control practices within the West Bank governorates(Dar-Odeh et al., 2020) .

The healthcare system in Hebron Governorate is particularly affected by these challenges, and while there has been substantial research conducted on IPC practices in other parts of Palestine, there remains a gap in studies focused on Hebron. By focusing specifically on Hebron, this study addresses a crucial gap in our understanding of IPC practices within the region and offers insights that could help improve healthcare outcomes and reduce the incidence of HAIs.

Moreover, despite the presence of national IPC protocols and the development of related training programs, the lack of recent evaluations on their implementation and effectiveness in Hebron Governorate raises concerns. The failure to systematically assess and update IPC practices leaves significant gaps that may compromise patient safety and quality of care.

This study is essential because it will identify specific areas of non-compliance with IPC protocols in Hebron, targeting healthcare workers' adherence, particularly nurses. Nurses play a critical role in preventing HAIs, as they are involved in direct patient care and hygiene practices. By identifying barriers to compliance, this research aims to develop targeted interventions that can enhance adherence to IPC protocols, ultimately reducing the burden of HAIs in the region.

The outcomes of this study will provide evidence-based recommendations to policymakers and healthcare administrators in Palestine. It will also offer practical insights that can be applied to other similar regions with comparable healthcare challenges. The research is aligned with global public health goals to improve patient safety, reduce preventable infections, and enhance the overall quality of healthcare services. Through this study, we aim to contribute significantly to the ongoing efforts to optimize infection prevention and control in Palestine, ultimately leading to better healthcare outcomes for patients in Hebron and beyond.

1.3 The problem statement

HAIs remain a major global public health challenge, particularly in resource-limited settings like Palestine, contributing to increased morbidity, mortality, and healthcare costs (Yazie et al., 2019). Compliance with infection prevention and control (IPC) protocols by healthcare workers is crucial in reducing HAIs and improving patient outcomes (Tartari, Garlasco, et al., 2024; Tomczyk et al., 2021). Despite global efforts, adherence to IPC protocols remains inconsistent, highlighting the need for evaluative studies on IPC practices.

In Palestine, governmental hospitals face significant challenges in implementing IPC protocols due to limited resources, inadequate infrastructure, and weak surveillance, exacerbating infection risks (WHO, 2017). The Ministry of Health (MOH) introduced its first IPC guidelines in 2004, later adopting Jordanian infection control protocols in 2012(Al-Ramahi et al., 2018). A comprehensive national IPC protocol was developed in 2017, with regular updates, the latest in 2022, along with training programs to enhance healthcare professionals' competencies (Khalil et al., 2023; MOH, 2020). However, research assessing compliance with these protocols, particularly in the West Bank, remains scarce (Dar-Odeh et al., 2020).

As frontline caregivers, nurses play a crucial role in infection prevention, yet data on their adherence to IPC protocols in Hebron’s governmental hospitals are limited despite challenging working conditions (Fashafsheh et al., 2015). HAIs remain a significant global public health concern, particularly in resource-limited settings such as Palestine, where they contribute to high rates of morbidity, mortality, and increased healthcare costs. Despite the existence of national Infection Prevention and Control (IPC) protocols, the adherence to these protocols among healthcare workers, particularly nurses, remains suboptimal. As frontline caregivers, nurses play a critical role in preventing the spread of infections and ensuring patient safety. However, in Palestine, adherence to IPC protocols is hindered by several challenges, including limited healthcare resources, political instability, and geographical constraints.

The situation is particularly concerning in Hebron Governorate, which faces some of the most severe healthcare challenges in the region. Despite the presence of the Palestinian

National Infection Control Protocol, there is a notable lack of comprehensive studies evaluating nurses' adherence to these protocols within Hebron's governmental hospitals. The gap in research highlights a crucial issue in patient safety and infection control in the region.

Through my observation and analysis, it has become clear that the effectiveness of IPC measures in Hebron's healthcare system may be compromised, largely due to insufficient adherence by healthcare professionals. This study aims to assess the extent of nurses' compliance with the Palestinian National Infection Prevention and Control Protocol in Hebron's governmental hospitals, addressing the significant research gap and contributing valuable insights to improve IPC practices in the region. By identifying specific barriers to compliance and understanding the factors influencing adherence, the study will offer recommendations that could significantly enhance infection control efforts, ultimately improving patient safety and healthcare quality in the region.

1.3 Aim

To assess nurses' compliance level with the National Palestinian Infection Prevention and Control Protocol in governmental hospitals in Hebron Governorate.

1.4 Research question

1. What is the overall level of compliance among nurses with the National Palestinian Infection Prevention and Control Protocol within governmental hospitals in Hebron Governorate?
2. How often do nurses engage in specific infection control practices, such as hand hygiene, personal protective equipment (PPE) use, and proper disposal of medical waste?
3. What is the level of knowledge, attitudes, training and education among nurses regarding the National Palestinian Infection Prevention and Control Protocol?
4. What are the barriers that nurses face in adhering to the National Palestinian Infection Prevention and Control Protocol?
5. How does institutional support (e.g., availability of resources, training programs, feedback mechanisms) impact nurses' compliance with infection prevention and control protocols?
6. How do the workload and staffing levels affect the ability of nurses to comply with infection prevention and control protocols?
7. What factors influence nurse compliance with the National Palestinian Infection Prevention and Control Protocol, including knowledge and attitudes?
8. How do demographic characteristics (Place of work (Hospital), Gender, Age, Marital status, Type of shift, Nature of the department, Employment Status, Education, Current job position, Years of experience) influence nurses' compliance with infection prevention and control protocols?
9. What are the perceived barriers to compliance with infection control protocols among nurses across different demographic and professional factors?

1.5 Thesis chapters

Chapter one includes the study background, significance of study, research problem, aim, and research questions, providing a clear foundation for the study and highlighting its importance.

Chapter Two provides a comprehensive review of the existing literature, analyzing relevant studies, theories, and key findings related to the research topic. It critically examines previous research, identifies gaps, and incorporates both the theoretical and conceptual frameworks that underpin the study. This chapter ensures a solid foundation for the research by establishing the study's academic context and guiding its methodology.

Chapter three focuses on the research methodology, detailing the study design, data collection methods, sampling techniques, and analytical approaches. It outlines the procedures used to ensure the validity and reliability of the research, providing a structured framework for conducting the study.

Chapter four presents the research findings, analyzing the collected data and highlighting key results. It provides a detailed interpretation of the outcomes in relation to the study objectives and research questions, offering insights that contribute to the overall understanding of the topic.

Chapter five begins with a discussion of the findings, analyzing their significance in relation to existing literature and the research question. It then presents practical recommendations based on the results, followed by a conclusion that highlights the key conclusions and contributions of the study.

Chapter Tow

literature review

2.1 Introduction and over view

Infections related to healthcare setting (HAIs) are the most common adverse event in the provision of healthcare. Each year, HAIs affect hundreds of millions of people worldwide, resulting in a considerable death toll and financial losses for health systems(Tabash et al., 2018).

HAIs continue to pose significant challenges to patient safety, complicating care, increasing resource use, and contributing to unexpected deaths. Early infection control efforts demonstrated the effectiveness of surveillance and prevention programs, laying the foundation for modern practices. Key to success are recognizing and addressing HAIs, implementing interventions to reduce infection rates, and combating antimicrobial resistance. Current challenges include adapting infection(Pittet, 2005).

These infections pose significant threats to patient safety, exacerbate healthcare burdens, and impede efforts to enhance overall healthcare quality. Addressing the complexities surrounding HAIs necessitates a multifaceted approach, encompassing robust infection prevention and control strategies, targeted interventions, and sustained investments in healthcare infrastructure and human resources(CDC, 2022).

In addition to having significant long-term expenditures, HAIs can cause an infected individual to have a worse quality of life or possibly have a shorter life expectancy(Alhumaid et al., 2021).

Unexpected infections acquired during healthcare treatment, usually known as healthcare-associated infections (HAIs), have major consequences for patient health outcomes, frequently resulting in significant mortality and morbidity.(Fashafsheh et al., 2015).

These infections not only prolong hospital stays but also necessitate additional diagnostic and therapeutic interventions, thereby amplifying the financial burden on patients already grappling with underlying diseases(Alhumaid et al., 2021).

HAIs are widely recognized as adverse events that compromise the quality of patient care and pose significant patient safety concerns. Given that a portion of these infections are preventable, their occurrence serves as a critical indicator for evaluating the effectiveness of infection prevention measures and overall healthcare quality (Elmadhoun, 2015).

HAIs remain a global public health challenge, contributing to increased morbidity, mortality, and financial burden. Infection prevention and control (IPC) measures are critical in reducing HAIs, particularly in resource-limited settings such as Palestine. This chapter reviews the existing literature on HAIs, IPC compliance, and the specific challenges faced by healthcare systems globally, regionally, and nationally, with a focus on nurses' roles in infection control.

2.2 Infection transmission cycle

The possibility of an organism entering the body and causing illness or not depends on a number of factors: 1. Causative agent: The causative agent, which might be bacterial, viral, rickettsia, protozoal, or fungal, is the first link in the chain. 2. Reservoirs: these are the environments where the invasive species thrive. A human reservoir can be either a case or a carrier. The reservoir is the environment in which the agent is present, whether it be in humans, animals, soil, or inanimate objects. 3. Exit site: Twenty organisms can leave the body by the bloodstream, genitourinary tract, intestinal tract, respiratory tract, or skin lesions. 4. The mode of transmission might be indirect through a middle vehicle, direct through human-to-human interaction, or both. 5. Mode of entry: this is somewhat related to the mode of escape and includes the gastrointestinal tract, genitourinary tract, respiratory tract, and mucous membrane through a skin break or burn. 6. Susceptible host: an individual who is susceptible to infection based on a variety of criteria such as age, overall health, diet, immunity, vaccination, and the quantity of organisms present(CDC, 2024b).

This indicates that infectious illnesses move along an infection chain; the goal of infection control and prevention procedures is to stop the transmission of infection by eliminating any one of these variables.

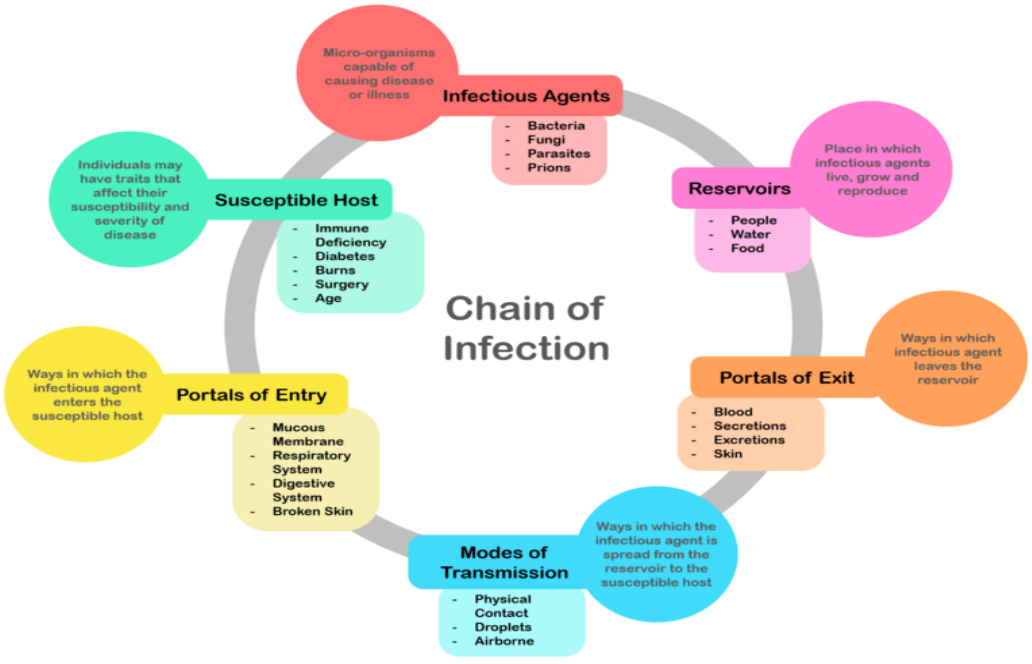


Figure 2.1: Infection transmission cycle

2.3 History

Infection control is not a modern, it's rooted in history in 1846, Hungarian physician Ignaz Semmelweis observed that hand contamination was responsible for the high mortality rates from childbed fever among women whose babies were delivered by physicians. He implemented a handwashing policy, significantly reducing mortality rates. Similarly, in 1854, British physician John Snow applied epidemiologic methods to identify and eliminate the source of a cholera outbreak in London. Despite their success, the ideas proposed by Semmelweis and Snow concerning hand contamination and fecal-oral transmission were initially rejected in favor of the miasma theory. These historical examples illustrate the early challenges and conceptual underpinnings of medical epidemiology and infection control, highlighting the evolution of public health practices(Torriani & Taplitz, 2010).

The history of infection prevention in healthcare, particularly in dentistry and surgery, traces back to the 19th century when key discoveries laid the foundation for modern practices. Initially, wound infections were attributed to "miasma" or bad air. However, in 1864, Louis Pasteur demonstrated the presence of microorganisms in the air, which Glasgow-based surgeon Joseph Lister leveraged to pioneer antiseptic techniques. Lister's methods, including the use of carbolic acid for wound treatment, significantly reduced infection rates, marking the beginning of antisepsis in surgery. Despite initial resistance, these practices were gradually adopted, with innovations such as the introduction of rubber gloves by William Halsted in 1889 to protect healthcare workers' hands from harsh disinfectants(Nield, 2020). The late 19th and early 20th centuries saw further advancements, including the sterilization of surgical instruments, driven by concerns over diseases like syphilis. The introduction of the autoclave in 1879 by Charles Chamberland and Louis Pasteur marked a major leap in sterilization technology, although widespread adoption took decades. The role of aerosols in disease transmission was recognized as early as 1884, but it wasn't until the mid-20th century that effective measures were implemented in dental practices(Nield, 2020).
The emergence of HIV/AIDS in the 1980s and concerns over prion diseases in the late 1990s prompted the establishment of stringent infection control guidelines, particularly in dentistry. The introduction of comprehensive protocols, such as the UK's "Decontamination in Primary Dental Practices" in 2009, standardized practices across the profession. The ongoing COVID-19 pandemic has further underscored the importance of these protocols, demonstrating that the historical principles of asepsis and antisepsis remain vital for protecting both patients and healthcare providers(Nield, 2020).
In the United States, where it was established in the 1950s in response to a HAIs Staphylococcus aureus epidemic. The discipline's conceptual foundations, however, predate the germ theory of disease(Torriani & Taplitz, 2010).
The review highlights how the evolution of infection prevention practices, driven by scientific discovery and public health challenges, has shaped modern healthcare, ensuring safety and efficacy in medical and dental procedures.
The defiance sources of infections underscore the complexity of their management and highlight the critical importance of vigilant preventive measures. Infections can arise from a variety of pathogens, including bacteria, viruses, and fungi, each requiring different strategies for prevention and control. For instance, HAIs are influenced by factors such as healthcare worker compliance with infection control practices, patient-related factors, and environmental cleanliness (Tartari et al. 2017).

Preventive measures, such as hand hygiene, proper use of personal protective equipment, and environmental disinfection, are essential in mitigating these risks.(WHO, 2020).

Diligent adherence to effective infection prevention and control (IPC) measures presents a proactive approach to averting HAIs, thereby circumventing potential adverse(Koros et al., 2018).

Healthcare systems and organizations must place a high focus on preventing HAIs, since they pose a serious threat to the safety of both patients and healthcare staff (Alhumaid et al., 2021).

Within the boundaries of a healthcare delivery system, infection control is a crucial component that helps prevent illnesses linked to healthcare (HCAIs). Using methodical procedures and control methods, infection prevention and control aims to lessen the risks associated with HAIs (Koros et al., 2018).
The establishment of comprehensive Healthcare-Associated Infection Prevention (HAIP) programs is imperative at both local and national levels within healthcare settings to mitigate the risk of infectious outbreaks (Padoveze et al., 2017).

Conversely, infection prevention and control (IPC) stands as a pivotal, evidence-based strategy aimed at shielding patients and healthcare personnel from avoidable illnesses. At all levels of the healthcare system, including politicians, facility administrators, healthcare professionals, and patients, effective IPC necessitates ongoing activity. (Tabash et al., 2018).

Clinically and financially successful, infection prevention and control (IPC) programs save a significant amount of money by reducing HAIs, shortening hospital stays, reducing antibiotic resistance, and lowering the cost of treating infections(Elmadhoun, 2015).
For a hospital to be free of dirt and clean, periodic cleaning is essential. Visible dirt is typically full of microorganisms, which may be removed with regular washing. Ordinary household cleaning is necessary in administrative and office spaces where patients are not present. Cleaning most patient care locations should be done with a moist mop. Sweeping with no water is not advised. Cleaning results are better when a neutral detergent solution is used(WHO, 2005).
The history of infection control is deeply rooted in the mid-19th century, with key contributions from Ignaz Semmelweis, John Snow, and Joseph Lister, whose advancements in hand hygiene, epidemiology, and antiseptic techniques laid the foundation for modern practices. Despite initial resistance to these innovations, they became integral to medical practice, particularly in surgery and dentistry. Over time, crises like HIV/AIDS, prion diseases, and COVID-19 have underscored the critical importance of stringent infection control. In Palestine, as in other regions, infection control remains vital for preventing HAIs, though challenges such as healthcare worker compliance, resource shortages, and environmental hygiene complicate efforts. Effective infection prevention and control (IPC) measures, such as hand hygiene and personal protective equipment, have the potential to reduce HAIs, highlighting the need for comprehensive IPC programs at both local and national levels. This research addresses these gaps by evaluating nurse compliance with IPC protocols in Hebron's hospitals, ultimately contributing to the ongoing improvement of infection control practices.

2.4 Definition

Infection Prevention and Control (IPC) is defined by the Centers for Disease Control and Prevention (CDC) as the measures and actions implemented by healthcare facilities to reduce the transmission of infectious agents. These actions include proper use of personal protective equipment (PPE), adherence to strict hygiene practices, and ensuring meticulous work habits, including effective hand hygiene(CDC, 2022).
Preventing infections in patients while they are at a medical facility is the responsibility of healthcare personnel. Through frequent in-service training and workshops, infection prevention and control procedures are reinforced(Stellenbosch, 2017).

Ensuring the implementation and adherence to infection prevention and control measures in these hospitals is crucial for preventing the spread of infections, safeguarding patient well-being, and maintaining the overall quality of healthcare services(WHO, 2020c)

Infection prevention and control strategies must be followed to provide safe and high-quality patient care in all healthcare settings(CDC, 2022).

2.5 Factors influencing adherence to infection prevention and control

Numerous studies have identified factors that influence healthcare workers' adherence to infection prevention and control (IPC) practices. These factors can be broadly categorized into individual, environmental, organizational, and resource-related elements.

Individual Factors**:** Individual characteristics, such as education level, awareness of infection prevention, and personal attitudes, have been found to significantly influence hand hygiene compliance. For instance, a study by (Jain et al., 2012)found that only 55.3% of doctors and nurses were aware of conventional precautions, highlighting a knowledge gap between nurses (52%) and doctors (71.3%). Similarly, (Efstathiou et al., 2011)emphasized that cultural, economic, and social circumstances, along with self-efficacy and lack of information, impact compliance with IPC guidelines. (Sands & Aunger, 2020)also noted that hospital management's communication openness, peer performance perceptions, and individual stress levels influence hand hygiene compliance among healthcare workers.

Work Environment and Organizational Factors**:** Environmental factors, such as staffing levels, overcrowding, and available resources, play a crucial role in infection control. (Griffiths, 2008)highlighted the role of health policies in encouraging safe environments and providing infection control guidelines. Low nurse staffing and overcrowded patient rooms have been associated with higher rates of HAIs, especially when combined with poor hand hygiene practices. (Collins, 2008)demonstrated that understaffing in intensive care units (ICUs) contributes to the spread of pathogens like Methicillin-resistant Staphylococcus aureus (MRSA), primarily due to reduced adherence to basic infection control practices. The (Shuldham et al., 2009)study found that hospitals with higher registered nurse staffing levels had significantly lower rates of hospital-acquired pneumonia and urinary tract infections (UTIs) among medical patients compared to hospitals with lower staffing levels. Additionally, (Mukwato, 2008)showed that the inclusion of IPC guidelines in healthcare workers' training and curricula significantly impacted compliance.

Resources and Materials Availability: The availability of necessary materials, such as alcohol-based hand sanitizers, gloves, and disinfecting supplies, is essential for ensuring proper IPC adherence. (Assefa et al., 2021)found that alcohol-based hand sanitizers significantly improved hand hygiene compliance, as they are more accessible and less irritating than traditional soap-and-water handwashing. (Castro-Sánchez & Holmes, 2015)pointed out that the availability of materials for disinfection is a key factor influencing healthcare workers' adherence to IPC practices. On the other hand, (Mukwato, 2008)highlighted that insufficient glove supply in certain regions leads to incorrect procedures, affecting compliance with IPC standards.

Time and Workload**:** Time constraints and high workload also significantly affect hand hygiene compliance. Research by (Erasmus, 2010)revealed that healthcare workers' adherence to handwashing protocols remains between 20% and 50%, with time pressures, skin irritation from frequent washing, and difficulty accessing sinks being major barriers. The workload also impacts compliance, as healthcare workers in high-stress environments like critical care units are less likely to adhere to hand hygiene practices due to time constraints and cognitive load. (Sands & Aunger, 2020)found that reduced stress and cognitive load were associated with improved hand hygiene compliance.

Administrative Support and Training**:** Administrative support, leadership, and ongoing training are crucial to enhancing compliance with IPC guidelines. (WHO, 2021a)emphasized that ongoing on-the-job and off-the-job training, as well as adherence to revised standard operating procedures, could help reduce the risk of hospital-acquired infections. Furthermore, (Silva & Lacerda, 2011) noted the growing demand for systems that evaluate the quality of infection control procedures and services in hospitals, using quantitative indicators to assess the effectiveness of these measures.

In summary, various factors influence healthcare workers' adherence to infection prevention and control (IPC) practices. These factors include individual characteristics such as education and awareness, work environment elements like staffing levels and overcrowding, and organizational support through training and resources. The availability of essential materials, time constraints, and workload also play significant roles in IPC compliance. Administrative leadership, ongoing training, and proper resource allocation are crucial to promoting effective adherence. A comprehensive approach addressing these multiple factors is necessary to improve IPC practices and reduce healthcare-associated infections.

2.6 Global infection prevention and control measures

2.6.1 Global Impact and Prevalence of (HAIs):

HAIs represent a significant global health challenge, affecting a notable proportion of hospitalized patients, particularly in intensive care units (ICUs). Globally, HAIs affect 5–15% of hospitalized patients and 9–37% of patients in ICUs in developed countries (WHO, 2011). In Europe, it is estimated that 5 million HAIs occur in acute care hospitals each year,

leading to 25 million additional days of hospitalization (WHO, 2011). Similarly, in the United States, approximately 1.7 million HAIs occur annually, resulting in 99,000 deaths (Jemal et al., 2020). HAIs contribute to longer hospital stays, with nonsocial infections alone causing the deaths of 88,000 individuals annually (Suksatan et al., 2022). The incidence of HAIs is particularly high in low-income countries, where inadequate healthcare infrastructure and resources exacerbate the problem (Tartari, Bellissimo-Rodrigues, et al., 2024). In Germany, HACI problems contribute to between 400,000 and 600,000 deaths annually (Drägerwerk, 2016).
In low-resource countries, the burden of HAIs is even more severe, with the absence of safe and hygienic healthcare facilities impacting approximately 1.4 million people globally, and the burden being 2 to 20 times higher in these regions due to inadequate healthcare hygiene (Jemal et al., 2020). These statistics highlight the significant health burden HAIs impose on healthcare systems, particularly in low-income regions where the impact is magnified due to lack of infrastructure.

2.6.2 The Economic Burden of (HAIs):

The financial impact of HAIs is substantial and places a significant strain on healthcare systems worldwide. In the USA, the costs associated with HAIs are estimated to be between $4.5 billion and $5.7 billion annually (WHO, 2005). The financial impact of HAIs continues to be substantial, placing significant strain on healthcare systems worldwide. In the USA, recent estimates suggest that the annual costs associated with HAIs range from $4.5 billion to $11 billion, depending on the type of infection and patient population considered (Zimlichman et al., 2013).

In England, the National Health Service (NHS) incurs an annual cost of around £1,000 million due to HAIs (WHO, 2005). In low-income countries, the economic burden is even greater. For instance, in Mexico, HAIs consume as much as 70% of the entire health budget (WHO, 2005), while Trinidad and Tobago allocate 5% of its annual hospital budget to combat these infections, and some Thai hospitals allocate 10% (WHO, 2005).

The yearly economic cost of HAIs in Europe is estimated to be between 13 and 24 billion euros (WHO, 2012). In the USA, HAIs incurred an economic cost of around US$ 6.5 billion in 2004 (WHO, 2012). The lack of safe and hygienic healthcare facilities is a major factor contributing to the economic burden of HAIs, with approximately 1.4 million people impacted globally (Jemal et al., 2020). These figures underscore the immense financial strain HAIs place on healthcare systems, especially in countries with limited resources.

The prevalence of HAIs, particularly in low-resource countries, further exacerbates the economic burden. The high incidence of infections in such regions is due to inadequate monitoring systems and a lack of essential resources (Tartari, Bellissimo-Rodrigues, et al., 2024). Addressing these gaps and improving infection prevention and control (IPC) protocols, such as hand hygiene and proper use of personal protective equipment (PPE), could reduce both the health and economic burdens of HAIs (Tomczyk et al., 2021).

HAIs pose a significant global health and economic challenge, especially in low-resource countries where inadequate infrastructure exacerbates their prevalence. These infections lead to longer hospital stays, higher mortality rates, and substantial costs, highlighting the

urgent need for effective infection prevention and control measures to reduce both the health and financial burdens.

2.7 Regional infection prevention and control measures

In Less Developed Countries, HAIs remain a significant challenge due to political instability, resource shortages, and overburdened healthcare systems, identifies key obstacles to reducing HAIs in the region, including inadequate infrastructure, lack of trained staff, and limited knowledge of infection prevention protocols(WHO, 2016)

HAIs continue to pose significant challenges in the Less Developed Countries due to factors such as political instability, resource shortages, and overburdened healthcare systems. These issues are further compounded by inadequate infrastructure, a shortage of trained staff, and limited knowledge of infection prevention protocols (WHO, 2017).The risk of HAIs is particularly high in underdeveloped countries, with studies indicating a prevalence ranging from 15.5% to 47.9% per 1000 patient-days in adult intensive care units (WHO, 2012)

Moreover, the incidence of surgical site infections (SSI) is notably higher in less developed regions, with a cumulative incidence of 5.6 per 100 surgical operations, making it one of the most common hospital-acquired infections (WHO, 2020b).Research conducted in various countries has highlighted significant gaps in the knowledge, attitudes, and practices related to infection control among healthcare professionals. For instance, a study in Ghana revealed that while a high percentage of medical staff were aware of universal precautions, there were notable gaps in their understanding and implementation (Hesse et al., 2006).

Similarly, in Nigeria, final-year medical and nursing students showed limited understanding of universal precautions, with nurses generally demonstrating better hand hygiene practices than medical students (Bamigboye & Adesanya, 2006).A study in Iran also found that awareness and adherence to universal precautions varied significantly among healthcare workers, with a correlation observed between educational level and compliance(Motamed et al., 2006).

2.8 Arab world infection prevention and control measures

The Arab world faces ongoing challenges in managing HAIs due to inconsistent adherence to infection prevention and control (IPC) protocols. Studies have identified several factors contributing to these challenges, including inadequate infection control measures, delayed recognition of infections, and insufficient isolation of suspected cases. For example, a review of healthcare-associated outbreaks in the Middle East highlighted that factors such as delayed recognition, inadequate infection control measures, and inadequate triaging and isolation of suspected patients contributed to the spread of infections(Al-Tawfiq & Auwaerter, 2019).

Despite efforts to standardize these practices, studies have shown that compliance among healthcare workers remains inadequate across the region (Al-Rawajfah et al., 2013). For instance, in North Jordan, only 13.6% of private-sector general dentists fully adhered to

infection control measures, with younger practitioners demonstrating better compliance(Al-Omari & Al-Dwairi, 2005).

Similarly, a study in Egypt's Gharbiya Governorate found that safe injection practices were compromised by insufficient infection control policies and a shortage of essential supplies, leading to high rates of needlestick injuries and low hepatitis vaccination coverage among healthcare professionals (Ismail NA, 2007).These findings emphasize the urgent need for enhanced training and improved policies to ensure safer practices.

Educational interventions have shown promise in addressing these gaps. For example, a training program in Assiut City, Egypt, significantly improved nurses' knowledge and practices regarding infection control, demonstrating the potential of regular, ongoing education to maintain high standards of care (Hassan, 2004).However, substantial knowledge gaps persist, as highlighted by research in Al-Hassa, Saudi Arabia, where healthcare workers showed poor understanding of standard precautions, especially in hand hygiene and the use of personal protective equipment. Barriers such as insufficient training, heavy workloads, and resource limitations were identified as major impediments to effective IPC compliance (Amin & Wehedy, 2009).

Overall, these studies underscore the critical need for robust, region-wide strategies to improve IPC compliance, focusing on continuous education, adequate resourcing, and the implementation of standardized protocols. Addressing these issues is essential to reducing the prevalence of HAIs and enhancing patient safety across the Arab world.

2.9 National infection prevention and control measures

2.9.1 The Palestinian infection prevention and control measures:

A formal set of rules and procedures was developed to guide healthcare workers (HCWs) in Palestinian hospitals, aiming to standardize practices and ensure optimal infection prevention and control (IPC) tailored to each setting's needs. This curriculum, supported by the Ministry of Health (MOH), was designed to enhance staff performance and adherence to quality standards. Drafted by a local consultant and reviewed by MARAM technical teams, additional local experts, and USAID-based international consultants, the document incorporates feedback from multiple reviews. While primarily developed for primary healthcare settings, the principles and procedures are applicable to general healthcare environments, including hospitals. However, specialized units like operating rooms and intensive care units will require more specific protocols not covered in this document(MOH, 2004)
Amidst the myriad challenges confronting the Palestinian healthcare system, HAIs have emerged as a pressing concern warranting immediate attention(Alhumaid et al., 2021).

Within Palestine, the conversation on IPC compliance and HAIs is particularly relevant due to the unique healthcare challenges faced by the Palestinian population. Limited resources, political instability, and geographical constraints impact healthcare delivery and IPC practices in Palestinian hospitals(Fashafsheh et al., 2015).

Infection prevention and control (IPC) are critical components of healthcare management, ensuring the safety of both patients and healthcare providers. In the context of Palestinian healthcare, adherence to national protocols is paramount to effectively combatting infectious diseases and maintaining a high standard of healthcare delivery(Alhumaid et al., 2021).

The first Palestinian IPC protocols were created in 2004 to safeguard clients, HCPs, and community initiatives. These protocols were exclusively applied in primary health care centers located in the Palestinian territories. The MOH approved the Jordanian infection control guidelines in 2012 so that the governmental hospitals may use them. The guidelines concentrated on the key components of IPC practices, including waste management, hand hygiene, the use of disinfection, the use of personal protective barriers, and the use of antiseptics in a safe environment. It also provided a detailed presentation of the infection control procedures used in different hospital departments (Tabash et al., 2018)
The Palestinian healthcare system, including the NGO sector, faces challenges due to inconsistent administrative and technical procedures, leading to disparities in health services and an increased risk of surgical site infections (SSI). A needs evaluation of maternity and newborn facilities in Gaza and the West Bank revealed a decline in safety concerning hospital-acquired infections (HAIs). Following a Klebsiella outbreak in a Ramallah neonatal unit in 2008, further research indicated that other Palestinian hospitals were also at high risk for similar epidemics. At Al-Shifa Hospital in Gaza, a study on abdominal gunshot wounds found that wound infections were the most common complication, affecting 17.0% of patients. These findings underscore the urgent need for standardized procedures to improve patient safety and reduce infection rates in Palestinian healthcare facilities.(Kandil, 2005)

They evaluated the performance of nurses and the standards of quality care in newborn units in government hospitals in the West Bank; the findings showed a positive relationship between the lack of quality application and the absence of process guidelines. Furthermore, compared to their younger, less experienced, and less educated counterparts, the neonatal nurses who are older, have more years of experience, and have more educational degrees, applied better standards of quality care(Stone, 2009)
A study in West Bank governmental hospitals (Al-Ramahi et al., 2018)revealed significant gaps in compliance with the Infection Control Protocol (ICP) among medical staff, nurses, and administrators. Among 587 participants, only 44.6% had a copy of the ICP in their department, and just 38.0% offered infection control instruction. Infections were a leading cause of death, accounting for 3.3% of mortalities in the West Bank in 2013, particularly affecting acute surgical wards, orthopedic wards, and intensive care units. Nurses were more likely than doctors to receive ICP training (47.4% vs. 24.5%). However, only 42.1% of respondents consistently washed their hands, and 42.6% always wore gloves during patient exams. While 92.5% disposed of needles correctly, 39.5% still improperly recapped them. Key barriers to ICP compliance included resource shortages (55.0%), lack of training programs (49.6%), unclear protocols (44.1%), and heavy patient loads (44.0%). The study highlights the urgent need for standardized ICP protocols and improved training to enhance compliance and reduce infection-related deaths(Al-Ramahi et al., 2018)

Eljedi and Dalo's 2014 study assessed healthcare providers' adherence to infection prevention protocols in three government pediatric hospitals in Gaza, uncovering significant deficiencies. Less than half of the participants washed their hands before leaving the unit, and only a third did so before performing invasive procedures. Additionally, 28% did not remove needles from used syringes, and 41% failed to recap needles before disposal. Proper hand-washing was observed in only 45.9% of participants. Moreover, most healthcare providers were unaware of the Palestinian Infection Prevention and Control (IPC) Protocol,

with no copies available in any department. The study highlights a critical need for better education and dissemination of IPC protocols to enhance hygiene and safety practices(Eljedi & Dalo, 2014)

Fashafsheh et al., 2015 also conducted a study evaluated the knowledge and practices of nursing staff regarding infection control in Palestinian hospitals, finding that 53.9% of nurses had fair knowledge levels, while 91.1% demonstrated good practices. No significant differences in knowledge were observed based on age, experience, or prior training. The study recommended enhancing nurses' knowledge and practices through continuous in-service education, emphasizing evidence-based infection control practices, and providing regular training for new nurses(Fashafsheh et al., 2015).

A different research that evaluated infection prevention and control procedures in operating rooms of non-governmental hospitals in the governorates of Gaza revealed that most healthcare workers were aware of IPC procedures and their significance in lowering HAIs. The majority of HCWs also had favorable attitudes toward IPC procedures(Elmadhoun, 2015).

A study on environmental infection control in Gaza's intensive care units (ICUs) found that ICU healthcare providers generally had a positive attitude toward infection control. However, there were knowledge gaps, with 64.66% of participants uncertain about whether syringes should be removed from used needles before disposal(Khadoura, 2013) . This suggests a need for improved education in specific areas of infection control.

Abuzaid's 2023 study assessed the knowledge and practice of infection control among radiographers in Gaza Strip government hospitals, revealing key challenges in implementing standard precautions. Radiology departments, due to their high patient volume, are particularly prone to infection risks, with equipment like imaging tables and X-ray couches identified as potential sources of transmission. The study found that 78.2% of radiographers had never received infection control training, while 74.4% had moderate knowledge and 65.2% demonstrated moderate practices(Abuzaid, 2023). These results highlight the need for enhanced training and stricter infection control protocols in radiology departments to prevent HAIs.

A Palestinian ICP that is standardized is advised. Programs for instruction and training are strongly advised(Al-Ramahi et al., 2018).

In 2017, the Palestinian Ministry of Health took significant strides by developed a comprehensive national protocol for infection control and prevention (Al-Sharif & Husseini, 2023).

In Palestine the Ministry of Health's development plans, which called for standardizing policies across all Ministry of Health facilities and improving the services offered to ensure patient health and safety through the caliber of services provided and their impact on maintaining the health of health care professionals, led to the publication of the first edition of the Palestinian guide for the prevention and control of infection in healthcare facilities(Khalil, 2023) .

Despite the ongoing evolution of infectious diseases such as COVID-19 and the implementation of national protocols alongside relevant training programs, the absence of recent studies raises concerns regarding the ongoing evaluation of infection prevention and control practices within the West Bank governorates(Dar-Odeh et al., 2020) .

The Ministry has been proactive in updating its infection control protocols, culminating in the most recent version in 2022. Moreover, it has focused on enhancing the competencies of healthcare professionals through numerous training courses centered on these protocols. Special emphasis has been placed on intensifying training for infection control officers

within hospitals to strengthen the healthcare system's capacity to combat infections effectively(Khalil, 2023).

The Palestinian healthcare system has made significant strides in developing and implementing infection prevention and control (IPC) protocols to safeguard both patients and healthcare providers. The Ministry of Health (MOH) has played a crucial role in these efforts by establishing a formal set of guidelines, initially introduced in 2004 and subsequently updated, including the adoption of the Jordanian infection control guidelines in 2012 and the latest protocol version in 2022 (Khalil et al., 2023; MOH, 2004).Despite these advancements, HAIs remain a pressing concern, exacerbated by resource limitations, political instability, and inconsistent adherence to IPC standards across different healthcare settings(Alhumaid et al., 2021; Fashafsheh et al., 2015).

Studies reveal substantial gaps in compliance with IPC protocols in various healthcare sectors. For instance, research in the West Bank has shown that only a minority of healthcare workers consistently follow infection control practices, with significant barriers including inadequate training, unclear protocols, and resource shortages (Al-Ramahi et al., 2018).Similar issues have been observed in Gaza, where healthcare providers in pediatric hospitals and radiology departments displayed moderate adherence to infection control measures, highlighting the need for enhanced education and stricter protocols(Abuzaid, 2023; Eljedi & Dalo, 2014).

The lack of standardized IPC practices has been linked to outbreaks, such as the Klebsiella incident in a Ramallah neonatal unit in 2008, and high rates of surgical site infections in hospitals like Al-Shifa in Gaza (Kandil, 2005).These incidents underscore the urgent need for more rigorous IPC protocols tailored to the unique challenges of the Palestinian healthcare system.

While ongoing training and education initiatives by the MOH are promising, the absence of recent studies raises concerns about the continuous evaluation and effectiveness of IPC practices, particularly in the wake of evolving infectious diseases like COVID-19 (Dar-Odeh et al., 2020).Moving forward, it is essential to reinforce IPC training, especially for infection control officers, and to conduct regular assessments of protocol adherence to ensure a resilient and effective healthcare system in Palestine(Khalil et al., 2023).

2.9.2 The Role of Nurses in Infection Prevention and Control:

Nurses play a pivotal role in implementing IPC measures in healthcare settings. As frontline caregivers, they are responsible for adhering to protocols such as hand hygiene, the use of PPE, and sterilization practices(WHO, 2020c) Numerous studies demonstrate that nurses' compliance with IPC guidelines significantly impacts patient outcomes and infection rates(Tartari, Garlasco, et al., 2024).

Research in resource-limited settings, such as Palestine, highlights the critical role of nurses in IPC, but also points to challenges in compliance. For example, Fashafsheh et al. (2015) found that Palestinian nurses often face difficulties adhering to IPC protocols due to heavy workloads, lack of training, and limited access to necessary resources. Al-Ramahi et al. (2018) similarly reported that nurses' compliance with national IPC guidelines was inconsistent, often due to insufficient knowledge and resource shortages(Al-Ramahi et al., 2018; Fashafsheh et al., 2015).

consistently identifies significant gaps in healthcare workers' knowledge of IPC protocols and infection prevention measures. These knowledge gaps, combined with resource shortages, contribute to inconsistent compliance with IPC guidelines, particularly among nurses in Palestine (WHO, 2017).In Hebron's governmental hospitals, where resources are often limited, these challenges are even more pronounced.

2.9.3 Impact of COVID-19 on Infection Prevention and Control in Palestine:

The COVID-19 pandemic has placed additional strain on Palestine's healthcare system, exacerbating existing challenges in IPC compliance. Recent studies from 2020 onwards indicate that the pandemic has underscored the need for stringent infection prevention measures and has led to the revision of IPC protocols to address emerging threats(Dar-Odeh et al., 2020) . However, the implementation of these protocols has been hindered by the same issues of resource shortages and limited training opportunities for healthcare workers, particularly nurses(Khalil et al., 2023).

The literature review addresses the challenges and developments in infection prevention and control (IPC) within the Palestinian healthcare system, particularly in Gaza and the West Bank. Various studies have identified significant gaps in IPC compliance, knowledge, and practice among healthcare workers across a range of medical settings, including hospitals, pediatric units, radiology departments, and intensive care units. Despite the Ministry of Health's efforts to standardize IPC protocols and provide training, persistent issues such as inconsistent administrative procedures, resource shortages, and inadequate education hinder effective infection control.

Key findings from these studies emphasize the need for continuous and enhanced training programs, particularly in specialized units, to improve adherence to IPC guidelines and reduce HAIs. There is also a highlighted need for ongoing evaluation and updating of IPC practices to address evolving challenges, such as emerging infectious diseases, ensuring the safety of both patients and healthcare providers in Palestine.

In Hebron Governorate, which has a substantial population and healthcare infrastructure, the importance of rigorous IPC practices is especially evident. Ensuring compliance with IPC protocols across all healthcare settings is essential for improving patient outcomes, reducing the economic burden of HAIs, and enhancing the overall quality of healthcare services in the region. Investment in healthcare infrastructure, human resources, and sustained training programs is crucial to addressing the complexities of infection control and safeguarding public health.

However, despite the Ministry of Health's efforts to develop and update national IPC protocols and provide training, significant gaps remain. These include gaps in healthcare workers' knowledge, shortages of essential resources, and inconsistent adherence to national protocols, particularly in the West Bank. One of the critical gaps in the literature is the lack of comprehensive studies evaluating nurse compliance with the Palestinian National IPC Protocol in Hebron Governorate. Addressing this gap will provide valuable insights into the challenge's nurses face, such as heavy workloads, inadequate training, and limited access to resources, which hinder the implementation of IPC measures.

This evaluation aims to identify areas for improvement, potential challenges, and successful practices that can enhance IPC measures in Hebron Governorate's governmental hospitals. The findings will serve as a foundation for targeted interventions, training programs, and policy adjustments to strengthen the healthcare system’s capacity to effectively combat infectious diseases.

2.10 Theoretical framework

To comprehend the complex factors influencing nurse compliance with IPC protocols, several theoretical models have been applied in healthcare research:

2.10.1 Health Belief Model (HBM):

The Health Belief Model (HBM) is a psychological framework developed in the 1950s by social psychologists at the U.S. Public Health Service to explain and predict health-related behaviors. It posits that individuals' actions are influenced by their perceptions of susceptibility to a health issue, the severity of its consequences, the benefits of taking preventive action, and the barriers to performing that action. Additionally, cues to action and self-efficacy are integral components that affect the likelihood of engaging in health-promoting behaviors(Lestari Ramadhani Nasution et al., 2022).

The perception of severity also plays a critical role. Nurses who recognize the serious consequences of HAIs, including prolonged hospital stays, patient morbidity, and even mortality, are more motivated to adhere to infection control guidelines (Glanz et al., 2008).

Additionally, the perceived benefits of compliance influence behavior. Nurses are more likely to follow IPC protocols when they believe that proper hand hygiene, the use of personal protective equipment (PPE), and adherence to sterilization procedures effectively reduce infection rates and enhance patient safety (Champion, 2008).

However, certain barriers can hinder compliance. Factors such as high workload, limited access to PPE, and a lack of institutional support can make it difficult for nurses to consistently follow IPC protocols. Addressing these barriers through improved resource allocation, administrative support, and ongoing training is crucial for enhancing compliance (Glanz et al., 2008).

Recent studies have applied the Health Belief Model (HBM) to understand and improve nurses' compliance with Infection Prevention and Control (IPC) protocols. A 2023 study examined the impact of an educational intervention based on the HBM on nurses' compliance with standard precautions. The results demonstrated significant improvements in nurses' adherence to IPC measures following the HBM-based training, highlighting the model's effectiveness in promoting preventive behaviors in healthcare settings(Alinejad et al., 2023).
These contemporary studies underscore the relevance of the HBM in understanding and enhancing nurses' compliance with IPC protocols, emphasizing the importance of addressing individual perceptions and beliefs to promote adherence to infection prevention measures.

2.10.2 Theory of Planned Behavior (TPB):

Theory of Planned Behavior (TPB) is a psychological framework that explains how human behavior is influenced by individual intentions. According to this theory, a person's behavioral intentions are determined by three key factors: their attitudes toward the behavior, subjective norms (also known as social norms), and perceived behavioral control. These components work together to predict whether an individual will engage in a specific behavior(Steele A, 2024).

In the context of nursing, TPB has been utilized to understand compliance with Infection Prevention and Control (IPC) protocols. For example, a study conducted among hospital nurses in Hong Kong during the COVID-19 pandemic found that subjective norms and perceived behavioral control significantly influenced nurses' hand hygiene practices. This suggests that when nurses feel supported by their peers and believe they have the necessary resources and capabilities, they are more likely to adhere to IPC measures (Sin & Rochelle, 2022).

A nurse's compliance with Infection Prevention and Control (IPC) practices is significantly influenced by their attitudes, subjective norms, and perceived behavioral control, as outlined in the Theory of Planned Behavior (TPB). A nurse's positive or negative evaluation of IPC practices, shaped by their attitudes, plays a critical role in determining their likelihood of compliance. Training and education can positively influence these attitudes by increasing awareness of the benefits of adherence, such as improved patient safety and reduced infection risks. Additionally, subjective norms, or the perceived social pressure from colleagues, supervisors, or the institution, can strongly motivate nurses to follow IPC protocols, as they feel encouraged or obligated to align with the expectations of their professional environment. Finally, perceived behavioral control, which reflects nurses' confidence in their ability to comply with IPC measures, is shaped by the availability of resources, such as personal protective equipment (PPE), and access to adequate training. Together, these factors interact to influence nurses' intentions and behaviors, highlighting the importance of fostering a supportive environment that addresses both individual and systemic barriers to compliance.(McEachan et al., 2011)

2.10.3 Donabedian Model:

The Donabedian Model is a conceptual framework for evaluating healthcare quality, introduced by Avedis Donabedian in 1966. It assesses quality through three interconnected components: structure, process, and outcome. Structure refers to the attributes of the settings where care occurs, including facilities, equipment, and human resources. Process involves the methods by which care is provided, encompassing diagnosis, treatment, and patient education. Outcome denotes the effects of healthcare on patient health status, such as recovery, functional restoration, and patient satisfaction. This model posits that a well-organized structure supports effective processes, which in turn lead to favorable outcomes(BERWICK & FOX, 2016).

Applying the Donabedian Model to nurse compliance with Infection Prevention and Control (IPC) protocols offers valuable insights. Structure encompasses factors like adequate

staffing, availability of personal protective equipment (PPE), and robust infection control policies. Process pertains to nurses' adherence to IPC procedures, including proper hand hygiene and PPE usage. Outcome focuses on metrics such as reduced HAIs and improved patient safety. A study utilizing this model found that organizational factors, including resource availability and staffing levels, significantly impacted nurses' ability to adhere to patient safety protocols during the COVID-19 pandemic(Pogorzelska-Maziarz et al., 2023).

The Donabedian Model emphasizes the importance of structure, process, and outcomes in ensuring compliance with Infection Prevention and Control (IPC) protocols. Structure includes staffing, infection control resources, and leadership support, forming the foundation for IPC practices. Process involves healthcare workers' adherence to protocols through training, audits, and continuous education. Outcomes reflect the impact of compliance, such as reduced HAIs and improved patient safety and nurse well-being (Veillard et al., 2005).

This underscores the importance of a supportive structure and efficient processes in achieving optimal IPC outcomes.

2.10.4 Job Demands-Resources (JD-R) Model:

The Job Demands-Resources (JD-R) Model is a framework that examines how job characteristics influence employee well-being and performance. It categorizes workplace factors into two groups: job demands and job resources. Job demands are aspects of a job that require sustained physical or mental effort, such as high workload or time pressure, which can lead to stress and burnout. In contrast, job resources are elements that help achieve work goals, reduce job demands, or promote personal growth, like supportive management or access to necessary materials. The balance between these demands and resources affects employees' motivation and health outcomes(Bakker & Demerouti, 2014).

Applying the JD-R Model to nursing, particularly in the context of Infection Prevention and Control (IPC) protocols, provides valuable insights. High job demands, such as excessive workloads and insufficient staffing, can increase stress among nurses, potentially diminishing their adherence to IPC measures. Conversely, ample job resources, including the availability of personal protective equipment (PPE), comprehensive infection control training, and robust organizational support, can enhance compliance with IPC protocols. A study highlighted that balancing job demands and resources is crucial for creating healthier work environments and improving patient outcomes(Broetje et al., 2020).

2.10.5 Diffusion of Innovations Theory (DOI):

The Diffusion of Innovations (DOI) Theory, introduced by Everett Rogers in 1962, explains how new ideas, products, or practices spread within a society or organization. The theory identifies five categories of adopters: innovators, early adopters, early majority, late majority, and laggards. These groups represent the spectrum of individuals' willingness to adopt innovations, from those eager to try new things to those resistant to change. The diffusion process is influenced by factors such as the innovation's perceived advantages over existing solutions, its compatibility with current values and practices, its complexity or simplicity, the ability to test it on a limited basis trialability, and the visibility of its results

to others observability. Understanding these factors helps explain the rate and manner in which innovations are adopted across different segments of a population(Dearing & Cox, 2018).

In the context of healthcare, particularly regarding Infection Prevention and Control (IPC) protocols, the DOI theory provides a framework for understanding how new infection control measures are adopted among nursing staff. Innovators and early adopters within the nursing team can lead by example, encouraging their peers to embrace updated IPC practices. Effective dissemination of these innovations relies on clear communication channels, comprehensive training programs, and strong leadership support. A study highlighted the role of opinion leaders, such as school nurses, in influencing the adoption of health innovations, underscoring the importance of social dynamics in the diffusion process(Rosen & Goodson, 2014).

2.11 Conceptual Framework

This conceptual framework aims to contribute to the understanding of factors influencing nurse compliance with IPC protocols, providing insights for developing targeted interventions to improve patient safety and reduce HAIs in Palestinian healthcare settings.

Nurse compliance:

Nurse compliance refers to the extent to which nurses adhere to established infection prevention protocols, procedures, and guidelines to ensure high-quality care and improve patient outcomes(Babore et al., 2024). This adherence is essential for preventing HAIs and maintaining a safe clinical environment. Compliance is influenced by factors such as knowledge, training, availability of resources, and institutional support, all of which play a crucial role in ensuring the effective implementation of infection control measures(Lee & Jun, 2022).

This is the variable that will be measured in the study. It represents the extent to which nurses adhere to the National Palestinian Infection Prevention and Control Protocol at governmental hospitals in Hebron Governorate.

Compliance, especially in the context of healthcare-associated infection (HAI) prevention strategies, is influenced by various determinants. These determinants can be categorized into individual, organizational, and systemic factors. Here's an overview:

Individual Factors

- Nurse Characteristics: These variables include age, years of experience, education level, gender, marital status, type of shift and nature of department they may influence nurse's compliance with the protocol.

  Research has shown that nurse characteristics such as age, education level, and years of experience impact compliance with IPC protocols. Older, more experienced nurses tend to demonstrate higher adherence to infection control measures, as they may have a deeper understanding of the risks involved and are more familiar with protocols (Bahegwa et al., 2022).

- Knowledge: refers to the understanding and awareness of healthcare workers regarding infection prevention protocols, particularly those related to HAIs. This includes comprehending the risks associated with infections and the procedures required to prevent them(Alojaimy et al., 2021).

  Studies highlight that the level of knowledge and understanding about IPC protocols directly influences compliance. Nurses with more education and continuous training tend to have a higher commitment to infection control practices(Alojaimy et al., 2021)

- Attitudes: are the personal beliefs and perceptions that healthcare workers hold about the likelihood of contracting infections and the severity of the consequences of non-compliance with infection prevention protocols. It also involves understanding the perceived benefits and barriers of adhering to infection control practices(Jones et al., 2015).

  The Health Belief Model suggests that if nurses believe they are at risk of contracting infections or perceive the potential severity of the consequences, they are more likely to comply with IPC measures. This model highlights the importance of perceived susceptibility, perceived severity, and the benefits of adhering to infection control practices(Jones et al., 2015).

- Education and Training: refer to the formal and continuous process of imparting knowledge and skills to healthcare workers regarding infection prevention and control. This includes both initial education on standard protocols and ongoing training to ensure that healthcare workers remain updated on the latest guidelines and best practices in infection prevention(Tartari et al., 2021).

Organizational Factors

- Workload and Staffing: Adequate staffing levels are crucial to manage the workload without compromising compliance with infection prevention protocols. When staffing levels are insufficient, nurses may find it difficult to adhere to IPC protocols due to time constraints. On the other hand, adequate staffing allows for better compliance by providing the necessary time and resources to implement infection prevention measures effectively(Digital Scholar et al., 2018).

- Availability and accessibility of infection control resources, such as hand sanitizers, personal protective equipment (PPE).

  The availability of supplies like hand sanitizers and personal protective equipment (PPE) is essential for ensuring that nurses adhere infection control guidelines(WHO, 2010).
- Leadership and Management Supportive Leadership: Encouragement and support from management for infection control practices.

  Support from leadership significantly impacts nurses' adherence to infection control protocols. Leadership that promotes a culture of safety and provides necessary resources encourages compliance(Graystone, 2019).

- Physical Environment: The physical environment in healthcare settings significantly influences adherence to infection prevention and control (IPC) protocols.

Factors such as adequate space, proper ventilation, and access to infection control resources play a crucial role in supporting staff in their adherence to IPC guidelines. In poorly designed or overcrowded environments, healthcare workers may face challenges in implementing effective infection control measures. A well-structured environment enhances compliance by providing the necessary space and resources to carry out infection prevention tasks effectively (Nadi et al., 2024).

Systemic Factors

- Healthcare Policies and Guidelines: National and local guidelines and standards form the foundation for hospital-level infection prevention and control (IPC) protocols. Clear, evidence-based guidelines ensure uniformity in practices, promoting consistent application of infection control measures across different healthcare settings and ensuring adherence by healthcare workers(Tartari et al., 2021).
- Accreditation and Audits: Regular audits and inspections to ensure compliance with infection control standards.

  Routine audits help maintain high compliance levels with IPC protocols by identifying gaps and areas for improvement(Hong & Park, 2016).

- Access to Information: Easy access to updated information and resources on HAI prevention.

  Access to updated information on infection prevention and control measures helps nurses stay informed and comply with evolving guidelines(O'Gorman et al., 2016).

  By addressing these determinants, healthcare facilities can develop more effective strategies to enhance compliance with HAI prevention measures, ultimately reducing the incidence of healthcare-associated infections.

2.11.1 Conceptual framework diagram:

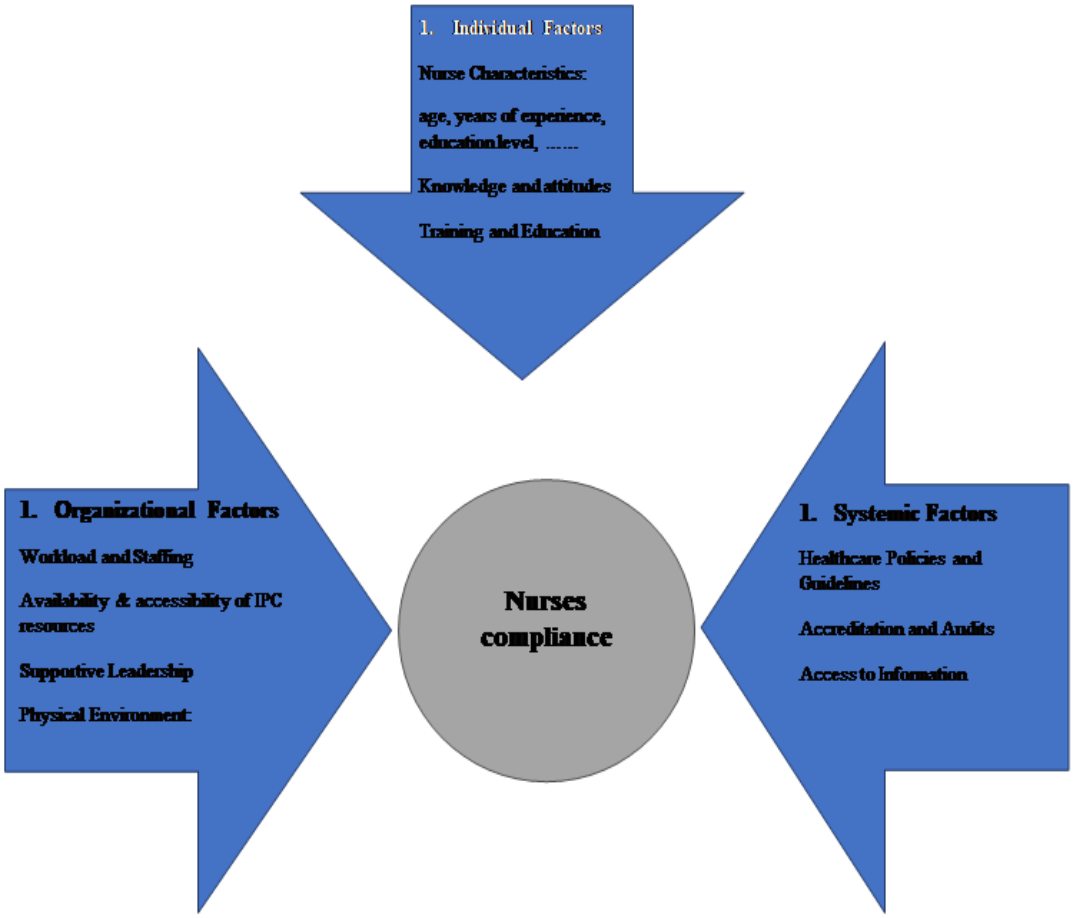


Figure 2.2: Conceptual framework

2.12 Operational Definition

Nurse Characteristics :refers to a set of personal and professional traits that describe and reflect the attributes of nurses in the workplace. It includes factors such as gender, age, marital status, shift type, department nature, educational level, current job position, employment status, total years of experience, vaccination status for Hepatitis B, and exposure to needle or sharp instrument injuries. These characteristics are measured through questions 1 to 13, providing insights into the nurses' demographic and professional background, which may influence their performance, health, and safety in the healthcare environment.

Nurse Compliance: refers to the extent to which nurses follow safety and infection prevention guidelines, and it is measured through the Practices section of the survey, covering questions 35 to 49. This includes the use of personal protective equipment (PPE), proper hand hygiene, sterilizing medical instruments, disposing of medical and sharp waste, and cleaning patient care areas. Compliance is assessed based on how consistently nurses adhere to these protocols to ensure a safe environment for patients and healthcare workers.

Knowledge: refers to the information, understanding, and awareness individuals have about a specific subject. In this study, it is measured through questions 14 to 21 in the Knowledge section of the survey, which assess nurses' understanding of infection prevention and control (IPC). This includes awareness of standard precautions, the importance of initial testing for hepatitis and HIV, the use of personal protective equipment in emergencies, and the role of hand hygiene in reducing infections and healthcare-associated costs. Responses help gauge nurses' knowledge of these critical practices.

Attitude: refers to the feelings, beliefs, and perceptions individuals have towards a specific subject. In this study, it is measured through questions 22 to 27 in the Attitude section of the survey, which assess nurses' views on the importance of complying with infection prevention and control (IPC) protocols. This includes their beliefs about the role of handwashing, the effectiveness of personal protective equipment in reducing infection, the influence of IPC protocols on practice, healthcare providers' responsibility for patient safety, and the importance of proper waste disposal in preventing infections.

Training and Education: refers to the provision of learning opportunities and resources that enhance nurses' knowledge and skills in infection prevention and control (IPC). In this study, it is measured through questions 28 to 34 in the Training and Education section of the survey. These questions assess whether the hospital provides on-the-job or in-service training, whether nurses hold professional certifications in infection control, their participation in IPC education sessions or workshops, the effectiveness of such training, their perceived need for further learning in IPC, the incorporation of IPC training in their basic education curriculum, and whether an orientation program for new personnel on IPC protocols is implemented at their facility.

Availability of Protocols and Guidelines: refers to the presence, accessibility, and implementation of infection prevention and control (IPC) protocols within a healthcare

setting. In this study, it is measured through questions 50 to 56 in the Availability of Protocols and Guidelines section of the survey. These questions assess whether nurses are aware of the Palestinian IPC protocol, if they have access to a copy of the protocol in their ward, whether they are applying the protocol, and where it is located. Additionally, barriers preventing the use of the protocol, such as lack of knowledge, resources, time, or training, are evaluated. The source of the protocols, whether from WHO, the Ministry of Health, national guidelines, or developed by the hospital, is also identified.

Availability of Materials and Equipment: refers to the presence and adequacy of essential resources required to support infection prevention and control (IPC) practices in healthcare settings. In this study, it is measured through questions 57 to 62 in the Availability of Materials and Equipment section of the survey. These questions assess whether antiseptic and disinfectant materials, water, soap, alcohol gel, and personal protective equipment (PPE) such as gowns, eye glasses, masks, gloves, shoe covers, head covers, and plastic aprons are available in the department. Additionally, the availability of sharp boxes, the sufficiency of sinks in relation to room numbers, and the adequacy of resources to support compliance with IPC protocols are evaluated.

Supportive Policies: refer to the presence and effectiveness of institutional regulations and management practices that facilitate and encourage compliance with infection prevention and control (IPC) protocols. In this study, it is measured through questions 63 to 66 in the Supportive Policies section of the survey. These questions assess whether hospital management adopts policies that support IPC compliance, the degree of management support in promoting IPC practices, the existence of an auditing program to ensure policy implementation, and whether the IPC program is included in the hospital's quality assurance program. These elements reflect the level of institutional commitment to supporting IPC efforts.

Supervision, Monitoring, and Evaluation: refer to the processes and systems in place to oversee and assess the implementation of infection prevention and control (IPC) protocols in a healthcare setting. In this study, it is measured through questions 67 to 72 in the Supervision, Monitoring, and Evaluation section of the survey. These questions assess the presence of an infection control committee, the availability of designated infection control practitioners, the use of a surveillance system for infection rates, whether the facility conducts follow-up supervision on IPC practices, and if nurses receive feedback on their IPC practices after supervision visits. These elements help evaluate the effectiveness of oversight and continuous improvement in IPC practices.

Workload and Workforce: refer to the impact of staffing levels and work demands on infection prevention and control (IPC) practices within a healthcare setting. In this study, it is measured through questions 73 and 74 in the Workload and Workforce section of the survey. These questions assess whether a lack of staff in hospital wards increases the risk of hospital-acquired infections (HAIs) and how increased workload affects IPC practices. The evaluation highlights the relationship between staffing levels, work demands, and the effectiveness of IPC efforts in preventing infections.

Physical Environmental Factors: refer to the characteristics and conditions of the healthcare setting that influence infection control practices. In this study, it is measured through questions 75 to 80 in the Physical Environmental Factors section of the survey. These questions assess the suitability of infrastructure and departmental design (including

water, laundry, ventilation, lighting, and storage areas) for infection control, the presence of special rooms with negative pressure systems (e.g., isolation rooms), and the effectiveness of the traffic flow system in maintaining clean and sterile areas separate from unclean zones. Additionally, the air quality is evaluated, including the system for controlling environmental temperature and humidity, as well as the compliance of the air ventilation system with infection control standards. These factors help determine the adequacy of the physical environment in preventing infections.

Chapter Three

Study Methodology

3.1 Study design

The study design is a descriptive-analytical cross-sectional study. The cross-sectional design was chosen for this study on nurses' compliance with the National Palestinian Infection Prevention and Control Protocol due to its ability to provide a snapshot of compliance levels at a specific point in time. This design is particularly useful for assessing the prevalence of behaviors and attitudes among a population, allowing for the identification of patterns and correlations without the need for long-term follow-up. Given the nature of the research question, which seeks to evaluate current compliance rates and factors influencing these rates, a cross-sectional approach allows for efficient data collection and analysis across multiple hospitals simultaneously.

3.2 Setting

Hebron Governorate, located in the southern part of the West Bank it is the largest governate in Palestine by both area and population, 822435 population(Palestinian Central Bureau of Statistics, 2017). and faces unique healthcare challenges, including overcrowded hospitals, shortages of essential medical supplies, and the strain of ongoing political instability (State of Palestine, 2017).it's home to five governmental hospitals out of eighteen government hospitals in the West Bank and 452 out of 1898 beds in the West Bank (MOH, 2023).

We are focusing on nurses, a specific group within the Ministry of Health. The number of nurses in the Palestinian Ministry of Health is 2728, which represents 22% of all nurses in the West Bank, according to figures given by the ministry of health in 2022(MOH, 2023).

The study was conducted in five selected governmental hospitals in Hebron governorates these hospitals were selected for their diverse occupancy rates, departments, and patient populations, providing a comprehensive overview of compliance across various healthcare environments in Hebron, the selection of five different hospitals ensures diversity in the data, as each hospital offers different services and operates at varying capacities.

(Hebron (Alia)Hospital, Yatta Hospital, Dora Hospital, President Mahmoud Abbas Hospital, and Mohammad Ali Al Mohtaseb Hospital) (MOH, 2023),to reflect representative results.

- (Hebron (Alia)Hospital: is a government hospital in the Hebron city, West Bank, Palestine. Since 1957, the hospital has been serving over eight hundred thousand patients in the Westbank largest governorate. It boasts the highest occupancy rate of any government hospital at 155%. Departments of general surgery, urology, orthopedic, ENT, neurosurgery, pediatric, internal, and pediatric surgery are all housed within the hospital. orthopedic surgery, ENT surgery, neurosurgery, pediatric surgery, internal medicine, pediatrics, emergency medicine, intensive care unit, ophthalmology, operations, sterilization, lab, blood bank, radiology, CT and MRI, physical therapy, anatomy, and a number of other administrative and service departments 239 beds, 508 employees(MOH, 2018, 2023).
- Yatta Hospital: is a governmental hospital in Yatta city south of Hebron governorate since 2004 With a 170% occupancy rate, the hospital offers medical services to almost 100,000 people within its many department. There are 73 beds in the following departments: general surgery, pediatrics, obstetrics and gynecology, emergency, dialysis, operations; outpatient clinics; laboratory; radiology; and pharmacy. There are 175 staff members working in these departments(MOH, 2018, 2023).
- Dora Hospital: Dura Government Hospital is a Palestinian government hospital established in the city of Dura, south of Hebron in the West Bank, with a clinical capacity of 43 beds and about 54 employees. The hospital began providing its services in 2020, which were limited to the treatment of coronavirus disease in Palestine, as the Ministry of Health temporarily converted it to be a COVID-19 treatment center for the southern West Bank, and increased its clinical capacity to 120 beds, including 20 beds for intensive and intermediate care, and 20 beds for intensive and intermediate care. Its other departments include emergency services, operations, outpatient clinics, laboratory, blood bank, pharmacy, radiology, internal, intensive care, and oncology, in addition to administration and general and administrative services. In 2022, it had only 43 beds after the COVID-19 pandemic(MOH, 2023).
- President Mahmoud Abbas Hospital: President Mahmoud Abbas Governmental Hospital is one of the governmental hospitals affiliated with the Palestinian Ministry of Health. It is located in the city of Halhul, north of Hebron governorate in the West Bank, and its construction began in 2018. The hospital opened in late 2021 to treat COVID-19 patients. The hospital officially launched for service in September 2022, with a clinical capacity of 19 beds and a staff of 66. The hospital serves the residents of Halhul city and the cities and towns in the northern Hebron governorate.(MOH, 2023).
- Mohammad Ali Al Mohtaseb Hospital: Muhammad Ali Al-Muhtasib Governmental Hospital is one of the Palestinian governmental hospitals in Hebron Governorate, Palestinian Ministry of Health included it at the end of 2015 with a clinical capacity of 35 beds and 137 employees. IN 2017, the hospital's occupancy rate reached about 80%, as the hospital provided services to more than 100,000 citizens, through its various departments, namely:

Emergency, Operations, General Surgery, Obstetrics and Gynecology, ENT, Eye, Outpatient, Radiology, Laboratory and Blood Bank(MOH, 2018, 2023).

3.3 Target Population and Sampling:

The population of this research consisted of all nurses who are working in governmental hospitals in Hebron Governorate. According to eligibility criteria, the study will be conducted in the following five governmental hospitals in Hebron governorate: Hebron Governmental Hospital which contains 271 nurses, Yatta Governmental Hospital which contains 76 nurses, Muhammad Ali Muhtasib Governmental Hospital which contains 34 nurses, Dura Governmental Hospital which contains 22 nurses, and President Mahmoud Abbas Governmental Hospital which contains 39 nurses. Hence, the total number of the population is 442 nurses(MOH, 2023).

3.4 Eligibility criteria

3.4.1 Inclusion Criteria:

The study included Staff and practical, head nurses and nursing director who is working in the selected governmental hospitals located in the Hebron Governorate. Only nurses who expressed a willingness to participate voluntarily were considered for inclusion, ensuring that the participants were fully informed and consenting. This approach aimed to gather data from individuals who were actively involved in patient care within these hospitals and who had a real interest in contributing to the research.

3.4.2 Exclusion Criteria:

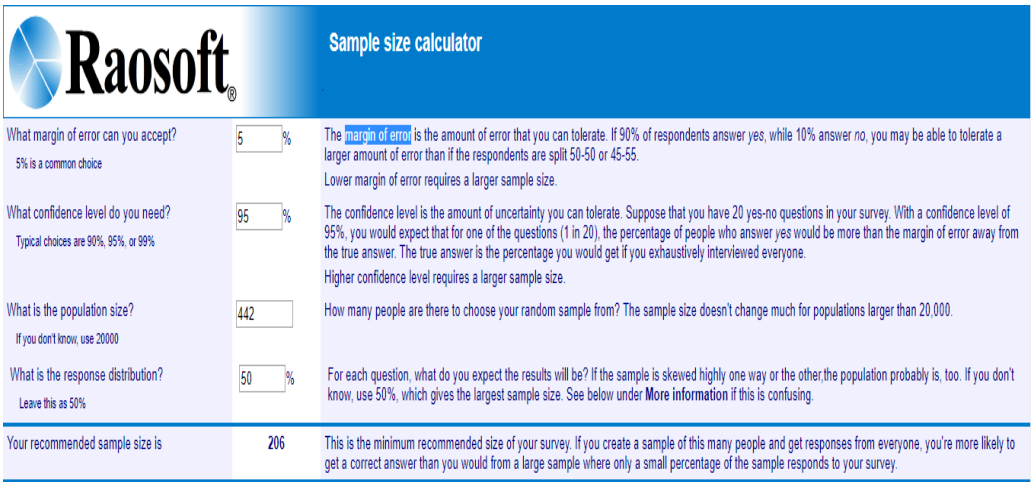
The exclusion criteria for this study were established to ensure that participants could provide relevant and meaningful data.

Nurses who were on leave during the data collection period (e.g., maternity leave, sick leave) were excluded because they were not actively engaged in daily hospital operations and therefore could not accurately reflect compliance with infection control protocols. Additionally, nurses who refused to participate or were unable to provide informed consent were excluded, in line with ethical guidelines.

3.5 Sample size

Simple random sample selected from the study population of size 442. The sample size was determined by using online tool (Raosoft, 2024) considering 95% confidence level, 5% marginal error, and 50% proportion (P=0.5). For a population of size 442, we will get the minimum sample size needed for the study is 206 sampling units (nurses). The researcher

decided to add a margin of 14 sampling units in order avoid the nonresponse from the nurses, so the researcher decided to distribute 220 questionnaires randomly. The researcher used the available list of the 442 nurses to select the sample, the researcher used Microsoft Excel program to generate 220 random numbers from 442 to specify the selected nurses from the list, after that, the researcher distributed the online questionnaire on the selected nurses. The total number of the returned questionnaires is 212, so the response rate is (212/220=96%).



Raosoft®

Sample size calculator

What margin of error can you accept? 5% is a common choice	5 %	The margin of error is the amount of error that you can tolerate. If 90% of respondents answer *yes*, while 10% answer *no*, you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55. Lower margin of error requires a larger sample size.
What confidence level do you need? Typical choices are 90%, 95%, or 99%	95 %	The confidence level is the amount of uncertainty you can tolerate. Suppose that you have 20 yes-no questions in your survey. With a confidence level of 95%, you would expect that for one of the questions (1 in 20), the percentage of people who answer *yes* would be more than the margin of error away from the true answer. The true answer is the percentage you would get if you exhaustively interviewed everyone. Higher confidence level requires a larger sample size.
What is the population size? If you don't know, use 20000	442	How many people are there to choose your random sample from? The sample size doesn't change much for populations larger than 20,000.
What is the response distribution? Leave this as 50%	50 %	For each question, what do you expect the results will be? If the sample is skewed highly one way or the other,the population probably is, too. If you don't know, use 50%, which gives the largest sample size. See below under **More information** if this is confusing.
Your recommended sample size is	206	This is the minimum recommended size of your survey. If you create a sample of this many people and get responses from everyone, you're more likely to get a correct answer than you would from a large sample where only a small percentage of the sample responds to your survey.

3.6 Data collection

After obtaining the necessary permits from the university and the Palestinian Ministry of Health, a questionnaire was distributed to participants through Google Forms. This questionnaire included an explanation of the study's purpose, informed consent information, and a section for participants to provide their contact details or ask any questions they may have. The data collection period lasted one month, allowing participants sufficient time to respond and ensuring that the target sample size was met.

Additional assistance was given to take into consideration the possibility that certain nurses might not be acquainted with or have access to digital platforms. In order to achieve inclusion, hospital administration personnel assisted participants who were unable to access the Google Form using digital access in hospital settings.
Given that self-reported data can introduce bias, especially in the form of social desirability bias, measures were taken to minimize this risk. Responses were submitted anonymously, and participants were assured that their answers would remain confidential, reducing the likelihood of respondents altering their answers to appear more compliant with infection control protocols.

To improve the response rate, follow-up strategies were implemented. After the initial distribution of the Google Forms questionnaire, follow-up emails were sent to non-responders to remind and encourage them to participate in the study. These reminders were sent periodically during the one-month data collection period to ensure that participants who had not yet responded had multiple opportunities to complete the questionnaire. Additionally, support from hospital administration was sought to further prompt non-responders, especially among nurses with limited access to digital platforms.

Data loss or incomplete replies were not a major problem in this study since Google Forms is made to avoid incomplete submissions by asking participants to finish each component before moving forward. Respondents cannot submit the form without filling out all required fields due to the platform's structure. As a result, partially completed replies were not included in the dataset.

3.7 Study tool

After reviewing many similar studies and reviewing the tools used, I used a research tool for a similar study (Elmadhoun, 2015)after communicating and obtaining permission from the researcher (see Appendix 5,6)

The questionnaire was designed to be self-administered and was adopted from a previous study(Elmadhoun, 2015). It was not developed specifically for this research but was used with permission from the original study to suit the needs of the current research. There was no jargon words, leading questions, or complicated terminology in the questionnaire. There are no verbal or visual cues that may sway the respondent's answers, neither did the researcher's personal beliefs affect how the respondent answered the questions. The survey was created in Arabic so that the responders could easily comprehend it. To make filling out the questionnaire easier, an explanation note was attached to each one. The questionnaire consisted of five sections and took around fifteen minutes to be completed.
The Questionnaire was created with the study's aim and objectives in mind and its conceptual framework. It was made up of the following components: The first section covered the respondents' profiles, the second section contained questions to assess the individual factors that influence the nurse's practices and compliance to the IPC protocols. The third section included questions that assess the nurse's practices to IPC protocols. The fourth section examined the influence of organizational factors on the adherence to IPC protocols. The fifth part assessed the physical environmental factors that hindering the adherence to protocols.
The adaptation and changes made to the questionnaire were informed by expert and aimed at enhancing its effectiveness and relevance in the Palestinian context. By focusing on language accessibility, structured sections, and cultural considerations, the tool was tailored to address the specific needs and challenges of the region. This approach ensures that the questionnaire is not only comprehensive but also culturally and contextually appropriate, thereby improving the rigor and appropriateness of the research.

3.8 Validity

The validity of the instrument (questionnaire) evaluates the extent to which the instrument is enabling to measure the study domains and subjects. One method is the face validity which is achieved in this study by organizing the questionnaire in categories with logical sequence to encourage the respondent to fill it. The second method is the content validity which is achieved by sending the questionnaire to different experts in the fields including infection prevention and control (IPC), public health, and healthcare management researchers, managers, and statistician (Appendix 7) asked to assess the clarity language and relevance to the objectives of the study, Response scale appropriateness and of evaluate cultural suitability for nurses in Palestinian governmental hospitals.

The comments obtained after the expert assessment was thorough, but no significant changes were needed. Still, a number of helpful recommendations were made. For example, adding some questions to help gather detailed insights into the frequency of specific infection control practices and understand the perceived barriers and facilitators affecting compliance among nurses, highlighted that some of the questions on IPC procedures could be general and suggested that they be tailored to particular protocols in the context of Palestinian healthcare. And additionally, was suggested that some technical words be further simplified so that all nurses, regardless of educational level, could comprehend the questions completely. To make sure the questions were understandable and clearly related to the day-to-day experiences of nurses at hospitals in the Hebron Governorate, some small adjustments were made in response to this input.

All comments on the questionnaire were taken in consideration, and as a result some modification for some items was done.

3.9 Pilot study

A pilot study was conducted before starting the data collection as a pretest to point out weaknesses in wording, predict response rate, determine the real time needed to fill the questionnaire and identify areas of ambiguity and to test the reliability, validity and suitability of the questionnaire. A sample of 21 participants from all hospital was chosen from the study target population to conduct the pilot study. All of them received clear explanation about the study purpose. Some modifications were introduced to the questionnaire but did not affect its important content. Participants who participated in the pilot study were not included in the study sample because excluding participants from the pilot study ensures the integrity and objectivity of the final results. Their prior exposure to the research instruments could introduce bias through increased familiarity or learning effects, potentially altering their responses compared to new participants. Additionally, the pilot process often leads to refinements in the study tools, meaning these participants would have experienced both the original and adjusted versions, creating inconsistencies in data collection. By excluding them, the study avoids these potential biases, ensuring that the final sample reflects a more accurate and representative assessment of the target population

3.10 Reliability

The reliability of any instrument (questionnaire or any research tool) evaluates the extent to which the instrument is stable and capable to give the same results each time used with the same observers or respondents. The reliability can be measured by evaluating the internal consistency of the respondents' answers toward the items of the questionnaire. One measurement of the internal consistency is the coefficient of Cronbachs' alpha. The usual acceptable values of Cronbachs' alpha is 0.7 or more(Crocker, 2008; Taherdoost, 2016). The researcher verified the reliability of the study questionnaire by using a pilot sample of 21 respondents. The values of Cronbachs' alpha for the parts of the questionnaire based on the pilot study are: Individual factors (0.78), Practices (0.91), Organizational factors (0.71), Physical environmental factors (0.76), and the total value of Cronbachs' alpha of all statements of the questionnaire was 0.79. Table (3.1) shows the values of Cronbachs' alpha for each part of the questionnaire and the entire questionnaire.

Table 3.1: Reliability of the questionnaire

No.	Domains	Alpha Cronbach
1.	Individual factors	0.78
2.	Practices	0.91
3.	Organizational factors	0.71
4.	Physical environmental factors	0.76
	All statements of the questionnaire	0.79

3.11 Period of the study

The study was conducted from February to January 2024, it was started by preparing research proposal and designing the data collection instruments, and then get the approval from the University to complete the study, pilot study and data collection was done in June, July and august and then data analysis and completing the research in October and November.

3.12 Ethical Considerations

The researcher adhered to all ethical and administrative guidelines required for conducting the study. Ethical approval was obtained from the School of Public Health, Al-Quds University (Appendix 1), as well as official approval from the Ministry of Health (Appendix 2). Participants were provided with a comprehensive explanation of the study's purpose, ensuring that they understood the nature of confidentiality and the voluntary nature of their participation. Participation was completely voluntary, and participants were informed that they could withdraw from the study at any time (Appendix 3,4). Confidentiality was rigorously maintained, especially in smaller hospitals where anonymity could be more difficult to ensure. To protect participants' identities, all responses were anonymized. Additionally, data was securely stored in password-protected files that were accessible only to the research team. No compensation was provided to participants, further highlighting the voluntary nature of their involvement in the study.

3.13 limitation

while the study provides valuable insights into nurses' compliance with IPC protocols, potential limitations, such as response and sampling biases, must be acknowledged. Response bias, arising from self-reporting, could lead to socially desirable answers, potentially overestimating compliance levels. Similarly, the focus on governmental hospitals in Hebron Governorate may limit the generalizability of the findings to other healthcare settings. To mitigate these biases, steps such as random sampling, comprehensive inclusion criteria, anonymizing responses, and emphasizing voluntary participation were taken.

3.14 Data management and statistical analysis

The Data analysis was conducted using (SPSS 23). The data was reviewed, cleaned, and recoded into appropriate entry codes, and the necessary variables were calculated.

The means and the standard deviations were computed to describe the respondents' answers toward all the 5-likert scale items, and the percentage means computed also by dividing the mean of each item over 5 (Mean/5) *100%. In addition, the one sample t-test was used to specify the agreement level of the respondents toward each item by testing the difference between the item's mean and the neutral answer value (usually equals 3). The total degrees of the main domains and sub-domains were computed by averaging the 5-likert scale items inside each domain, and the total degrees and the items were manipulated as quantitative variables.

The other items and questions of the questionnaire were analyzed as categorical or qualitative variables (for example the questions whose answer options: yes, no, don't know). All qualitative questions were described by frequencies and percentages. Regarding multiple response questions such as the Barriers questions (Q55), it consisted of 9 multiple response options, each selected option was recoded as 1 and 0 for the unselected option, and then the sum of all selected options for each individual was computed and then converted to a percentage by dividing the sum over 9 ((sum/9) *100%). By this way, the researcher quantifies the Barriers as quantitative variable scaled from 0-100%. The same method of was used in manipulating the multiple response question (15) about the standard precautions which consisted of 3 options.

The Pearson correlation coefficients were used to test the probable relationships between the IPC Practices (compliance among nurses with the National Palestinian Infection Prevention and Control Protocol) and Barriers (barriers of complying with infection control protocols among nurses) as dependent variables; and the Individual factors (Knowledge about the (IPC) protocols, Attitudes, Training and Education), Organizational Factors (Availability of protocols and guidelines, Availability of Materials and Equipment, Supportive policies, Supervision, Monitoring and Evaluation, and Workload and Workforce), Physical Environmental Factors (Design, Flow, Air quality) as independent variables.

The two independent samples t-test and the one way analysis of variance test (One way ANOVA) were used to examine the differences in the means of the respondents' answers toward the practices and barriers according to the socio-demographic and personal characteristics (Place of work (Hospital), Gender, Age, Marital status, Type of shift, Nature of the department, Employment Status, Education, Current job position, Years of experience, Exposition to any injury from used needle or sharp surgical instrument, and Vaccination for Hepatitis-B).

Chapter Four

Results of Data Analysis

The researcher in this chapter introduces the results of data analysis of the Socio-demographic and Personal characteristics, The Individual factors, The Practices, The Organizational Factors, and the Physical Environmental Factors. In addition, the chapter shows the results of the analysis of the relationships between variables and the analysis of differences in IPC practices and the barriers of adhering IPC protocols according to the Socio-demographic variables.

4.1 Socio-demographic and Personal characteristics

In this section, the researcher views the distribution of the respondents in the study sample according to their socio-demographic and personal characteristics. The following table shows the frequencies (N) and the percentages (%) of the 212 nurses in the study sample.

Table (4.1-A): Socio-demographic and personal characteristics of the respondents in the study sample (N=212).

Variable	Category	Frequency N	Percentage %
Hospital	Hebron Governmental Hospital	113	53.3%
	Yatta Governmental Hospital	39	18.4%
	Muhammad Ali Muhtasib Governmental Hospital	20	9.4%
	Dura Governmental Hospital	15	7.1%
	President Mahmoud Abbas Governmental Hospital	25	11.8%
	Total	212	100.0%
Gender	Male	121	57.1%
	Female	91	42.9%
	Total	212	100.0%
Age	20-29	72	34.0%
	30-39	89	42.0%
	40-49	45	21.2%
	50-59	6	2.8%
	Total	212	100.0%
Marital status	Married	165	77.8%
	Single	47	22.2%
	Total	212	100.0%
Type of shift	Morning shift	63	29.7%
	Evening shift	4	1.9%
	Mixed shift (morning, evening, night)	145	68.4%
	Total	212	100.0%
Nature of the department	Open department	128	60.4%
	Closed department	84	39.6%
	Total	212	100.0%

Table (4.1-B) Socio-demographic and personal characteristics of the respondents in the study sample (N=212).

Employment Status	Full-time	203	95.8%
	Part-time	9	4.2%
	Total	212	100.0%
Education	Diploma	59	27.8%
	Bachelor	131	61.8%
	Master	22	10.4%
	Total	212	100.0%
Current job position	Director	4	1.9%
	Head nurse	39	18.4%
	Practitioner	169	79.7%
	Total	212	100.0%
Years of experience	1-9 years	105	49.5%
	10-19 years	76	35.8%
	20-29 years	28	13.2%
	30 and more	3	1.4%
	Total	212	100.0%
Exposure to injury	Yes	115	54.2%
	No	97	45.8%
	Total	212	100.0%
HB Vaccination	Yes	173	81.6%
	No	39	18.4%
	Total	212	100.0%
Number of doses	One	48	28.1%
	Two	34	19.9%
	Three	47	27.5%
	Three doses and a booster shot	42	24.6%
	Total	171	100.0%

The results in the table above show that the sample of the study consisted of 121 (57.1%) males and 91 (42.9%) females. Most of the respondents in the sample work in Hebron Governmental Hospital (53.3%), and the other respondents are distributed on other hospitals: Yatta Governmental Hospital (18.4%), Muhammad Ali Muhtasib Governmental Hospital (9.4%), Dura Governmental Hospital (7.1%), and President Mahmoud Abbas Governmental Hospital (11.8%). Most of the respondents are from the age groups 30-39 (42%) and 20-29 (34%), and most of the respondents are married (77.8%) with Bachelor education degree (61.8%), and about half of them (50%) have 1-9 years of experience.

The respondents in the sample are distributed based on their current job position as 4 (1.9%) directors, 39 (18.4%) head nurses, and 169 (79.7%) Practitioners. Most of the respondents are Full-time workers (95.8%) and working in mixed shifts (morning, evening, night) (68.4%), and in open departments (60.4%).

The results in the table show that about 54% of the respondents have been exposed to injury from used needle or sharp surgical instrument, and about 82% of them have been vaccinated for Hepatitis B: 28.9% of them have been vaccinated by one dose, 19.7% by two doses, 27.2% by three doses, and 24.3% by Three doses and a booster shot.

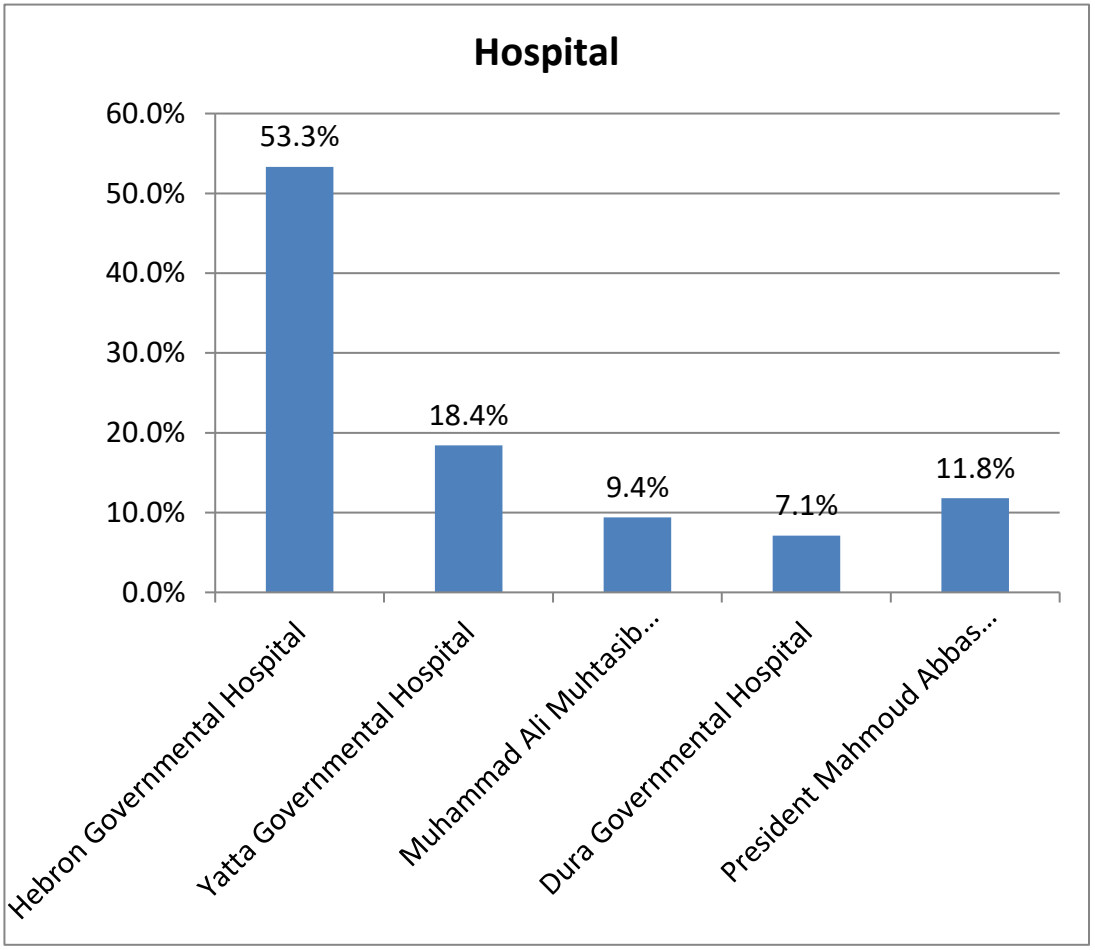


Figure 4.1: Distribution of the study sample by the place of work (Hospitals).

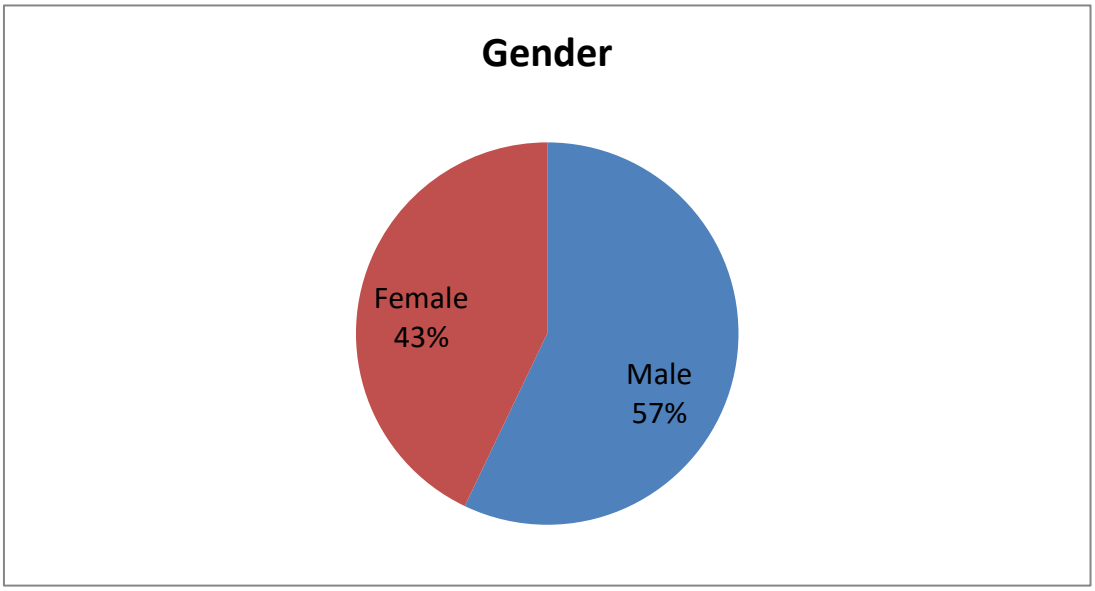


Figure 4.2: Distribution of the study sample by the Gender.

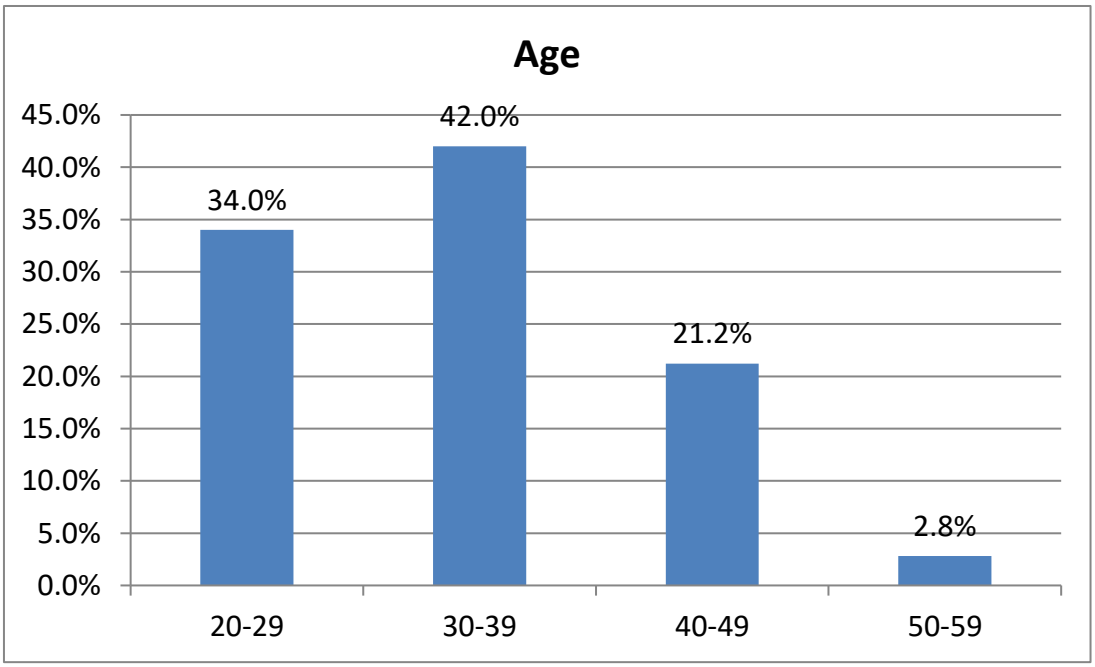


Figure 4.3: Distribution of the study sample by the Age.

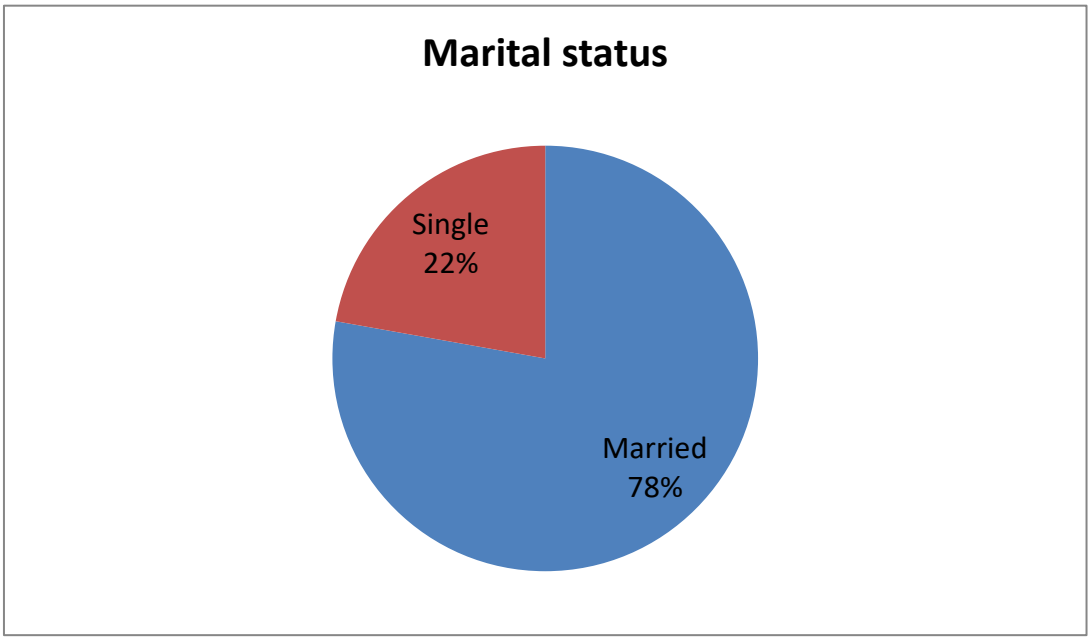


Figure 4.4: Distribution of the study sample by the Marital status.

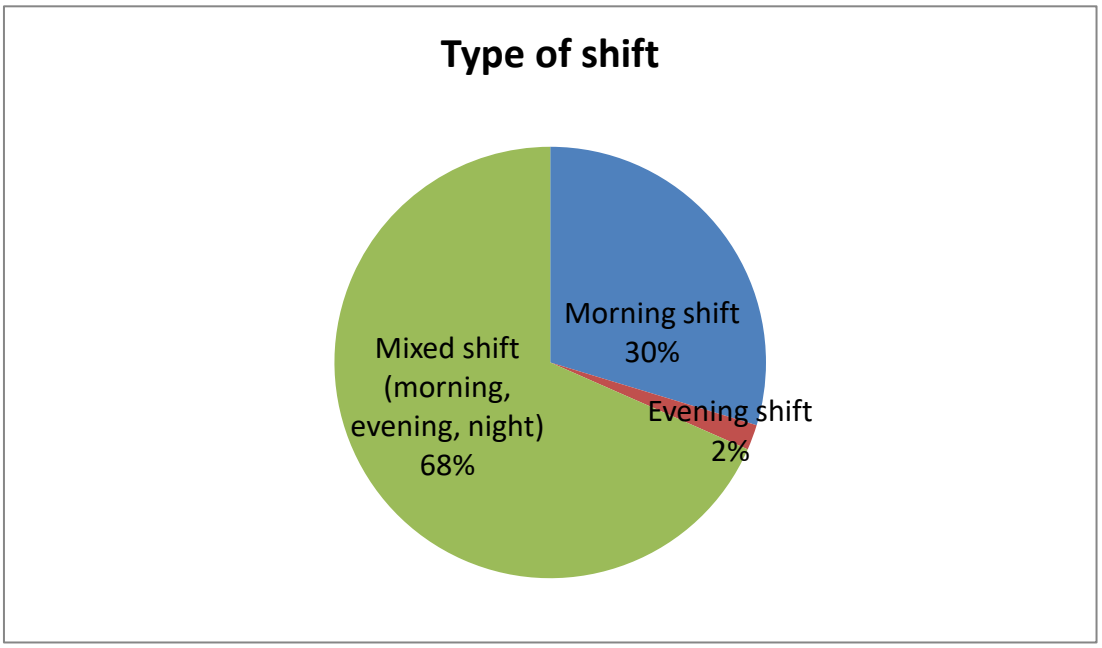


Figure 4.5: Distribution of the study sample by the Type of shift.

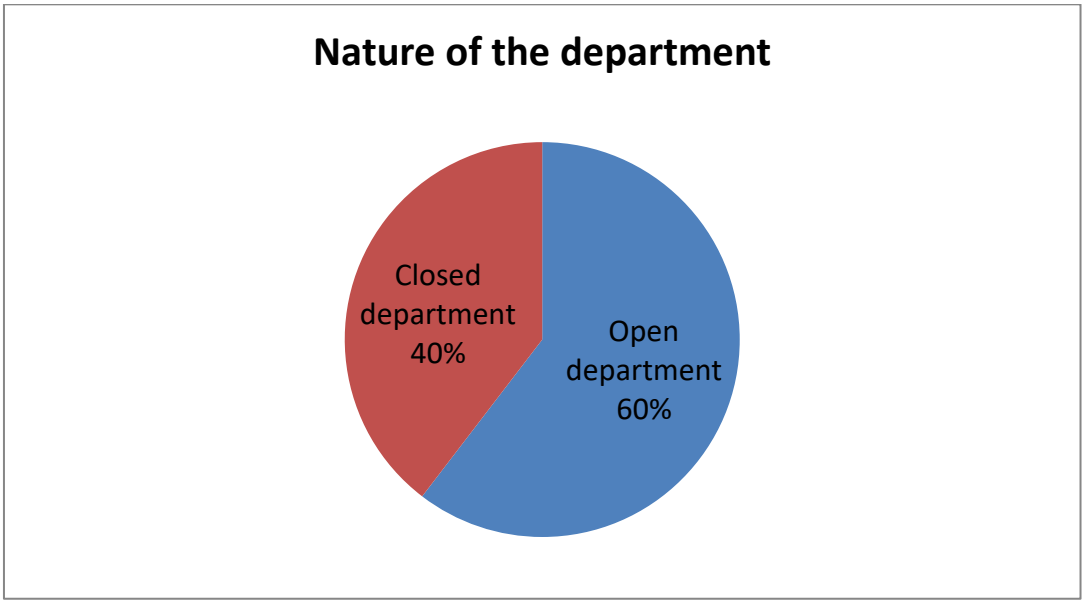


Figure 4.6: Distribution of the study sample by the Nature of the department.

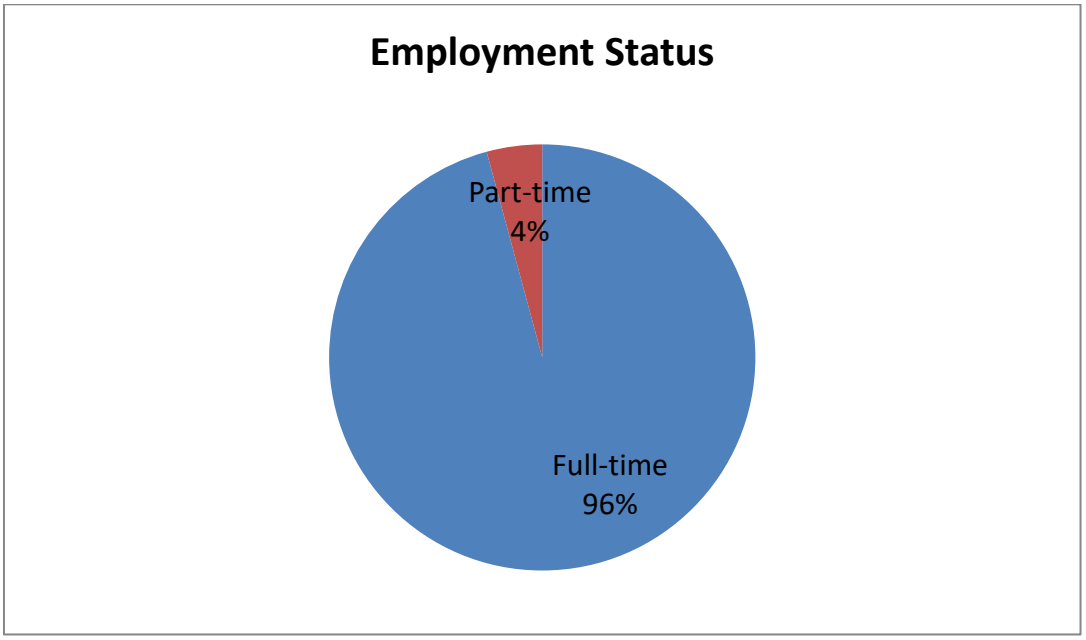


Figure 4.7: Distribution of the study sample by the Employment Status.

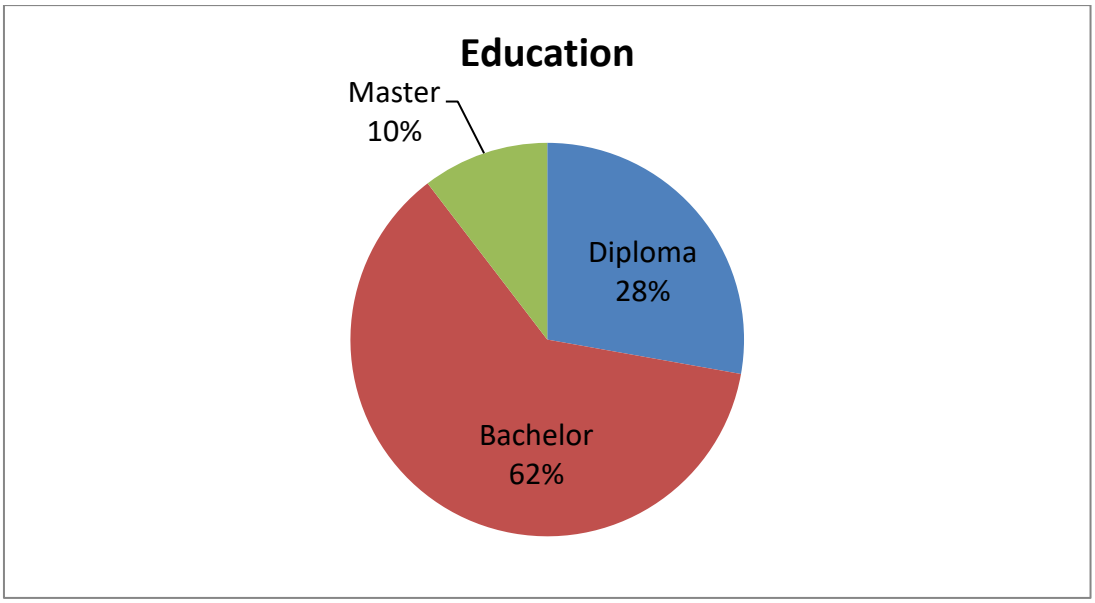


Figure 4.8: Distribution of the study sample by the Education.

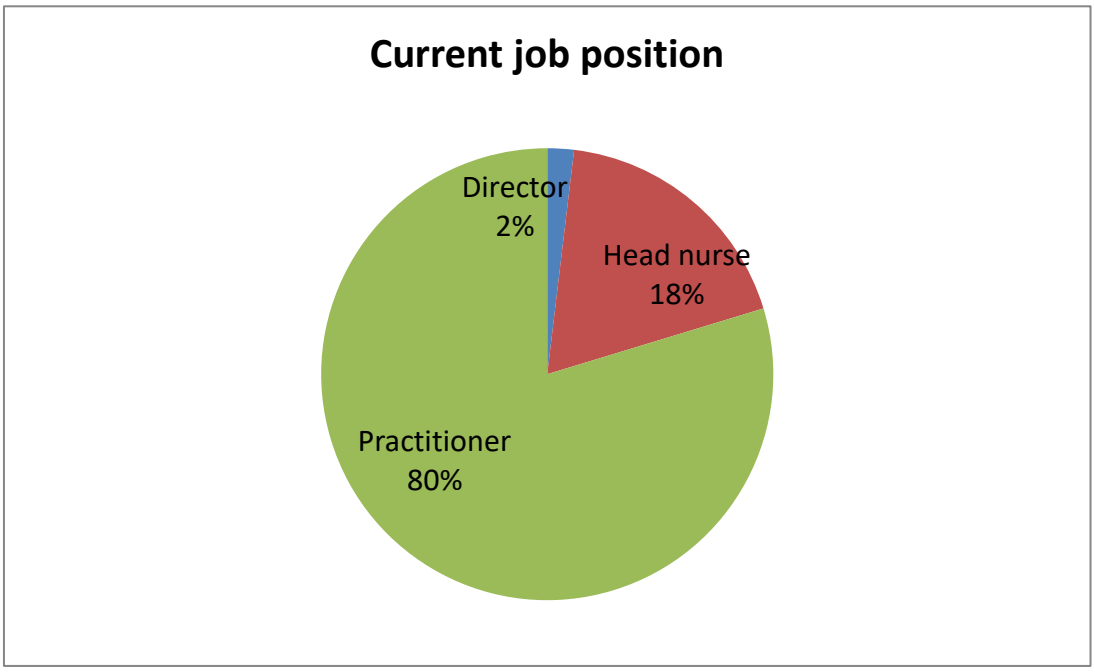


Figure 4.9: Distribution of the study sample by the Current job position.

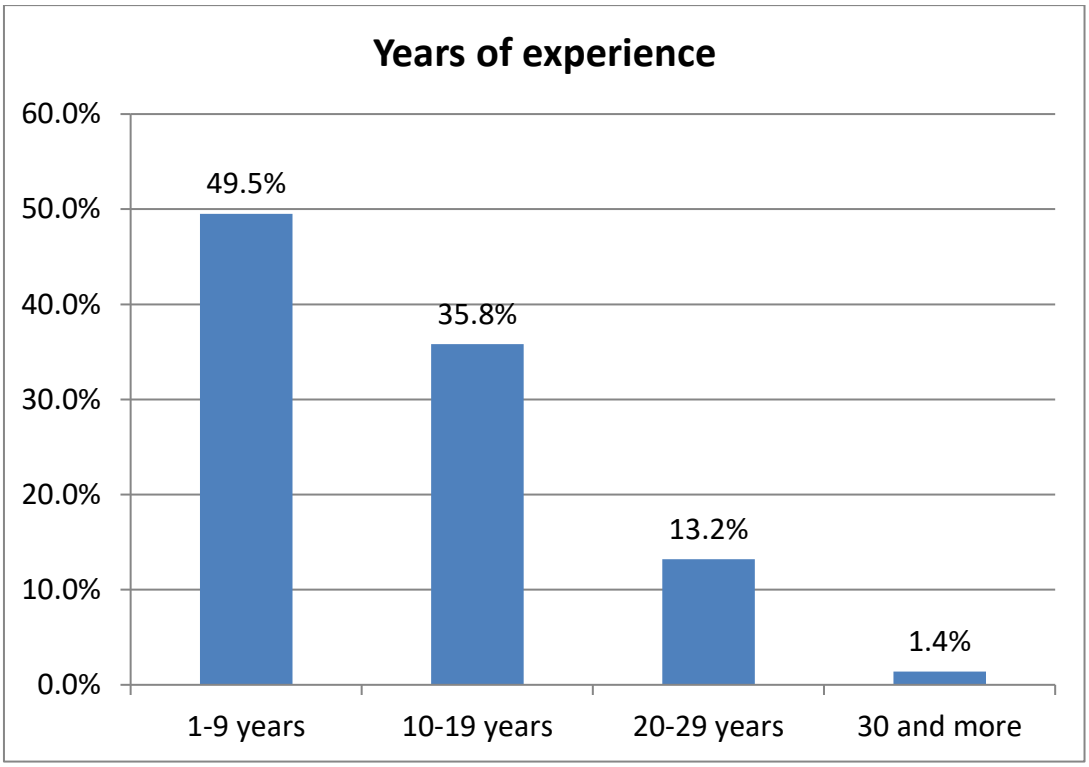


Figure 4.10: Distribution of the study sample by the Years of experience.

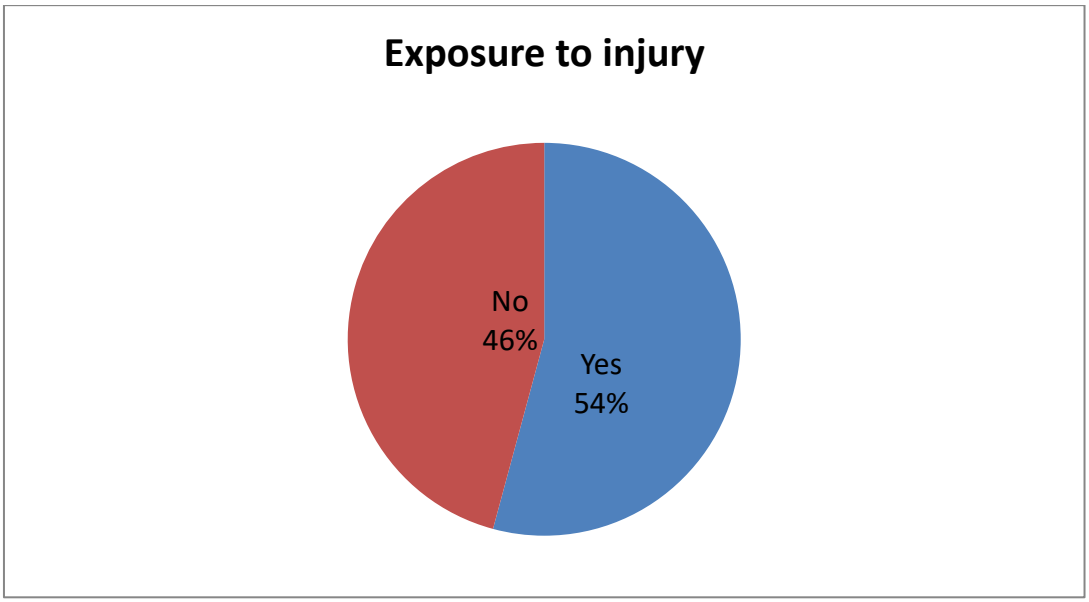


Figure 4.11: Distribution of the study sample by the Exposure to injury.

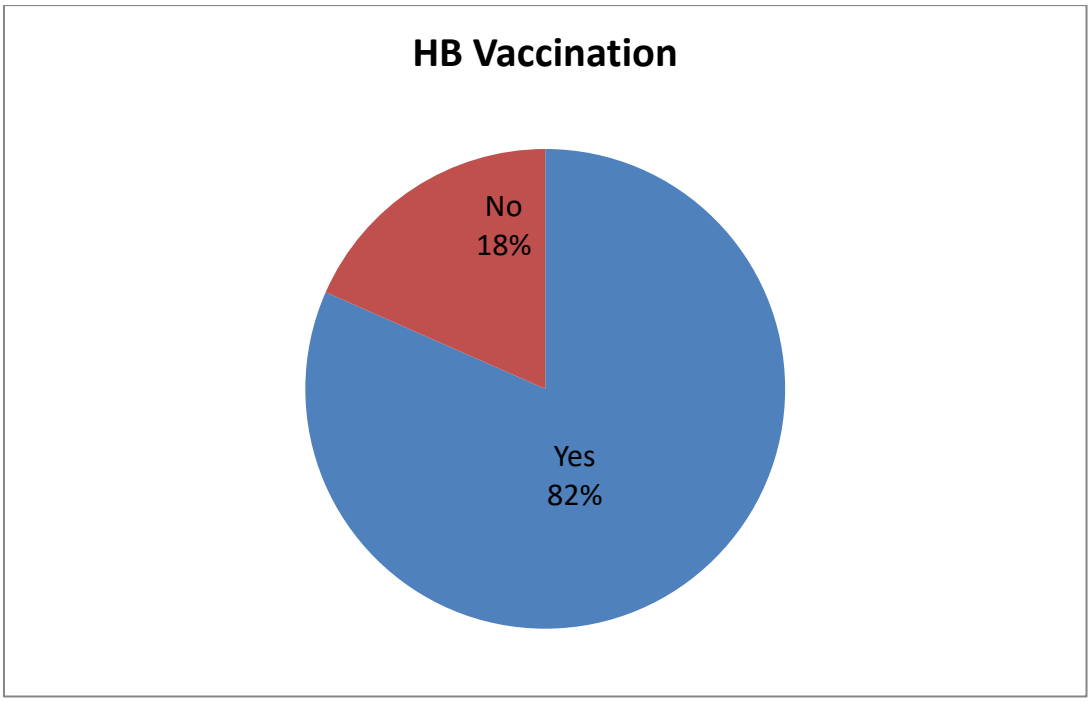


Figure 4.12: Distribution of the study sample by the HB Vaccination.

4.2 Practices

In this section, the researcher introduces the analysis results of the nurse's practices to control infection. These practices represent nurses' compliance with infection prevention and control protocols and practices in order to answer the related first and second study question: What is the overall level of compliance among nurses with the National Palestinian Infection Prevention and Control Protocol within governmental hospitals in Hebron Governorate?

How often do nurses engage in specific infection control practices, such as hand hygiene, personal protective equipment (PPE) use, and proper disposal of medical waste?

The following table shows means, standard deviations, percentage means, t and p-values of the one sample t-test of the respondent's practices which represent their compliance with the Infection Prevention and Control (IPC) protocols.

Table (4.2-A): Results of participants practices with the Infection Prevention and Control (IPC) protocols (N=212). *

Practices	Mean	Percentage Mean	Std. Deviation	t	p-value
Do you use personal protective equipment (gloves, mask, head cover, goggles, gown, and shoe cover) as recommended when handling patients during any procedure?	4.08	81.7%	0.84	18.831	0.000
Do you properly handle contaminated equipment to prevent cross infection?	4.43	88.7%	0.65	31.955	0.000

Table (4.2-B): Results of participants practices with the Infection Prevention and Control (IPC) protocols (N=212). *

Performs hand hygiene and hand washing (using soap and water or hand sanitizer) in the recommended five moments (5 moments)?	4.44	88.9%	0.77	27.162	0.000
Do you wash your hands when arriving at work?	4.13	82.6%	0.88	18.679	0.000
When washing hands, you remove jewelry, watch and rings.	4.13	82.6%	1.10	14.956	0.000
You wash your hands after any contact with blood, body fluids, secretions, and excretions.	4.79	95.8%	0.56	46.737	0.000
Make sure medical instruments are properly sterilized before use.	4.66	93.1%	0.62	38.702	0.000
You wash your hands before you leave the department	4.58	91.6%	0.72	31.918	0.000
Do you consistently follow disposal protocols for medical waste?	4.42	88.4%	0.66	31.369	0.000
Do you consistently follow protocols for disposing of sharp waste, such as needles and surgical instruments?	4.69	93.9%	0.59	41.898	0.000
Wearing gloves when you come in contact with blood, body fluids, secretions, mucous membranes and excretions.	4.70	94.0%	0.62	39.985	0.000

Table (4.2-C): Results of participants practices with the Infection Prevention and Control (IPC) protocols (N=212). *

You don't recap the used needles before disposal.	4.13	82.5%	1.07	15.278	0.000
You don’t break or bend the used needle before disposal.	4.28	85.6%	1.17	15.971	0.000
You clean and disinfect surfaces in patient care areas?	4.37	87.4%	0.75	26.488	0.000
Total Degree	4.42	88.3%	0.47	43.949	0.000

*** Test value of the one sample t-test is the neutral answer =3.**

The results in the table above show that all the p-values of the t-test are significant and higher than 0.05 level of significance and all the t-values are positive, indicating high agreement toward the practices. The total percentage mean is 88.3% indicating very high nurses’ compliance with the Infection Prevention and Control (IPC) protocols.

The results in the table shows that nurses wash their hands after any contact with blood, body fluids, secretions, and excretions (95.8%), they wearing gloves when they come in contact with blood, body fluids, secretions, mucous membranes and excretions (94.0%), they consistently follow protocols for disposing of sharp waste, such as needles and surgical instruments (93.9%), they also make sure that medical instruments are properly sterilized before use (93.1%), they wash their hands before they leave the department (91.6%), they perform hand hygiene and hand washing (using soap and water or hand sanitizer) in the recommended five moments (5 moments) (88.9%), they properly handle contaminated equipment to prevent cross infection (88.7%), and they consistently follow disposal protocols for medical waste (88.4%), they clean and disinfect surfaces in patient care areas (87.4%), and they don’t break or bend the used needle before disposal (85.6%), they wash their hands when arriving at work (82.6%), they remove jewelry, watch and rings when washing hands (82.6%), they don't recap the used needles before disposal (82.5%), and they use personal protective equipment (gloves, mask, head cover, goggles, gown, and shoe covers) as recommended when handling patients during any procedure (81.7%).

4.3 Individual factors

In this section, the researcher introduces the analysis results for the Individual factors in order to answer the related third study question: What are the levels of the (knowledge, attitudes, and training and education) among nurses regarding the National Palestinian Infection Prevention and Control Protocol?

4.3.1 Knowledge:

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding their knowledge about the standard precautions for the Infection Prevention and Control (IPC) protocols. The table also shows the total mean and standard deviation (Mean ± S.D) for the Knowledge scale of the standard precautions for the (IPC) protocols.

Table (4.3): Results of participants answers regarding their knowledge about the standard precautions for the (IPC) protocols (N=212).

Question	Answer	Frequency (N)	Percentage (%)
Do you know about the standard precaution for IPC?	No	17	8.0%
	Yes	195	92.0%
	Total	212	100.0%
Standard precautions are designed for:			
The care of all patients regardless of whether or not they are infected		144	67.9%
Standard Precautions apply to blood and all other body fluids, secretions and excretions		122	57.5%
Their implementation is mean to reduce the risk of transmitting microorganisms from known or unknown sources of infection		154	72.6%
Total scale of Knowledge about the standard precautions for the (IPC) protocols		**Mean ± S.D**	
		72.52 ± 24.27	

The results in the table above show that most of the respondents in the study sample know about the standard precaution for IPC (92%). In addition, the results show that most of the respondents (72.6%) think that the standard precautions are designed for reducing the risk of transmitting microorganisms from known or unknown sources of infection, and about 68% of the respondents think that the standards designed for the care of all patients regardless of whether or not they are infected, and 57.5% of them think that the standard precautions apply to blood and all other body fluids, secretions and excretions. The results in the table above also show that the total mean of the respondents Knowledge about the standard precautions for the (IPC) protocols is about 72.5%.

The following table shows means, standard deviations, percentage means, t and p-values of

the one sample t-test of the respondent's answers in the study sample regarding their knowledge about the Infection Prevention and Control (IPC) protocols.

Table (4.4): Results of participants answers regarding their knowledge about the (IPC) protocols (N=212). *

Knowledge about the (IPC) protocols	Mean	Percentage Mean	Std. Deviation	t	p-value
Initial testing for hepatitis and HIV should be done for all patients and staff.	4.67	93.3%	0.64	37.708	0.000
The doors to the rooms of patients with airborne diseases should always be kept closed.	4.31	86.1%	0.89	21.380	0.000
Personal protective equipment is used in the event of an emergency	3.82	76.3%	1.10	10.833	0.000
Glove use for all patients is a useful strategy for reducing risk of surgical site infection.	4.59	91.8%	0.57	40.387	0.000
Performing hand hygiene in the recommended situations can reduce patient mortality.	4.64	92.7%	0.59	40.508	0.000
Infection prevention and control can reduce medical costs associated with HAIs.	4.58	91.7%	0.57	40.217	0.000
Total degree	4.43	88.7%	0.42	49.300	0.000

*** Test value of the one sample t-test is the neutral answer =3.**

The results in the table above show that all the p-values of the t-test are significant and higher than 0.05 level of significance and all the t-values are positive, indicating high agreement of

the respondent's knowledge toward the items. The total percentage mean is 88.7% indicating very high agreement and knowledge about the (IPC) protocols. The respondents demonstrate very high knowledge degree regarding the following : initial testing for hepatitis and HIV should be done for all patients and staff (93.3%), performing hand hygiene in the recommended situations can reduce patient mortality (92.7%), glove use for all patients is a useful strategy for reducing risk of surgical site infection (91.8%), infection prevention and control can reduce medical costs associated with HAIs (91.7%), the doors to the rooms of patients with airborne diseases should always be kept closed (86.1%), personal protective equipment is used in the event of an emergency (76.3%).

4.3.2 Attitudes:

The following table shows means, standard deviations, percentage means, t and p-values of the one sample t-test of the respondent's answers in the study sample regarding their attitudes toward IPC protocols.

Table (4.5): Results of participants answers regarding their attitudes toward the IPC protocols (N=212). *

Attitudes toward the IPC protocols	Mean	Percentage Mean	Std. Deviation	t	p-value
Complying with IPC protocol is very essential for infection prevention.	4.60	92.1%	0.52	45.040	0.000
Recurrent hand washing is essential to prevent hospital acquired infection.	4.66	93.2%	0.52	46.292	0.000
The personal protective equipment (gloves, gown, apron and eye glasses) decrease the infection.	4.62	92.5%	0.52	45.136	0.000
The influence of IPC protocol on your practice is positive.	4.29	85.8%	0.81	23.113	0.000
Insuring the client's safety and preventing them of getting HAIs is the healthcare provider's responsibility.	4.25	85.0%	0.80	22.860	0.000
Safe and proper waste disposal decreases or prevent infection.	4.48	89.6%	0.60	36.190	0.000
Total Degree	4.49	89.7%	0.44	49.366	0.000

*** Test value of the one sample t-test is the neutral answer =3.**

The results in the table above show that all the p-values of the t-test are significant and higher than 0.05 level of significance and all the t-values are positive, indicating high agreement of the respondent's attitudes toward the IPC protocol items. The total percentage mean is very high (about 90%) indicating very high agreement and attitudes toward the IPC protocols. The respondents demonstrate very high attitudes regarding the following items : they think that the recurrent hand washing is essential to prevent hospital acquired infection (93.2%), the personal protective equipment (gloves, gown, apron and eye glasses) decrease the

infection (92.5%), complying with IPC protocol is very essential for infection prevention (92.1%), safe and proper waste disposal decreases or prevent infection (89.6%), the influence of IPC protocol on their practice is positive (85.8%), and insuring the client's safety and preventing them of getting HAIs is the healthcare provider's responsibility (85.0%).

4.3.3 Training and Education

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding training and education.

Table (4.6-A): Results of participants answers regarding Training and Education (N=212).

Question	Answer	Frequenc (N)	Percentage (%)
Does your hospital provide on job or in-service training and education about IPC?	Never	47	22.2%
	Yes sometimes	123	58.0%
	Yes regularly	42	19.8%
	Total	212	100.0%
Do you hold any professional certifications related to infection control?	No	160	75.5%
	Yes	52	24.5%
	Total	212	100.0%
Have you ever attended an education session or workshop on IPC?	Never	73	34.4%
	Yes, last year	48	22.6%
	Yes, in the past 2 years	33	15.6%
	Yes, more than 2 years	58	27.4%
	Total	212	100.0%

Table (4.6-B): Results of participants answers regarding Training and Education (N=212).

If yes, how would you describe the effectiveness of the training?	Not at all effective	29	20.9%
	Ineffective	94	67.6%
	Neutral	14	10.1%
	Effective	2	1.4%
	Very effective	0	0.0%
	Total	139	100.0%
Do you feel that you need to learn more about infection prevention and control?	Yes	182	85.8%
	No	30	14.2%
	Total	212	100.0%
Does your basic education curriculum incorporate training about the IPC protocols and guidelines?	No	53	25.0%
	Yes	159	75.0%
	Total	212	100.0%
Is program of orientation of new personnel on IPC implemented in your facility?	No	34	16.0%
	Don't know	36	17.0%
	Yes	142	67.0%
	Total	212	100.0%

The results in the table above show that 58% of the respondents in the study sample declared that sometimes the hospitals provide on job or in-service training and education about IPC and only about 20% of them declared that the hospitals provide such training regularly. The results also show that most of the respondents haven't hold professional certifications related to infection control (75.5%), while most of the respondents have ever attended an education session or workshop on IPC in the last year or in the past (65.6%). In addition, the results exhibit that most of the respondents feel that they need to learn more about infection prevention and control (about 86%) and also most of them provided that their basic education curriculum incorporates training about the IPC protocols and guidelines (75%). Finally, most of the respondents provided that the program of orientation of new personnel on IPC was implemented in their facility (67%).

4.4 Organizational Factors

In this section, the researcher introduces the analysis results for the Organizational Factors and Barriers in order to answer the related forth study question: What are the barriers that nurses face in adhering to the National Palestinian Infection Prevention and Control Protocol?

4.4.1 Barriers of using the Palestinian IPC protocol:

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding their barriers that prevent them from using the Palestinian IPC protocol. The table also shows the total mean and standard deviation (Mean ± S.D) for the Barriers score.

Table 4.7: Results of participants answers regarding barriers that prevent them from using the Palestinian IPC protocol (N=212).

Barriers	**Frequency (N)**	**Percentage (%)**
Lack of knowledge and education regarding IPC	130	61.3%
Lack of materials and equipment	125	59.0%
Difficult to understand	50	23.6%
Low job satisfaction among employee	61	28.8%
Unsuitable design and infrastructure of the department	93	43.9%
Lack of time and work overload	133	62.7%
Insufficient training	90	42.5%
Lack of supportive policy	68	32.1%
Poor monitoring and evaluation	87	41.0%
Total scale of Knowledge about the standard precautions for the (IPC) protocols	**Mean ± S.D**	
	43.87 ± 28.17	

The results in the table above show that the highest barriers for the nurses from using the Palestinian IPC protocol are: the lack of time and work overload (62.7%), and the lack of knowledge and education regarding IPC (61.3%), and the lack of materials and equipment (59%). The total mean of the barriers score is about 44% which represent the average percentage of the number of barriers that were chosen from the nine choices by nurses.

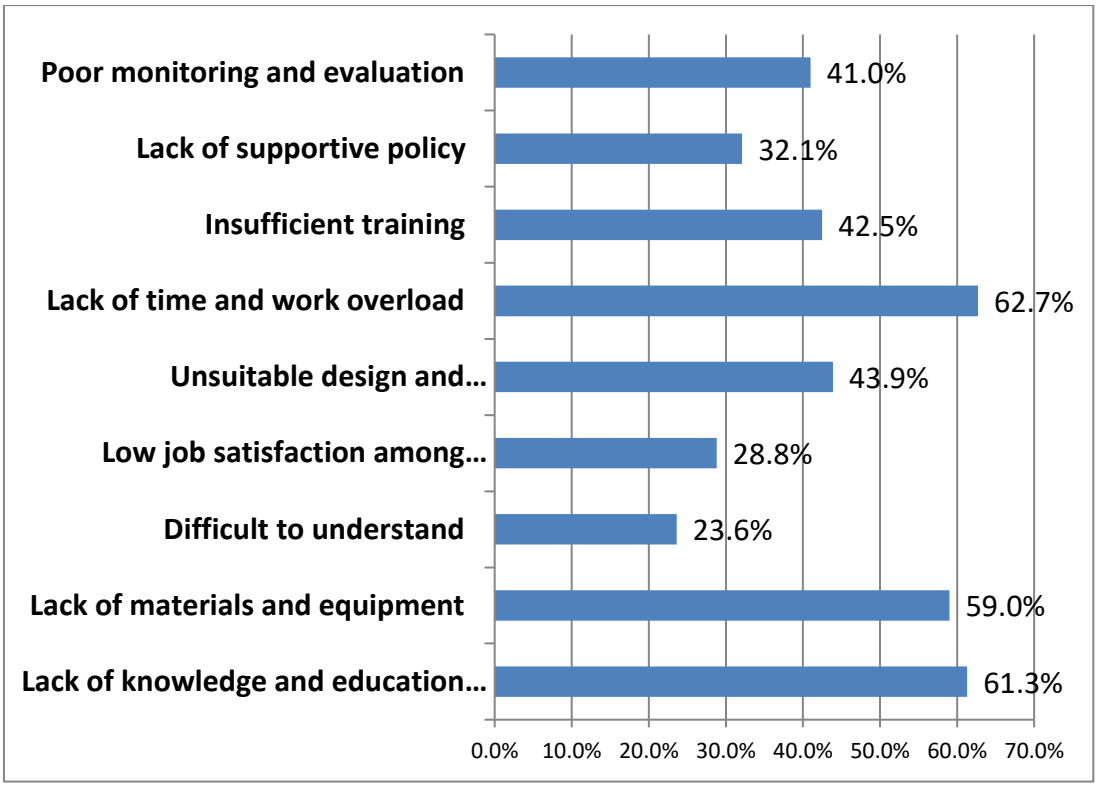


Figure (4.13) Barriers that prevent nurses from using the Palestinian IPC protocol

4.4.2 Availability of protocols and guidelines

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding the availability of protocols and guidelines.

Table (4.8-A): Results of participants answers regarding the availability of protocols and guidelines (N=212).

Question	Answer	Frequency (N)	Percentage (%)
Do you know if there is a Palestinian infection prevention and control protocol?	No	51	24.1%
	Yes	161	75.9%
	Total	212	100.0%
Do you have a copy of the Palestinian IPC protocol in your ward?	No	37	17.5%
	Don’t know	51	24.1%
	Yes	124	58.5%
	Total	212	100.0%
If no, have you access to the copy?	No	12	38.7%
	Yes	19	61.3%
	Total	31	100.0%
If Yes, are you currently applying the IPC protocols within your OR?	Never	3	2.4%
	Sometimes	41	33.1%
	Always	80	64.5%
	Total	124	100.0%
Where it is located?	present in the drawer	55	25.9%
	present on the shelf of the room where services are provided	50	23.6%
	present in the cupboard	31	14.6%
	Other places	26	12.3%
	I don't know	50	23.6%
	Total	212	100.0%

Table (4.8-B): Results of participants answers regarding the availability of protocols and guidelines (N=212).

What is the source of the protocols you have?	WHO	44	20.8%
	MOH	110	51.9%
	National	19	9.0%
	Developed by hospital	13	6.1%
	Don't know	26	12.3%
	Total	212	100.0%

The results in the table above show that most of the respondents in the study sample know that there is a Palestinian infection prevention and control protocol (about 76%), and about 59% of the respondents have a copy of the Palestinian IPC protocol in their ward and 64.5% of them are currently always applying the IPC protocols within their department. For those nurses who have not a copy of the Palestinian IPC protocol in their ward, about 51% of them have access to the copy. Finally, about 26% of the nurses answered that the copy of the Palestinian IPC protocol is located in the drawer, 23.6% present on the shelf of the room where services are provided, and also 23.6% don't know where it located is, and 14.6% present in the cupboard and about 12% are located in other places. Most of the copies of the protocols are supplied by MOH by about 52%, the second source is WHO by about 21%.

4.4.3 Availability of Materials and Equipment:

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding the Availability of Materials and Equipment.

Table (4.9-A): Results of participants answers regarding the availability of materials and equipment (N=212).

Question	Answer	Frequency (N)	Percentage (%)
The antiseptic and disinfectant materials and equipment are available in your department?	No	10	4.7%
	Don't know	8	3.8%
	Yes	194	91.5%
	Total	212	100.0%

Table (4.9-B): Results of participants answers regarding the availability of materials and equipment (N=212).

Water, soap and 70% alcohol gel are available in all patient care areas.	No	17	8.0%
	Don't know	7	3.3%
	Yes	188	88.7%
	Total	212	100.0%
Which of the Personal Protective equipment are available in your department ?	Gown	142	67.0%
	Google	30	14.2%
	Mask	183	86.3%
	Cover shoes	103	48.6%
	Head cover	124	58.5%
	Plastic gown	0	0.0%
	Gloves	205	96.7%
	Sterile gloves	0	0.0%
	N95 mask	36	17.0%
How adequate are resources such as PPE and disinfectants to support compliance with infection control protocols?	Very insufficient	6	2.8%
	Insufficient	26	12.3%
	Somewhat sufficient	40	18.9%
	Sufficient	107	50.5%
	Very sufficient	33	15.6%
	Total	212	100.0%
Sharp boxes are Available in all patient care settings?	No	15	7.1%
	Don't know	9	4.2%
	Yes	188	88.7%
	Total	212	100.0%
There is a sufficient number of sinks in accordance with the number of rooms	No	101	47.6%
	Don't know	10	4.7%
	Yes	101	47.6%
	Total	212	100.0%

The results in the table above show that the antiseptic and disinfectant materials and equipment are available in nurses' departments by 91.5%, and water, soap and 70% alcohol gel are available in-patient care areas by 88.7%.

The results show that Gloves are available in the departments by 96.7%, Mask are available by 86.3%, Gowns are available by 67%, Head cover are available by 58.5%, Cover shoes are available by 48.6%, while N95 masks are available only by 17% and Google are available only by 14.2%.

The results show that about 66% of the respondents approved the sufficiency of the resources such as PPE and disinfectants to support compliance with infection control protocols, and most of the respondents confirmed the availability of sharp boxes in all patient care settings (88.7%), while 47.6% of the respondents confirmed that there is a sufficient number of sinks in accordance with the number of rooms.

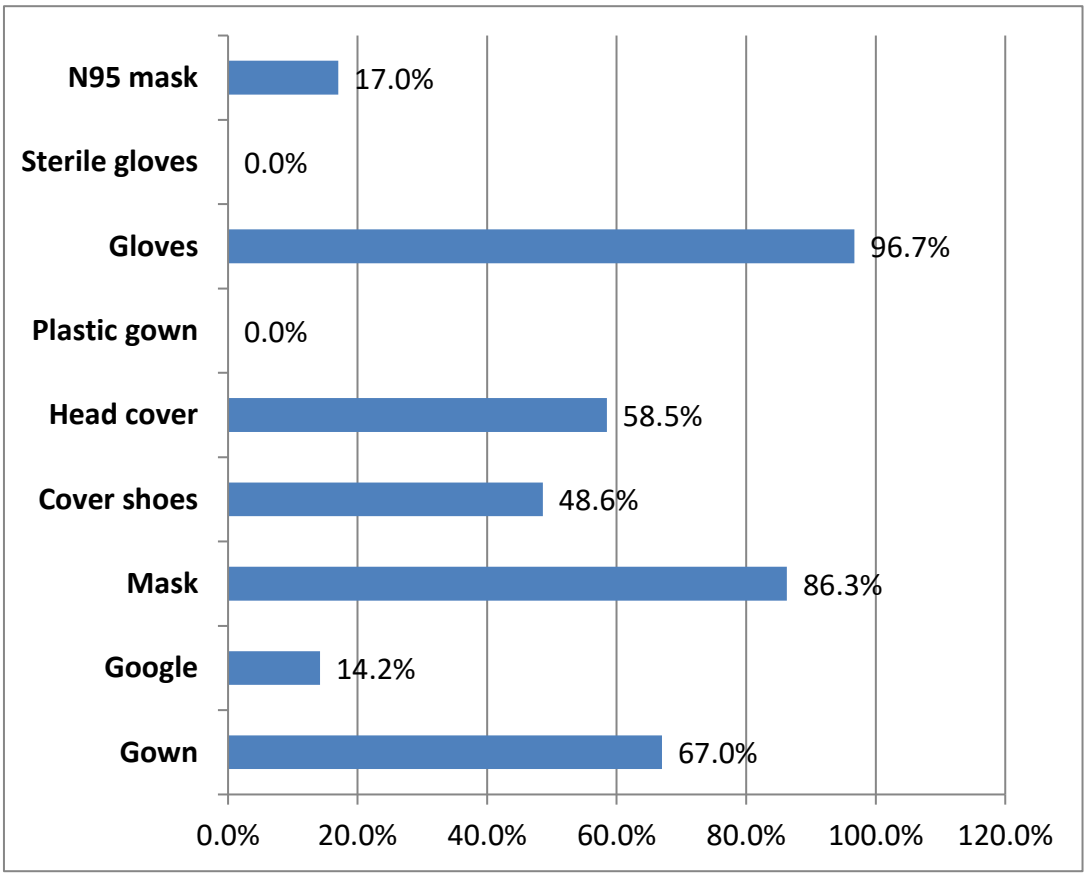


Figure (4.14) Personal Protective equipment available in the departments

4.4.4 Supportive policies:

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding the supportive policies.

Table 4.10: Results of participants answers regarding the supportive policies (N=212).

Question	Answer	Frequency (N)	Percentage (%)
Does hospital management adopt policies and regulations to support the compliance to the IPC protocols?	No	29	13.7%
	Don't know	39	18.4%
	Yes	144	67.9%
	Total	212	100.0%
The degree to which hospital management is supportive in promoting and facilitating compliance with infection prevention and control protocols?	Very Unsupportive	1	.5%
	Unsupportive	15	7.1%
	Neutral	59	27.8%
	Supportive	94	44.3%
	Very supportive	43	20.3%
	Total	212	100.0%
Is there an auditing program to ensure that policies have been implemented?	No	45	21.2%
	Don't know	50	23.6%
	Yes	117	55.2%
	Total	212	100.0%
Is infection prevention and control program included in the hospital quality assurance program?	No	20	9.4%
	Don't know	51	24.1%
	Yes	141	66.5%
	Total	212	100.0%

The results in the table above show that most of the respondents declared that the hospital management adopt policies and regulations to support the compliance to the IPC protocols (about 68%), and they also confirmed that the degree to which hospital management is supportive in promoting and facilitating compliance with infection prevention and control protocols (64.6%).

The results also show that about 55% of the respondents confirmed that there is an auditing program to ensure that policies have been implemented, and 66.5% of the respondents confirmed that the infection prevention and control program is included in the hospitals quality assurance programs.

4.4.5 Supervision, Monitoring and Evaluation:

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding the supervision, monitoring and evaluation.

Table (4.11-A): Results of participants answers regarding the supervision, monitoring and evaluation (N=212).

Question	Answer	Frequency (N)	Percentage (%)
Is there an infection control committee in your hospital as a supervisory body?	No	17	8.0%
	Don't know	29	13.7%
	Yes	166	78.3%
	Total	212	100.0%
Are designated IC practitioners/nurses available?	No	17	8.0%
	Don't know	30	14.2%
	Yes	165	77.8%
	Total	212	100.0%
Do have in use surveillance system about infection rate in your facility?	No	41	19.3%
	Don't know	95	44.8%
	Yes	76	35.8%
	Total	212	100.0%

Table (4.11-B): Results of participants answers regarding the supervision, monitoring and evaluation (N=212).

Has your facility ever carried out a follow up / supervision of your practice regarding the infection prevention implementation?	No	52	24.5%
	Don't know	29	13.7%
	Yes	131	61.8%
	Total	212	100.0%
Did you receive any feedback after your supervisor's visit regarding your IPC practices?	Not at all	56	26.4%
	Yes, verbal feedback	92	43.4%
	Yes, written feedback	64	30.2%
	Total	212	100.0%
If yes, what do you do with the feedback?	keep it in the files without discussion	33	21.2%
	Discuss it with concerned people	53	34.0%
	Use it in developing improvement strategies	67	42.9%
	No answers	2	1.3%
	Total	156	100.0%

The results in the table above show that most of the respondents declared that there are infection control committees in their hospitals as supervisory bodies (about 78%), and also about 78% of the respondents confirmed the availability of the designated IC practitioners/nurses, while about 45% of the respondents don't know if there is a surveillance system in use about infection rate in their facility. The results show that about 62% of the respondents confirmed that their facilities have ever carried out a follow up / supervision of their practices regarding the infection prevention implementation. The results also show that about 73.6% of the respondents received verbal or written feedbacks after their supervisor's visit regarding their IPC practices, and about 43% of them use these feedbacks in developing improvement strategies, and 34% of them discuss the feedbacks with concerned people.

4.4.6 Workload and Workforce:

The following table shows means, standard deviations, percentage means, t and p-values of the one sample t-test of the respondent's attitudes toward the workload and workforce.

Table 4.12: Results of participants attitudes toward the workload and workforce (N=212). *

Item	Mean	Percentage Mean	Std. Deviation	t	p-value
Lack of staff in hospital wards increases the risk of hospital acquired infections.	4.43	0.72	88.6%	28.830	0.000
Increased workload affects the IPC practices and increase HAI.	4.51	0.61	90.2%	35.922	0.000
Total Degree	4.47	0.59	89.4%	35.992	0.000

*** Test value of the one sample t-test is the neutral answer =3.**

The results in the table above show that all the p-values of the t-test are significant and higher than 0.05 level of significance and all the t-values are positive, indicating a high agreement toward the workload and workforce items. The total percentage mean is 89.4% which is very high.

The results in the table shows that the respondents are highly agree with that the lack of staff in hospital wards increases the risk of hospital acquired infections (88.6%), and also, they think that the increased workload affects the IPC practices and increase HAI (90.2%).

4.5 Physical Environmental Factors

In this section, the researcher introduces the analysis results for the Physical Environmental Factors in order to answer the related study questions and achieve the related study objectives.

The following table shows frequencies and percentages of the respondent's answers in the study sample regarding the Physical Environmental Factors (Design, Flow, and Air quality).

Table (4.13-A): Results of participants answers regarding the Physical Environmental Factors (Design, Flow, and Air quality) (N=212).

Question	Answer	Frequency (N)	Percentage (%)
Design			
Infrastructure and departmental design (water, laundry, ventilation, lighting and storage areas .....) are suitable for infection control strategies.	No	101	47.6%
	Don't know	22	10.4%
	Yes	89	42.0%
	Total	212	100.0%
In your department or hospital, there are special rooms with a negative pressure system such as isolation rooms or others.	No	112	52.8%
	Don't know	17	8.0%
	Yes	83	39.2%
	Total	212	100.0%
Flow			
The traffic flow system within the departments (operations, laundry, sterilization) is in line with the principles of infection control, one-way movement and separation of clean and sterile areas from unclean and non-sterile areas.	No	84	39.6%
	Don't know	37	17.5%
	Yes	91	42.9%
	Total	212	100.0%
Air quality			
There is a system for controlling the environmental temperature and humidity that ensures safe limits for anaesthetized patients.	No	108	50.9%
	Don't know	21	9.9%
	Yes	83	39.2%
	Total	212	100.0%

Table (4.13-B): Results of participants answers regarding the Physical Environmental Factors (Design, Flow, and Air quality) (N=212).

The air ventilation system of the department is complying to infection control standards.	No	86	40.6%
	Don't know	44	20.8%
	Yes	82	38.7%
	Total	212	100.0%

The results in the table above show that regarding the design, 47.6% of the respondents confirmed that the infrastructure and departmental design (water, laundry, ventilation, lighting and storage areas .....) are not suitable for infection control strategies while 42% of the respondents who confirmed the opposite. Also, about 53% of the respondents confirmed that in their departments or hospitals, there are no special rooms with a negative pressure system such as isolation rooms or others while about 39% of the respondents who confirmed the opposite.

Regarding Flow, the results show that about 43% of the respondents confirmed that the traffic flow system within the departments (operations, laundry, sterilization) is in line with the principles of infection control, one-way movement and separation of clean and sterile areas from unclean and non-sterile areas, while about 40% confirmed the opposite.

Regarding Air quality, the results show that about 51% of the respondents confirmed that there is no a system for controlling the environmental temperature and humidity that ensures safe limits for anaesthetized patients, while about 39% of the respondents confirmed the existence of such environmental temperature controlling system. Also, the results show that about 41% of the respondents confirmed that the air ventilation system of the department is not complying with infection control standards, while about 39% of the respondents confirmed the opposite.

4.6 Relationships between variables

In this section, the researcher exhibits the results of the analysis of the relationships between the IPC practices and Barriers as dependent variables and the Individual factors, Organizational Factors, Physical Environmental Factors as independent variables. in order to answer the related fifth, sixth and seventh study question: How does the institutional support and available resources impact nurses' compliance with infection prevention and control protocols?

How do the workload and staffing levels affect the ability of nurses to comply with infection prevention and control protocols?

What factors influence nurse compliance with the National Palestinian Infection Prevention and Control Protocol, including knowledge and attitudes?

The researcher used Pearson Correlation Coefficients to examine the relationships between

the dependent and the independent variables. Table 4.14 shows Pearson Correlation Coefficients between the IPC practices and the studied independent factors.

Table (4.14): Pearson Correlation Coefficients between the IPC practices and the studied independent factors. *

Independent variables	Pearson Correlation (r)	P-value
Individual Factors		
Total knowledge about the (IPC) protocols and the standard precautions	0.256**	0.000
Attitudes	0.450**	0.000
Training and Education	0.226**	0.001
Organizational Factors		
Availability of protocols and guidelines	0.373**	0.000
Barriers of using the Palestinian IPC protocol	-0.032	0.645
Availability of Materials and Equipment	0.364**	0.000
Supportive policies	0.393**	0.000
Supervision, Monitoring and Evaluation	0.355**	0.000
Workload and Workforce	0.027	0.700
Physical Environmental Factors		
Design	0.178**	0.009
Flow	0.152**	0.027
Air quality	0.139**	0.044

*** the correlation is significant at the 0.05 level. ** the dependent variable is the Practices.**

The results in the table above show that there are significant positive relationships between the practices and the individual factors at the 0.05 level. The results show that there is a significant positive relationship between the practices and the knowledge about the (IPC) protocols (r=0.256, P-value=0.000), also there is a significant positive relationship between the practices and the Attitudes (r=0.450, P-value=0.000), and also there is a significant positive relationship between the practices and the Training and Education (r=0.226, P-value=0.001).

The results in the table above also show that there are significant positive relationships between the practices and most of the organizational factors at the 0.05 level. The results show that there is a significant positive relationship between the practices and the Availability of protocols and guidelines (r=0.373, P-value=0.000), there is a significant positive relationship between the practices and the Availability of Materials and Equipment (r=0.364, P-value=0.000), there is a significant positive relationship between the practices and the Supportive policies (r=0.393, P-value=0.000), and also there is a significant positive relationship between the practices and the Supervision, Monitoring and Evaluation (r=0.355, P-value=0.000). On the other hand, the results show that there are no significant relationships between the practices and both the Barriers of using the Palestinian IPC protocol and the Workload and Workforce, the p-values are higher than the level of significance ($\alpha = 0.05$) with very low Pearson correlations (-0.032, 0.027).

The results in the table above also show that there are significant positive relationships between the practices and the Physical Environmental Factors at the 0.05 level. The results show that there is a significant positive relationship between the practices and the design (r=0.178, P-value=0.009), also there is a significant positive relationship between the practices and the flow (r=0.152, P-value=0.027), and also there is a significant positive relationship between the practices and the Air quality (r=0.139, P-value=0.044).

Finally, the results above lead to conclude that the increase of the following factors increase the level of nurses' practices and their compliance with the national Palestinian infection Prevention and control protocol : Individual Factors (Total knowledge about the (IPC) protocols and the standard precautions, Attitudes, Training and Education), Organizational Factors (Availability of protocols and guidelines, Availability of Materials and Equipment, Supportive policies, Supervision, Monitoring and Evaluation), and Physical Environmental Factors (Design, Flow, Air quality).

Table 4.15 shows Pearson Correlation Coefficients between the Barriers of using the Palestinian IPC protocol and the studied independent factors.

Table (4.15) Pearson Correlation Coefficients between the Barriers of using the Palestinian IPC protocol and the studied independent factors. *

Independent variables	Pearson Correlation (r)	P-value
Individual Factors		
Total knowledge about the (IPC) protocols and the standard precautions	0.337**	0.000
Attitudes	-0.080	0.248
Training and Education	-0.092	0.182
Organizational Factors		
Availability of protocols and guidelines	-0.106	0.125
Availability of Materials and Equipment	-0.091	0.188
Supportive policies	-0.273**	0.000
Supervision, Monitoring and Evaluation	-0.220**	0.001
Workload and Workforce	0.111	0.108
Physical Environmental Factors		
Design	-0.297**	0.000
Flow	-0.260**	0.000
Air quality	-0.265**	0.000

*** the correlation is significant at the 0.05 level. ** the dependent variable is the Barriers of using the Palestinian IPC protocol.**

The results in the table above show that there is a significant positive relationship only between the barriers and the knowledge about the (IPC) protocols (r=0.337, P-value=0.000). The results also show that there are no significant relationships between the barriers and both the Attitudes and the Training and Education.

The results in the table above also show that there is a significant negative relationship between the barriers and the Supportive policies (r=-0.273, P-value=0.000), and also there is a significant negative relationship between the barriers and the Supervision, Monitoring and Evaluation (r=-0.220, P-value=0.001). On the other hand, the results show that there are no significant relationships between the barriers and the Availability of protocols and guidelines, Availability of Materials and Equipment, and Workload and Workforce.

The results in the table above also show that there are significant negative relationships between the barriers and the Physical Environmental Factors at the 0.05 level. The results show that there is a significant negative relationship between the barriers and the design (r=-0.297, P-value=0.000), also there is a significant negative relationship between the barriers

and the flow (r=-0.260, P-value=0.000), and also there is a significant negative relationship between the barriers and the Air quality (r=-0.265, P-value=0.000).
Finally, the results above lead to conclude that the increase of the knowledge about the (IPC) protocols decreases nurses' barriers of using the Palestinian IPC protocol, while the increase of the following factors decrease nurses' barriers of using the Palestinian IPC protocol: Organizational Factors (Supportive policies, Supervision, Monitoring and Evaluation), and Physical Environmental Factors (Design, Flow, Air quality).

4.7 Differences in IPC practices according to the Socio-demographic variables.

In this section, the researcher exhibits the results of the analysis of the differences in IPC practices according to the Socio-demographic variables in order to answer the related eighth study question : How do demographic characteristics (Place of work (Hospital), Gender, Age, Marital status, Type of shift, Nature of the department, Employment Status, Education, Current job position, Years of experience, Exposition to any injury from used needle or sharp surgical instrument, and Vaccination for Hepatitis-B) influence nurses' compliance with infection prevention and control protocols?

The researcher used the two independent samples t-test and the one way analysis of variance test (One way ANOVA) to examine the differences in the means of the respondents' answers toward their practices due to their socio-demographic characteristics (Place of work (Hospital), Gender, Age, Marital status, Type of shift, Nature of the department, Employment Status, Education, Current job position, Years of experience, Exposition to any injury from used needle or sharp surgical instrument, and Vaccination for Hepatitis-B). Table 4.16 shows means, standard deviations, and the results of the t-test and ANOVA test of differences in IPC practices according to the socio-demographic variables.

Table (4.16A): Differences in IPC practices according to the socio-demographic variables.

Variable	Group	Count	Mean	Standard Deviation	Test value	P-value
Hospital	Hebron Governmental Hospital	113	4.37	0.45	1.524	0.196
	Yatta Governmental Hospital	39	4.40	0.52		
	Muhammad Ali Muhtasib Governmental Hospital	20	4.59	0.37		
	Dura Governmental Hospital	15	4.59	0.44		
	President Mahmoud Abbas Governmental Hospital	25	4.43	0.55		
Gender	Male	121	4.38	0.47	-1.333	0.184
	Female	91	4.47	0.47		
Age	20-29	72	4.31	0.55	2.000	0.115
	30-39	89	4.47	0.43		
	40-49	45	4.46	0.42		
	50-59	6	4.61	0.13		
Marital status	Married	165	4.45	0.44	1.723	0.090
	Single	47	4.30	0.55		
Type of shift	Morning shift	63	4.55	0.39	3.764*	0.025
	Evening shift	4	4.38	0.21		
	Mixed shift (morning, evening, night)	145	4.36	0.49		
Nature of the department	Open department	128	4.34	0.49	-2.866*	0.005
	Closed department	84	4.53	0.41		

Table (4.16B): Differences in IPC practices according to the socio-demographic variables.

Employment Status	Full-time	203	4.41	0.47	-0.594	0.553
	Part-time	9	4.51	0.49		
Education	Diploma	59	4.41	0.46	0.448	0.640
	Bachelor	131	4.41	0.45		
	Master	22	4.51	0.61		
Current job position	Director	4	4.11	0.42	5.292*	0.006
	Head nurse	39	4.62	0.30		
	Practitioner	169	4.38	0.49		
years of experience	1-9 years	105	4.39	0.50	0.317	0.813
	10-19 years	76	4.44	0.47		
	20-29 years	28	4.46	0.35		
	30 and more	3	4.52	0.15		
Exposition to any injury from used needle or sharp surgical instrument	Yes	115	4.37	0.46	-1.707	0.089
	No	97	4.48	0.47		
Vaccination for Hepatitis-B	Yes	173	4.46	0.46	2.613*	0.010
	No	39	4.24	0.48		

*** The difference is significant at 0.05 level.**

The results in the table above show that there are significant differences in the means of the respondents' answers toward their practices only due to (Type of shift, Nature of the department, Current job position, Vaccination for Hepatitis-B), the p-values are lower than the level of significance ($\alpha = 0.05$) corresponding to these variables.

The results of the post-hoc multiple comparisons (shown below) show that regarding the Type of shift variable, the mean of the respondents' practices in the Morning shift (Mean=4.55) is significantly higher than only the mean of the respondents' practices in the Mixed shift (Mean=4.36). The results of the post-hoc multiple comparisons (shown below)

also show that regarding the Current job position, the mean of the Head nurses' practices (Mean=4.62) is significantly higher than only the mean of the Practitioners practices (Mean=4.38).
The results in the table above also show that the mean of the respondents' practices in the Closed departments (Mean=4.53) is significantly higher than the mean of the respondents' practices in the Open departments (Mean=4.34). Finally, the results show that the mean of the practices of the vaccinated respondents for Hepatitis-B (Mean=4.46) is significantly higher than the mean of the practices of the unvaccinated respondents (Mean=4.24).

Table 4.17 Multiple Comparisons (Tukey Post-hoc) test of differences in IPC practices according to the Type of shift and Current job position.

Variable	(I) Type of shift	(J) Type of shift	Mean Difference (I-J)	P-value
Type of shift	Morning shift	Evening shift	0.176	0.742
		Mixed shift (morning, evening, night)	0.191*	0.018
	Evening shift	Morning shift	-0.176	0.742
		Mixed shift (morning, evening, night)	0.015	0.998
	Mixed shift (morning, evening, night)	Morning shift	-0.19*	0.018
		Evening shift	-0.015	0.998
Variable	(I) Current job position	(J) Current job position	Mean Difference (I-J)	P-value
Current job position	Director	Head nurse	-0.512	0.088
		Practitioner	-0.270	0.478
	Head nurse	Director	0.512	0.088
		Practitioner	0.242*	0.010
	Practitioner	Director	0.270	0.478
		Head nurse	-0.242*	0.010

*** The difference is significant at 0.05 level.**

4.8 Differences in Barriers of adhering IPC protocols according to the Socio-demographic variables.

In this section, the researcher exhibits the results of the analysis of the differences in Barriers of adhering IPC protocols according to the Socio-demographic variables in order to answer the related ninth study question: What are the perceived barriers to compliance with infection control protocols among nurses across different demographic and professional factors?

The researcher used the two independent samples t-test and the one way analysis of variance test (One way ANOVA) to examine the differences in the means of the respondents' answers toward the barriers that prevent them from adhering IPC protocols due to their socio-demographic characteristics (Place of work (Hospital), Gender, Age, Marital status, Type of shift, Nature of the department, Employment Status, Education, Current job position, Years of experience, Exposition to any injury from used needle or sharp surgical instrument, and Vaccination for Hepatitis-B). Table 4.18 shows means, standard deviations, and the results of the t-test and ANOVA test of differences in barriers of adhering IPC protocols practices according to the socio-demographic variables.

Table (4.18-A): Differences in barriers of adhering IPC protocols according to the socio-demographic variables.

Variable	Group	Count	Mean	Standard Deviation	Test value	P-value
Hospital	Hebron Governmental Hospital	113	46.61	29.62	1.282	0.278
	Yatta Governmental Hospital	39	42.45	27.32		

Table (4.18-B): Differences in barriers of adhering IPC protocols according to the socio-demographic variables.

	Muhammad Ali Muhtasib Governmental Hospital	20	47.78	26.02		
	Dura Governmental Hospital	15	34.07	17.04		
	President Mahmoud Abbas Governmental Hospital	25	36.44	28.78		
Gender	Male	121	42.42	29.43	-0.860	0.391
	Female	91	45.79	26.44		
Age	20-29	72	44.44	29.54	0.661	0.577
	30-39	89	42.95	27.89		
	40-49	45	42.72	26.80		
	50-59	6	59.26	27.81		
Marital status	Married	165	43.03	27.66	-0.810	0.419
	Single	47	46.81	30.02		
Type of shift	Morning shift	63	41.80	25.46	0.256	0.775
	Evening shift	4	47.22	16.67		
	Mixed shift (morning, evening, night)	145	44.67	29.59		
Nature of the department	Open department	128	42.53	27.26	-0.850	0.396
	Closed department	84	45.90	29.56		
Employment Status	Full-time	203	43.90	28.46	0.071	0.943
	Part-time	9	43.21	21.83		
Education	Diploma	59	35.03	24.31	5.068*	0.007
	Bachelor	131	46.06	28.71		
	Master	22	54.55	29.48		
Current job position	Director	4	38.89	19.25	0.433	0.649
	Head nurse	39	40.46	24.78		

Table (4.18-C): Differences in barriers of adhering IPC protocols according to the socio-demographic variables.

	Practitioner	169	44.77	29.11		
years of experience	1-9 years	105	45.40	29.28	0.904	0.440
	10-19 years	76	40.64	27.31		
	20-29 years	28	44.84	25.92		
	30 and more	3	62.96	32.08		
Exposure to any injury from used needle or sharp surgical instrument	Yes	115	47.34	31.19	2.015*	0.045
	No	97	39.75	23.62		
Vaccination for Hepatitis-B	Yes	173	43.99	27.70	0.138	0.890
	No	39	43.30	30.57		

*** The difference is significant at 0.05 level.**

The results in the table above show that there are significant differences in the means of the respondents' answers toward barriers of adhering IPC protocols only due to (Education, and Exposure to any injury from used needle or sharp surgical instrument), the p-values are lower than the level of significance ($\alpha = 0.05$) corresponding to these two variables.

The results of the post-hoc multiple comparisons (shown below) show that regarding the Education variable, the means of the barriers score for the respondents from the Bachelor education group (Mean=46.06) and from the Master education group (Mean=54.55) are significantly higher than the mean of the barriers score of the respondents from Diploma education group (Mean=35.03).

The results in the table above also show that the mean of the barriers score of the respondents' who had exposed to injury from used needle or sharp surgical instrument (Mean=47.34) is significantly higher than the mean of the barriers score of the respondents' who had not exposed to injury from used needle or sharp surgical instrument (Mean=39.75).

Table 4.19 Multiple Comparisons (Tukey Post-hoc) test of differences in IPC practices according to the Education variable.

Variable	(I) Education	(J) Education	Mean Difference (I-J)	P-value
Education	Diploma	Bachelor	-11.028*	0.031
		Master	-19.517*	0.014
	Bachelor	Diploma	11.028*	0.031
		Master	-8.489	0.379
	Master	Diploma	19.517*	0.014
		Bachelor	8.489	0.379

*** The difference is significant at 0.05 level.**

Summary

Individual factors

Knowledge

The results showed that most of the respondents in the study sample know about the standard precaution for IPC (92%), and that most of the respondents think that the standard precautions are designed for reducing the risk of transmitting microorganisms from known or unknown sources of infection, and about 68% of the respondents think that the standards designed for the care of all patients regardless of whether or not they are infected, and 57.5% of them think that the standard precautions apply to blood and all other body fluids, secretions and excretions. The results showed that the total mean of the respondents Knowledge about the standard precautions for the (IPC) protocols is about 72.5%.
The results showed that there is a very high agreement and knowledge about the (IPC) protocols. The respondents demonstrated very high knowledge degree regarding the following : initial testing for hepatitis and HIV should be done for all patients and staff, performing hand hygiene in the recommended situations can reduce patient mortality, glove use for all patients is a useful strategy for reducing risk of surgical site infection, infection prevention and control can reduce medical costs associated with HAIs, the doors to the rooms of patients with airborne diseases should always be kept closed, personal protective equipment is used in the event of an emergency.

Attitudes

The results showed that there is a very high agreement and attitudes toward the IPC protocols. The respondents demonstrated very high attitudes regarding the following : they think that the recurrent hand washing is essential to prevent hospital acquired infection, the

personal protective equipment (gloves, gown, apron and eye glasses) decrease the infection, complying with IPC protocol is very essential for infection prevention, safe and proper waste disposal decreases or prevent infection, the influence of IPC protocol on their practice is positive, and insuring the client's safety and preventing them of getting HAIs is the healthcare provider's responsibility.

Training and Education

The results showed that 58% of the respondents in the study sample declared that sometimes the hospitals provide on job or in-service training and education about IPC and only about 20% of them declared that the hospitals provide such training regularly. The results also showed that most of the respondents haven't hold professional certifications related to infection control, while most of the respondents have ever attended an education session or workshop on IPC in the last year or in the past. In addition, the results exhibited that most of the respondents feel that they need to learn more about infection prevention and control and also most of them provided that their basic education curriculum incorporates training about the IPC protocols and guidelines. Finally, most of the respondents provided that the program of orientation of new personnel on IPC was implemented in their facility.

Practices

The results showed a very high nurses' compliance with the Infection Prevention and Control (IPC) protocols.
The results showed that nurses wash their hands after any contact with blood, body fluids, secretions, and excretions, they wearing gloves when they come in contact with blood, body fluids, secretions, mucous membranes and excretions, they consistently follow protocols for disposing of sharp waste, such as needles and surgical instruments , they also make sure that medical instruments are properly sterilized before use, they wash their hands before they leave the department, they perform hand hygiene and hand washing (using soap and water or hand sanitizer) in the recommended five moments (5 moments), they properly handle contaminated equipment to prevent cross infection, and they consistently follow disposal protocols for medical waste, they clean and disinfect surfaces in patient care areas, and they don't break or bend the used needle before disposal, they wash their hands when arriving at work, they remove jewelry, watch and rings when washing hands, they don't recap the used needles before disposal, and they use personal protective equipment (gloves, mask, head cover, goggles, gown, and shoe covers) as recommended when handling patients during any procedure.

Organizational Factors

Availability of protocols and guidelines

The results showed that most of the respondents in the study sample know that there is a Palestinian infection prevention and control protocol (about 76%), and about 59% of the

respondents have a copy of the Palestinian IPC protocol in their ward and 64.5% of them are currently always applying the IPC protocols within their department. For those nurses who have not a copy of the Palestinian IPC protocol in their ward, about half of them have access to the copy. Most of the copies of the Palestinian IPC protocol are located in the drawers, on the shelf of the rooms where services are provided, or in the cupboards. Most of the copies of the protocols are supplied by MOH, and the second source is WHO.

Barriers of using the Palestinian IPC protocol.

The results showed that the highest barriers for the nurses from using the Palestinian IPC protocol are the lack of time and work overload, and the lack of knowledge and education regarding IPC, and the lack of materials and equipment. The total mean of the barriers score is about 44%.

Availability of Materials and Equipment

The results showed that the antiseptic and disinfectant materials and equipment are available in nurses' departments. And water, soap, and 70% alcohol gel are available in-patient care areas.

The results showed that Gloves are available in the departments by 96.7%, Mask are available by 86.3%, Gowns are available by 67%, Head cover are available by 58.5%, Cover shoes are available by 48.6%, while N95 masks are available only by 17% and Google are available only by 14.2%.
The results showed that about 66% of the respondents approved the sufficiency of the resources such as PPE and disinfectants to support compliance with infection control protocols, and most of the respondents confirmed the availability of sharp boxes in all patient care settings, while about half of the respondents confirmed that there is a sufficient number of sinks in accordance with the number of rooms.

Supportive policies

The results showed that most of the respondents declared that the hospital management adopt policies and regulations to support the compliance to the IPC protocols, and they also confirmed that the degree to which hospital management is supportive in promoting and facilitating compliance with infection prevention and control protocols. The results also show the respondents confirmed that there is an auditing program to ensure that policies have been implemented, and the infection prevention and control program is included in the hospitals quality assurance programs.

Supervision, Monitoring and Evaluation

The results showed that most of the respondents declared that there are infection control committees in their hospitals as supervisory bodies, and also most of the respondents confirmed the availability of the designated IC practitioners/nurses, while about 45% of the respondents don't know if there is a surveillance system in use about infection rate in their facility. Also, the respondents confirmed that their facilities have ever carried out a follow up

/ supervision of their practices regarding the infection prevention implementation. The results also show that most of the respondents received verbal or written feedbacks after their supervisor's visit regarding their IPC practices, and most of them use these feedbacks in developing improvement strategies or discuss the feedbacks with concerned people.

Workload and Workforce

The results showed a high agreement toward the workload and workforce items. And the results showed that the respondents are highly agree with that the lack of staff in hospital wards increases the risk of hospital acquired infections, and also, they think that the increased workload affects the IPC practices and increase HAI.

Physical Environmental Factors

The results showed that regarding the design, about half of the respondents confirmed that the infrastructure and departmental design (water, laundry, ventilation, lighting and storage areas .....) are not suitable for infection control strategies. Also, about half of the respondents confirmed that in their departments or hospitals, there are no special rooms with a negative pressure system such as isolation rooms or others.

Regarding Flow, the results showed that about 43% of the respondents confirmed that the traffic flow system within the departments (operations, laundry, sterilization) is in line with the principles of infection control, one-way movement and separation of clean and sterile areas from unclean and non-sterile areas.
Regarding Air quality, the results show that about half of the respondents confirmed that there is no a system for controlling the environmental temperature and humidity that ensures safe limits for anaesthetized patients. Also, the results showed that about 41% of the respondents confirmed that the air ventilation system of the department is not complying with infection control standards.

Relationships between variables

The results showed that there are significant positive relationships between the practices and the individual factors at the 0.05 level. The results showed that there is a significant positive relationship between the practices and the knowledge about the (IPC) protocols, also there is a significant positive relationship between the practices and the Attitudes, and also there is a significant positive relationship between the practices and the Training and Education.
The results showed that there are significant positive relationships between the practices and most of the organizational factors at the 0.05 level. The results showed that there is a significant positive relationship between the practices and the Availability of protocols and guidelines, there is a significant positive relationship between the practices and the Availability of Materials and Equipment, there is a significant positive relationship between the practices and the Supportive policies, and also there is a significant positive relationship between the practices and the Supervision, Monitoring and Evaluation. On the other hand, the results show that there are no significant relationships between the practices and both the Barriers of using the Palestinian IPC protocol and the Workload and Workforce.
The results also showed that there are significant positive relationships between the practices and the Physical Environmental Factors at the 0.05 level. The results showed that there is a significant positive relationship between the practices and the design, also there

is a significant positive relationship between the practices and the flow, and also there is a significant positive relationship between the practices and the Air quality.
The results exhibited that the increase of the following factors increase the level of nurses' practices and their compliance with the national Palestinian infection Prevention and control protocol : Individual Factors (Total knowledge about the (IPC) protocols and the standard precautions, Attitudes, Training and Education), Organizational Factors (Availability of protocols and guidelines, Availability of Materials and Equipment, Supportive policies, Supervision, Monitoring and Evaluation), and Physical Environmental Factors (Design, Flow, Air quality).

The results showed that there is a significant positive relationship only between the barriers and the knowledge about the (IPC) protocols. The results also showed that there are no significant relationships between the barriers and both the Attitudes and the Training and Education.
The results also showed that there is a significant negative relationship between the barriers and the Supportive policies, and also there is a significant negative relationship between the barriers and the Supervision, Monitoring and Evaluation. On the other hand, the results showed that there are no significant relationships between the barriers and the Availability of protocols and guidelines, Availability of Materials and Equipment, and Workload and Workforce.
The results also showed that there are significant negative relationships between the barriers and the Physical Environmental Factors at the 0.05 level. The results showed that there is a significant negative relationship between the barriers and the design, also there is a significant negative relationship between the barriers and the flow, and also there is a significant negative relationship between the barriers and the Air quality.
The results exhibited that the increase of the knowledge about the (IPC) protocols decreases nurses' barriers of using the Palestinian IPC protocol, while the increase of the following factors decrease nurses' barriers of using the Palestinian IPC protocol: Organizational Factors (Supportive policies, Supervision, Monitoring and Evaluation), and Physical Environmental Factors (Design, Flow, Air quality).

Differences in IPC practices according to the Socio-demographic variables.

The results showed that there are significant differences in the means of the respondents' answers toward their practices only due to (Type of shift, Nature of the department, Current job position, Vaccination for Hepatitis-B).
The results showed that regarding the Type of shift variable, the mean of the respondents' practices in the Morning shift is significantly higher than only the mean of the respondents' practices in the Mixed shift. The results also showed that regarding the Current job position, the mean of the Head nurses' practices is significantly higher than only the mean of the Practitioners practices.
The results showed that the mean of the respondents' practices in the Closed departments is significantly higher than the mean of the respondents' practices in the Open department). Finally, the results show that the mean of the practices of the vaccinated respondents for Hepatitis-B is significantly higher than the mean of the practices of the unvaccinated respondents.

Differences in Barriers of adhering IPC protocols according to the Socio-demographic variables.

The results showed that there are significant differences in the means of the respondents' answers toward barriers of adhering IPC protocols only due to (Education, and Exposure to any injury from used needle or sharp surgical instrument.

The results showed that regarding the Education variable, the means of the barriers score for the respondents from the Bachelor education group and from the Master education group are significantly higher than the mean of the barriers score of the respondents from Diploma education group.

The results also showed that the mean of the barriers score of the respondents' who had exposed to injury from used needle or sharp surgical instrument is significantly higher than the mean of the barriers score of the respondents' who had not exposed to injury from used needle or sharp surgical instrument.

Chapter Five

Discussion

5.1. Introduction

The discussion, results, and recommendations will all be covered in this chapter. The goals of the study will serve as a basis for the conclusions.

5.2 Discussion

5.2.1 Compliance:

The findings of this study highlight a remarkable level of compliance with infection prevention and control (IPC) protocols among nurses working in governmental hospitals in Hebron, with an impressive adherence rate of 88.3%. Key practices such as hand hygiene (95.8%), use of personal protective equipment (PPE) (94%), and proper disposal of medical waste (93.9%) showcase the effective implementation of the National Palestinian IPC Protocol. This high compliance not only protects healthcare workers and patients but also aligns with efforts to reduce HAIs globally. These results reflect the diligent efforts of nurses in adhering to best practices and the strong support systems in place within Hebron's hospitals.

When compared to local studies, the adherence rates in Hebron align closely with findings from other Palestinian regions. For instance, (Elmadhoun, 2015) reported a 97.12% compliance rate for hand hygiene among healthcare workers in Gaza, emphasizing the importance of routine handwashing in minimizing infection risks. The West Bank also reported high PPE adherence, with (Al-Ramahi et al., 2018) documenting similar levels of compliance, particularly during patient care involving bodily fluids. These results demonstrate consistency in IPC adherence across Palestine, highlighting the shared commitment to reducing HAIs through national protocol implementation.

Regionally, the results are comparable to findings in neighboring countries such as Jordan and Saudi Arabia. In Jordan, compliance rates for PPE use and waste disposal protocols

were reported at over 90%, underscoring the region's emphasis on occupational safety (Al-Rawajfah et al., 2013). Saudi Arabian hospitals have similarly demonstrated high compliance with hand hygiene and PPE protocols, particularly in high-risk areas like operating rooms (Alojaimy et al., 2021).These findings are indicative of a broader regional trend in prioritizing IPC measures to enhance patient and staff safety.

Globally, the compliance rates in Hebron are on par with international standards, particularly in high-income countries where IPC adherence has been rigorously enforced. For example, in the United States, initiatives such as the "Clean Hands Save Lives" campaign have significantly improved hand hygiene compliance in intensive care units, reducing MRSA transmission by nearly 40%(CDC, 2019). Similarly, European hospitals have reported strong adherence to medical waste disposal practices, with strict protocols resulting in a significant reduction in environmental contamination ((Eckelman et al., 2018).

The alignment of Hebron's compliance rates with both regional and global standards reflects the effectiveness of targeted interventions, leadership support, and regular training programs in fostering a culture of safety. However, sustaining these results requires ongoing efforts to address potential barriers, such as resource limitations and heavy workloads, which could impact adherence. By continuing to strengthen support systems and prioritize IPC education, Hebron's hospitals can maintain their high standards and serve as a model for other regions aiming to improve healthcare safety.

Several factors contribute to these impressive compliance rates. Nurses in Hebron likely benefit from a solid foundation of IPC training during their education, fostering a strong sense of responsibility and commitment to maintaining safe healthcare environments. Additionally, extrinsic factors such as clear and accessible protocols, leadership engagement, and regular monitoring have been instrumental in reinforcing adherence(Gould et al., 2017; Sadeghi-Moghaddam et al., 2015). Studies from Saudi Arabia and Jordan have similarly shown that structured guidelines and active leadership play critical roles in promoting IPC compliance (Alojaimy et al., 2021). In the United Kingdom study was conducted the findings suggested that enhancing hand hygiene practices could lead to a significant reduction in HAIs, underscoring the importance of systemic support in infection control efforts(Guest et al., 2019).Likewise, initiatives in the United States, such as the "Clean Hands Save Lives" campaign, have significantly improved hand hygiene compliance and patient safety (CDC, 2019).

Hand hygiene emerged as a cornerstone of infection prevention, with an impressive 95.8% compliance rate in this study. This aligns with findings from Gaza, where 97.12% of healthcare workers adhered to handwashing protocols after exposure to blood and bodily fluids (Elmadhoun, 2015) .Globally, studies affirm the vital role of hand hygiene in minimizing infection risks. For instance, hospitals in Saudi Arabia have reported significant reductions in cross-infections due to consistent adherence to handwashing protocols, particularly in high-risk areas like operating rooms (Alojaimy et al., 2021).

The use of PPE is another critical aspect, with a compliance rate of 94% when handling blood or bodily fluids. This mirrors results from the West Bank and Gaza, where PPE adherence is consistently prioritized (Al-Ramahi et al., 2018; Fashafsheh et al., 2015) .Globally, adherence to personal protective equipment (PPE) protocols is crucial in safeguarding healthcare workers from occupational hazards. Studies have shown that consistent use of PPE significantly reduces the risk of infection among healthcare

professionals. For instance, a study highlighted that proper use of PPE, including gowns, gloves, and masks, is effective in preventing the spread of highly infectious diseases to healthcare staff (Hersi et al., 2015) Similarly, research from the United States emphasizes the role of PPE training programs in enhancing compliance and reducing occupational risks
The study by (Howard et al., 2021) emphasizes the importance of PPE training programs in improving compliance and reducing occupational risks among healthcare workers. Proper training ensures that healthcare professionals correctly use PPE, which is vital in preventing infections and minimizing exposure to hazardous environments. The research highlights that such training not only enhances adherence to safety protocols but also helps reduce errors that could lead to infection transmission. Continuous education and refresher courses are also crucial to maintaining high compliance levels and adapting to new risks in healthcare settings.

Waste management is another area of success, with high compliance rates of 93.9% for sharp waste and 88.4% for general medical waste. This is consistent with findings from the West Bank and East Jerusalem, where strong adherence to waste disposal protocols has been observed (Khair, 2013). Effective waste management is essential for minimizing environmental contamination and infection risks. European research underscores the importance of strict waste disposal practices, showing a significant reduction in contamination rates with proper adherence (Eckelman et al., 2018). In the United States, waste management compliance programs have similarly led to notable decreases in needle-stick injuries (CDC, 2020). However, these results reflect the perceptions of those involved in the programs. To strengthen these findings, it would be valuable to incorporate observational data to provide a more accurate measure of compliance and the actual impact on infection risks, rather than relying solely on self-reported compliance or perceptions.

Sterilization and proper handling of medical equipment are crucial in preventing infections. A study conducted in Gaza Strip hospitals identified factors influencing surgeons' adherence to preventive measures against surgical site infections (SSIs), emphasizing the importance of consistent sterilization practices to reduce SSIs (Elshami et al., 2020). Additionally, the World Health Organization (WHO) has provided comprehensive guidelines on implementing evidence-based recommendations to prevent SSIs, highlighting the significance of sterilization and equipment handling in infection control (WHO, 2018). These findings underscore the necessity for strict adherence to sterilization protocols to enhance patient outcomes and minimize infection risks.
Despite these encouraging findings, challenges remain in sustaining and improving IPC compliance. Barriers such as inconsistent availability of supplies, heavy workloads, and irregular training have been identified in previous studies (Awad, 2009; Moghnieh et al., 2023). Addressing these challenges will require targeted interventions, including regular training programs, adequate resource allocation, and stronger leadership support. Simulation-based training programs, which have been shown to improve healthcare worker adherence to IPC protocols by up to 85%, could be particularly beneficial (Knobloch et al., 2019). Similarly, mentorship programs, successfully implemented in high-risk departments in U.S. hospitals, could address specific gaps and enhance compliance (CDC, 2024a).
Hebron’s impressive compliance rates align with international guidelines that emphasize the importance of IPC in reducing HAIs and protecting healthcare workers. The World Health Organization (WHO) highlights hand hygiene and PPE use as fundamental measures in achieving these goals (WHO, 2021b). By addressing identified barriers and continuing to strengthen protocols, Hebron’s healthcare institutions can sustain their high standards and

serve as a model for other regions, contributing to the global effort to reduce HAIs and improve healthcare safety.

5.2.2 Individual factors:

5.2.2.1 Knowledge:

In this study, respondents demonstrated very high knowledge levels, with an 88.7% mean agreement on IPC practices such as the importance of hand hygiene, glove use, and maintaining isolation for airborne diseases. knowledge areas included the importance of hand hygiene in reducing patient mortality (92.7%) and the benefits of initial testing for hepatitis and HIV for all patients and staff (93.3%). This is consistent with (Elmadhoun, 2015) Gaza study, which also emphasized hand hygiene as essential in reducing microbial contamination. This aligns with (Abu-Qubaita, 2023), who found similarly high knowledge levels (96.3%) among healthcare workers in infection control. Similar findings were observed by (Khalil et al., 2023), where the majority of healthcare workers (HCWs) also had moderate to high knowledge and positive attitudes toward IPC. (Fashafsheh et al., 2015) in Palestine reported that nurses had fair knowledge, particularly regarding standard precautions, Similarly, (Al-Rawajfah et al., 2013) found that Jordanian nurses showed moderate knowledge but significant gaps in areas such as proper hand hygiene and equipment use. This underscores a recurring trend in the Palestinian healthcare sector knowledge of IPC protocols is generally high.

The consistently high knowledge levels about IPC practices in the Palestinian healthcare sector, as indicated by local studies, suggest several contributing factors. First, the importance of hand hygiene and other IPC protocols may be emphasized during the education and training of healthcare workers. In countries like Palestine, where healthcare systems face significant challenges, there is likely an increased focus on infection prevention to reduce the risk of outbreaks and improve patient safety.

Additionally, the presence of rigorous educational programs, awareness campaigns, and possibly the influence of international health organizations could contribute to these high knowledge levels. Healthcare workers may also be regularly trained or updated on IPC practices, ensuring they understand the importance of these practices in maintaining a safe healthcare environment.

However, it's important to note that while knowledge levels are high, the gap in practical application, as seen in studies like those by (Fashafsheh et al., 2015) and (Al-Rawajfah et al., 2013), suggests that knowledge alone is insufficient to ensure compliance. There might be barriers such as resource limitations, workload pressure, and lack of enforcement of IPC policies that could prevent the effective implementation of these practices. Thus, while knowledge levels in IPC are generally high, ensuring that this knowledge translates into consistent practice may require additional support, such as better resources, supervision, and a stronger culture of accountability.

5.2.2.2 Attitudes:

The study findings underscore that Hebron nurses not only possess strong knowledge of IPC practices but also hold positive attitudes towards compliance, recognizing the value of IPC in safeguarding patient and provider health.

The attitudes among the respondents were also positive, with a 90% mean agreement on the importance of practices like recurrent handwashing, use of personal protective equipment (PPE), and waste disposal as preventive measures against hospital-acquired infections (HAIs). This is consistent with findings from (Abu-Qubaita, 2023), who reported high levels of positive attitudes among healthcare workers in IPC practices, reflecting an awareness of the importance of IPC for patient and provider safety. Studies in Gaza by (Kashkash, 2018) highlighted similar attitudes among healthcare providers This positive perception is crucial, as previous local and regional studies have shown that positive attitudes are closely tied to compliance with IPC practices (Al-Rawajfah et al., 2013; Khalil et al., 2023). Positive attitudes are essential, as they are often linked with higher adherence to protocols, as supported by research indicating that healthcare workers with positive attitudes are more likely to comply with IPC guidelines (Fashafsheh et al., 2015). This is supported by global research from (Bahegwa et al., 2022), which found that healthcare workers with favorable attitudes towards infection prevention and control were significantly more likely to adhere to safety protocols and guidelines, contributing to a reduction in HAIs who found high correlations between positive IPC attitudes and compliance, as well as national findings from (Abu-Rayyan, 2020) that reported similar perceptions in Palestinian healthcare settings

The positive attitudes observed in this study can be attributed to several factors. First, there may be a strong culture of safety and responsibility within the healthcare environment in Hebron, where healthcare workers recognize the direct impact of IPC practices on patient outcomes and staff well-being. The education and training provided to healthcare workers in the region might emphasize the significance of IPC, fostering a sense of duty and commitment to maintaining a safe environment. Additionally, the consistent reinforcement of IPC protocols through hospital policies and leadership support could contribute to this positive attitude. In Palestinian healthcare settings, as highlighted by(Abu-Rayyan, 2020), healthcare workers may also feel a sense of social responsibility to protect both themselves and their patients, which could further explain their positive attitudes towards IPC practices.

Furthermore, the presence of successful role models, leadership engagement, and the visible benefits of infection control on patient and staff safety likely play a role in reinforcing these positive attitudes. Nurses and healthcare workers who observe the effectiveness of IPC measures in reducing infections may feel more motivated to adhere to guidelines, seeing them as beneficial not only for patient care but also for their personal health and professional credibility.

5.2.2.3 Training and Education:

In 2009 (Awad, 2009) reported absence of a training program. In 2014, (Eljedi & Dalo, 2014) reported that only 16.9% of healthcare workers had participated in IPC training sessions. Our study found that 65.6% of respondents had attended an education session or workshop on IPC in the last year or previously, indicating a significant increase in training participation. While training participation has increased, the frequency remains inconsistent only 20% of respondents in the current study reported regular IPC training and 58% reported

that hospitals sometimes provide on-the-job or in-service training about IPC. This indicates a need for more consistent and frequent training programs to ensure all healthcare workers receive regular updates on IPC practices.

The analysis of extracted data demonstrates a clear trend of continuous improvement in IPC practices within Palestinian healthcare settings from (Awad, 2009) ,(Khair, 2013),(Eljedi & Dalo, 2014),(Al-Ramahi et al., 2018) and other local study to 2023. Significant progress has been made in areas such as knowledge and awareness, compliance rates, and the integration of IPC training into healthcare education. These improvements align with global trends in IPC enhancement, as highlighted by the WHO's core components for IPC programs(El Burai Felix et al., 2024).

In addition, the results exhibit that most of the respondents feel that they need to learn more about infection prevention and control (about 86%) These findings align with other local and regional studies. For instance, (Khair, 2013)reported that 87.1% of healthcare workers expressed a need for more infection control training, while (Elmadhoun, 2015)found that 88.7% of respondents stated they needed more training.

However, ongoing challenges persist, particularly in the areas of consistent training, professional certification, resource availability, and workload management. These challenges are not unique to Palestinian healthcare settings but reflect broader issues faced by many low- and middle-income countries in implementing comprehensive IPC programs (Moghnieh et al., 2023).

Despite the high levels of knowledge and practice regarding infection control observed in the study, the continued desire for more training suggests a gap between theoretical knowledge and practical application. Several factors contribute to this. First, the data shows that IPC training is not consistent, with only 20% of respondents reporting regular training, while 58% indicated that on-the-job or in-service training is provided sporadically. This inconsistency may lead to a lack of continuous updates to knowledge and its consistent application. Second, even with extensive knowledge, healthcare workers may face difficulties in applying IPC practices consistently due to factors such as heavy workloads and time constraints, which hinder the practical implementation of learned skills. Furthermore, the methods or distribution of training might not be suitable to the workers' needs or schedules, leading them to feel the need for additional training. There may also be cultural or organizational barriers preventing the effective implementation of practices, which may increase the demand for further training. Finally, workload stress might impede the consistent application of IPC practices, despite understanding their importance, thus increasing the need for ongoing support and regular training.

5.2.3 Organizational Factors:

5.2.3.1 Barriers of using the Palestinian IPC protocol:

Lack of Time and Work Overload: Our results indicate that 62.7% of nurses identified lack of time and work overload as major barriers to IPC adherence. Comparable findings were reported in studies from the West Bank and Gaza, which cited similar issues of high workload affecting IPC compliance(Al-Ramahi et al., 2018; Elmadhoun, 2015; Kashkash, 2018). Globally, studies, such as those by (Mukwato, 2008) also highlight that increased patient loads and inadequate staffing can compromise IPC practices, underscoring the

universal nature of this barrier. The local findings in Palestinian healthcare settings align closely with global trends

Lack of Knowledge and Education: In our study, 61.3% of nurses cited insufficient knowledge and education as a barrier. This aligns with findings from (Khair, 2013) where a significant portion of healthcare workers (50%) lacked adequate IPC training. Furthermore, research in Saudi Arabia demonstrated that gaps in knowledge directly impact compliance levels, as healthcare workers with limited IPC knowledge are less likely to adhere strictly to protocols (Alhumaid et al., 2021).These findings emphasize the need for consistent educational interventions to reinforce IPC awareness and competence among nurses.

Despite high levels of knowledge reported in the study, the fact that 61.3% of nurses cited insufficient knowledge as a barrier points to a contradiction that may stem from several factors. First, nurses might have basic knowledge but lack the practical skills or deeper understanding needed to apply IPC protocols effectively in real-world settings. The training they received may not have been comprehensive or frequent enough to reinforce the necessary competencies. Additionally, knowledge measured in surveys may not always align with the actual application of that knowledge in practice, especially if nurses face resource limitations, heavy workloads, or inconsistent support from hospital leadership. This contradiction highlights the need for more hands-on, continuous education and support to bridge the gap between theoretical knowledge and real-world implementation.

5.2.3.2 Availability of protocols and guidelines:

The research highlights challenges in the availability and accessibility of IPC guidelines within hospitals. While 76% of nurses were aware of the Palestinian IPC protocol, only 59% reported having a copy accessible in their ward, these findings are relatively better than other local previous studies. For example, in Gaza (Elmadhoun, 2015)reported significant gaps in IPC compliance due to the lack of training and visible resources in Gaza where 63% of nurses were unaware of the protocol's existence, and 84.4% indicated the absence of protocol copies in their departments. (Eljedi & Dalo, 2014) highlighted that inadequate distribution and visibility of IPC materials, just 2.3% of respondents had a copy of the IPC Protocol, while 65.8% did not know of its existence. Similarly, (Awad, 2009)study found that 73% of respondents did not know about the IPC protocol, which was linked to inadequate training and infrequent updates. In the West Bank, (Al-Ramahi et al., 2018). in the West Bank highlighted that the lack of a clear, standardized Palestinian IPC protocol and insufficient educational programs hindered compliance among healthcare workers. In our study, the results are relatively better than those of other previous studies regarding the national protocol for infection control. This may be due to the Ministry of Health's increased focus on infection control protocols in terms of developing and standardizing protocols and training, especially after the COVID-19 pandemic. Increased awareness and availability of IPC resources during and after COVID-19 likely contributed to better adherence, as the pandemic underscored the importance of infection control measures. Studies such as those by (Hughes et al., 2020) and (Tomczyk et al., 2021)**.** emphasized that global health crises often serve as catalysts for improving protocol availability, visibility, and staff engagement through targeted education and systematic updates. Similar improvements were seen locally as the Ministry of Health expanded its efforts to prioritize IPC training and ensure consistent access to protocols following the pandemic.

These regional findings are consistent with global studies, such as those by (Al-Ramahi et al., 2018; Elmadhoun, 2015), which emphasized that the accessibility of protocols, continuous education, and supportive management significantly enhance adherence to IPC guidelines. The evidence suggests that while awareness of the protocol in Hebron is relatively high compared to previous local studies, the issues of availability, visibility, and the need for continuous training reflect broader trends seen in both Palestinian and international contexts. This highlights a contradiction between the high awareness reported in the study and the challenges related to protocol accessibility and consistent training, indicating a necessity for systematic improvements in IPC resource distribution and staff education. These contradictions suggest that while nurses in Hebron are aware of IPC practices, the infrastructure and continuous educational support needed to apply these protocols effectively may still be lacking.

5.2.3.3 Availability of Materials and Equipment:

Our study's findings reveal a generally high availability of basic antiseptic and disinfectant materials in nurse departments (91.5%) and patient care areas, with essential resources like water, soap, and 70% alcohol gel available in 88.7% of these areas. Gloves are widely accessible (96.7%), along with standard masks (86.3%) and gowns (67%), which facilitates adherence to basic IPC practices. However, critical protective items like N95 masks and goggles are significantly less available, reported only at 17% and 14.2%, respectively. These gaps in essential resources align with challenges documented in similar studies across other regions, demonstrating how resource availability directly impacts infection control compliance. For instance, studies in the Palestinian healthcare context, such as (Elmadhoun, 2015) in Gaza, report comparable issues with PPE shortages, especially for specialized equipment like N95 masks and goggles. (Eljedi & Dalo, 2014) observed that these limitations not only hindered IPC compliance but also heightened the perceived risk among healthcare workers. Limited PPE and inadequate access to necessary protective gear are noted as ongoing barriers, contributing to non-compliance and potentially compromising both patient and provider safety in healthcare settings.

Globally, insufficient PPE availability is a significant barrier to IPC adherence. For example, (Bahegwa et al., 2022). in Tanzania identified similar resource limitations, with reduced access to critical protective equipment leading to heightened infection risks and anxiety among healthcare staff. This situation mirrors findings in our study, where 66% of respondents noted that available resources like PPE and disinfectants were generally sufficient to support IPC compliance, but specific resources such as an adequate supply of sinks, present only in 47.6% of facilities were lacking.

These findings underscore the need for improved resource management and equitable access to PPE across healthcare settings to facilitate compliance with IPC protocols. The global parallels indicate that enhanced PPE provision could significantly reduce barriers to effective IPC adherence, ensuring both healthcare worker safety and better infection prevention outcomes.

To address these shortages effectively, we need to focus on smart resource planning and fair distribution. One practical solution is to create a centralized system for purchasing and distributing essential PPE, like N95 masks and goggles, so that every healthcare facility has access to what they need. Regularly assessing the needs of individual departments can also help identify shortages early and ensure timely solutions. Additionally, investing in better

supply chains and offering training on the best ways to use available PPE can empower healthcare workers to follow infection prevention protocols more easily.

The global challenges with PPE shortages remind us of the critical role resource availability plays in infection control. Ensuring a steady, reliable supply of PPE and other vital resources can remove barriers, protect healthcare workers and patients, and improve overall safety in hospitals. These steps are particularly important in places like Hebron, where careful planning and equitable resource allocation could make a big difference in supporting healthcare workers and enhancing adherence to infection control protocols, ultimately creating safer environments for everyone involved.

5.2.3.4 Supportive policies:

Supportive Policies: In (Elmadhoun, 2015) study, significant obstacles to using infection prevention and control (IPC) protocols were identified, with 78.4% of respondents citing insufficient training and 62.7% pointing to a lack of supportive policy. Only 39.6% felt that management policies supported infection control practices, 46.1% reported the absence of an infection control committee, and 72.1% had never been assessed for IPC compliance. In contrast, our study in Hebron Governorate hospitals showed improvements, with 68% of respondents acknowledging management's adoption of supportive policies and 64.6% confirming management's role in promoting compliance. Additionally, 55% reported the presence of an auditing program, and 66.5% noted the inclusion of IPC in quality assurance programs. These findings suggest a positive trajectory in policy support and auditing mechanisms compared to (Elmadhoun, 2015)findings, highlighting the importance of continuous auditing and accountability to ensure consistent IPC protocol application (Griffiths, 2008).This improvement aligns with regional trends, such as in Saudi Arabia, where systematic audits and training have enhanced compliance (Alojaimy et al., 2021). Globally, the integration of policy, education, and enforcement remains crucial for effective IPC strategies. Although the study shows improvements in supportive policies and auditing mechanisms in Hebron, the data also reveals a contradiction in some areas. For instance, 40% of respondents in Hebron reported that management's policies did not fully support IPC practices, and 45% did not agree that management promoted compliance. Moreover, 1/3 of respondents reported that the presence of auditing programs or quality assurance initiatives did not meet their expectations. This indicates that, while there has been progress compared to previous studies, a significant portion of healthcare workers still feel that supportive policies and auditing mechanisms are not fully effective, suggesting the need for ongoing improvements in policy enforcement and consistency.

5.2.3.5 Supervision, Monitoring and Evaluation:

The study found that a significant proportion of respondents (78%) reported the presence of infection control committees and designated infection control practitioners or nurses in their hospitals. However, 45% were unaware of an infection surveillance system, highlighting a gap in awareness and communication regarding infection monitoring. While 62% confirmed that follow-ups or supervision of IPC practices were conducted, 73.6% received feedback, with 43% using it to improve practices and 34% engaging in discussions with relevant stakeholders. When compared to (Elmadhoun, 2015)study in Gaza, which revealed barriers such as inadequate training (78.4%) and lack of supportive policies (62.7%), our findings demonstrate improvements in structural support and feedback mechanisms in Hebron’s hospitals. The presence of infection control committees in our study (78%) is notably higher

than the 46.1% reported by (Elmadhoun, 2015), signaling positive progress in organizational support for IPC. Our findings align with regional trends, such as those in Saudi Arabia, where audits and targeted training improved IPC compliance(Alojaimy et al., 2021). Globally, studies emphasize the importance of continuous monitoring, feedback, and education for improving IPC compliance (Koota et al., 2024; Tomczyk et al., 2021). Despite these improvements, resource disparities and training gaps remain challenges, similar to global findings. Therefore, addressing these issues through targeted solutions such as improve the depth and specificity of feedback mechanisms, ensuring that feedback is clear, actionable, and provides guidance on specific areas for improvement rather than being overly general. Institutions should consider employing more targeted feedback forms that focus on particular aspects of IPC practices, thereby fostering continuous improvement. Additionally, addressing concerns about insufficient training, particularly in resource-limited facilities, is crucial for bridging knowledge and skill gaps. A strategic emphasis on training, including the development of cost-effective online platforms or mobile learning modules, can ensure widespread access to education. Alongside feedback, the effectiveness of supervisory practices must be critically reviewed, incorporating not only assessments but also hands-on guidance and mentoring to improve compliance rates. Supervisors themselves could benefit from specific training on delivering effective feedback that translates into tangible improvements in practice. To address gaps in surveillance system awareness, hospitals should implement clear communication channels to ensure that staff are consistently informed about monitoring systems, including infection rate surveillance and response protocols. Regular updates or workshops can serve as a practical solution to engage staff and reinforce the importance of these systems. Finally, fostering collaboration between infection control teams and other hospital departments is vital to ensure that feedback is appropriately utilized. A collaborative framework, where feedback is shared, discussed, and acted upon by interdisciplinary teams, would enhance the overall effectiveness of IPC programs, ensuring comprehensive and sustainable improvements across the institution.

5.2.3.6 Workload and Workforce:

Our study highlights the critical role that workforce and physical environment factors play in infection prevention and control (IPC) within healthcare settings. A high consensus among healthcare professionals, with an 89.4% total mean agreement, underscores the significant influence of workload and staffing levels on IPC compliance. These results align closely with both local and international studies, reinforcing the importance of adequate staffing and suitable infrastructure in mitigating hospital-acquired infections (HAIs).Locally, the alignment with studies from Palestinian hospitals, such as study by (Al-Ramahi et al., 2018; Eljedi & Dalo, 2014) supports the notion that understaffing and high workloads hinder effective IPC practices, and other local study, particularly those from Gaza by (Elmadhoun, 2015; Khadoura, 2013), underline the need for improved staffing ratios and manageable workloads. similar conclusions are observed in research from neighboring countries like Saudi Arabia, which emphasize the strain that high patient loads place on IPC adherence (Alhumaid et al., 2021). Globally, the study's findings resonate with a broader consensus that adequate staffing is a cornerstone of effective IPC. International research, such as that by (Tomczyk et al., 2021) shows that low-resource settings face significant IPC challenges due to staffing shortages, while even high-resource settings struggle with workforce management, leading to increased infection risks. This global perspective underscores the universal applicability of the study's findings, demonstrating that the balance of staffing and workload is a pivotal factor in IPC, regardless of geographical and resource-based differences.

5.2.4 Physical Environmental Factors:

The study results reveal significant organizational and physical environmental barriers that nurses face in adhering to the National Palestinian Infection Prevention and Control Protocol within governmental hospitals in Hebron. These barriers are consistent with findings from local, regional, and global studies. Key barriers include inadequate infrastructure, with 47.6% of respondents identifying deficiencies in facilities such as water supply, ventilation, and storage. This aligns with(Elmadhoun, 2015), who reported similar challenges in Palestinian hospitals. Additionally, 53% noted the lack of specialized isolation rooms, a barrier also highlighted by (Eljedi & Dalo, 2014) in Gaza and by global studies (Raoofi et al., 2023; Tomczyk et al., 2021) , which underscore the need for such spaces to control airborne infections. Traffic flow systems were inconsistently reported, with 43% affirming compliance with infection control principles and 40% indicating the opposite, echoing local concerns from (Awad, 2009)and international observations by (Tomczyk et al., 2021)regarding inadequate department layouts. Air quality and ventilation were also problematic, with 51% citing the absence of temperature and humidity control systems, issues similarly found by (Khadoura, 2013)in Palestinian hospitals and globally by (Raoofi et al., 2023). Furthermore, 41% of respondents reported non-compliance of ventilation systems with infection control standards, in line with global research by (van Buijtene & Foster, 2019) , who emphasized the importance of effective air management. These comparisons with prior studies reinforce the current findings, reflecting common themes of substandard infrastructure and environmental controls that impede adherence to infection prevention protocols, both locally and globally. Resource constraints remain a critical challenge, emphasizing the need for improved facilities to support infection control efforts in low-resource settings. This highlights the necessity for continuous improvements in infrastructure and environment to enhance compliance with infection prevention and control measures. To overcome these barriers, we need to prioritize continuous improvements in infrastructure. Targeted investments in facility upgrades and better resource allocation can empower healthcare workers to follow infection prevention measures more effectively. By addressing these shortcomings, Hebron's governmental hospitals can create safer environments for both patients and staff, ultimately improving care quality and saving lives.

5.2.5 Relationships between variables:

5.2.5.1. Individual Factors and Compliance with IPC Protocols:

Knowledge, Attitudes, and Education/Training**:** our study indicates a significant positive relationship between individual factors such as knowledge about IPC protocols, attitudes, and training and nurses' compliance with IPC practices. This aligns with studies by (Kashkash, 2018), who identified inadequate knowledge (55.84%) and limited training access as major compliance barriers. Likewise,(Al-Ramahi et al., 2018). noted that the lack of knowledge and training was a key barrier to compliance. (Awad, 2009)further highlighted that the nurses lacked awareness of the Palestinian IPC protocols, suggesting that knowledge remains a critical barrier across studies in Palestine. These findings also resonate with broader literature. (Alhumaid et al., 2021)demonstrated that education and awareness programs are vital for improving IPC compliance globally, indicating that enhancing nurses'

knowledge and attitudes is universally recognized as essential. (Jemal et al., 2020)found a similar correlation between education and IPC compliance in Ethiopia, suggesting that bolstering individual knowledge and attitudes is crucial regardless of the setting.

5.2.5.2 Organizational Factors and IPC Compliance:

Availability of Resources and Supportive Policies: In our study, organizational factors such as the availability of protocols, materials, supportive policies, and monitoring were positively correlated with IPC compliance. Similar to (Elmadhoun, 2015), reported that the lack of IPC protocol copies in operating rooms was a major barrier. Additionally, (Al-Ramahi et al., 2018)identified the absence of supportive policies and inadequate organizational support as major barriers to IPC compliance.

Workload and Workforce: Our findings, revealed that there was no significant relationship between IPC compliance and workload or workforce levels. This result stands out, as many studies have highlighted the critical role that staffing and workload play in ensuring adherence to infection control protocols. For instance, (Shuldham et al., 2009) found only a weak connection between higher patient-to-nurse ratios and most outcomes related to IPC compliance, which somewhat aligns with our findings.

This difference could be explained by unique cultural and organizational dynamics within Hebron's healthcare system. It is possible that strong organizational support, effective teamwork, and the intrinsic motivation of healthcare workers help to offset the challenges posed by heavy workloads or limited staff. Additionally, cultural values that emphasize collective responsibility and mutual support might contribute to maintaining compliance, even when resources are stretched thin. Exploring these dynamics further could provide valuable insights into how Hebron's healthcare system supports IPC adherence despite resource constraints.

Our study's results suggest that other factors, such as individual knowledge, attitudes, and organizational support, play a more crucial role in influencing IPC compliance. By focusing on continuous education, fostering a positive workplace culture, and ensuring effective supervision, hospitals can make meaningful improvements. Moreover, the role of leadership and interprofessional collaboration in alleviating workload-related stress deserves attention, as these elements could be key to sustaining high compliance levels.

Future research should aim to uncover the specific factors that enable high IPC compliance in Hebron despite the challenges of workload. This might involve speaking directly with nurses to understand their experiences, as well as conducting comparative studies across different healthcare systems. Gaining a deeper understanding of how organizational culture, support mechanisms, and resource availability intersect can help design practical strategies to enhance infection prevention practices, both in Hebron and in other low-resource settings.

5.2.5.3. Physical Environmental Factors and IPC Compliance:

Impact of Design, Flow, and Air Quality**:** our study found significant positive relationships between environmental factors, including design, patient flow, and air quality, and IPC compliance. This is compatible with findings by (Khadoura, 2013)who highlighted the importance of environmental factors in Gaza's ICU settings. Similarly, (Kashkash, 2018)recommended environmental improvements to enhance compliance, specifically in

specialized units like hemodialysis, where infection control demands are higher. Globally, studies support your findings that environmental factors impact IPC compliance. For instance, the systematic review by (Raoofi et al., 2023)underscored the role of environmental conditions in reducing HAIs, linking facility design and ventilation with better IPC outcomes.

5.2.5.4 Barriers to IPC Protocol Compliance:

Knowledge and Organizational Barriers: our results indicate a significant positive correlation between barriers and limited knowledge of IPC protocols. Prior studies by (Awad, 2009; Elmadhoun, 2015)report similar findings, where insufficient knowledge was a major barrier. Additionally, lack of supportive policies, identified in our study as negatively correlated with barriers, was similarly highlighted by(Al-Ramahi et al., 2018) who recommended institutional support to address these gaps.

Contrasts on Policy and Supervision: While our study associates supportive policies and monitoring with reduced barriers, some global studies indicate that policies alone are not always effective without consistent enforcement. For example, (Efstathiou et al., 2011) found that policies without active supervision failed to improve compliance. This suggests that policy effectiveness may vary based on supervisory rigor, an area for potential future research.

In summary, our study highlights that individual, organizational, and environmental factors significantly influence nurses' compliance with the IPC protocol in Palestinian hospitals. These findings align well with regional studies, which similarly emphasize the importance of training, resource availability, and environmental design in enhancing compliance. The variation in findings concerning workload suggests an area for further exploration, particularly in understanding how institutional structures in Palestine may affect IPC compliance differently from global contexts.

5.2.6 Differences in IPC practices according to the Socio-demographic variables:

5.2.6 .1 Type of Shift and IPC Compliance:

In this study, nurses on the morning shift were found to exhibit notably better adherence to IPC protocols than their colleagues on mixed shifts. While previous research within Palestinian healthcare settings has often focused on knowledge, training, and policy-related factors, this study offers a novel insight by investigating the specific influence of shift types on IPC compliance. Our results align with broader literature that underscores how work conditions, particularly shift patterns, can impact adherence to healthcare guidelines. This finding is consistent with research by (Alshagrawi & Alhodaithy, 2024), which explored the effects of work hours and time-off on hospital workers' compliance with rules, highlighting that the structure of shifts can indeed have significant implications for protocol adherence.

The influence of shift types on IPC practices suggests that healthcare institutions may need to optimize shift schedules to improve compliance. One possible strategy could involve enhancing support and resources during mixed shifts, where compliance was found to be lower. Furthermore, reorganizing shift structures to balance workloads and minimize fatigue

could help boost adherence to IPC guidelines (Alshagrawi & Alhodaithy, 2024; Dai et al., 2015)

Shift work, particularly night shifts, has been linked to increased fatigue, which can impair focus and decision-making abilities, raising the risk of mistakes and overlooked IPC practices (Bahegwa et al., 2022).This could explain the lower compliance observed during mixed shifts, as these shifts may lead to more irregular work hours and potential disruptions in nurses' sleep patterns. However, further research should explore whether other moderating factors, such as work environment, staff morale, or workload intensity, contribute to the observed trends.

Additional insights could be gained by integrating staff feedback or examining indirect indicators of fatigue and compliance, such as error rates, absenteeism, and performance evaluations. Nurses' subjective experiences regarding their shifts could provide valuable context to better understand the underlying reasons for compliance variations across different shifts. Studies have shown that feedback on work conditions and shift satisfaction often correlates with improved adherence to safety protocols (Shi et al., 2023). Therefore, involving nurses in discussions about shift patterns may offer practical solutions to enhance compliance across all shift types.

By addressing both the physical and psychological impacts of shift work, healthcare organizations can create a more supportive and effective environment for IPC adherence, ultimately improving patient safety and outcomes.

5.2.6 .2 Departmental Nature and IPC Compliance:

The study showed that closed departments, such as Intensive Care Units (ICUs), had significantly better compliance with IPC protocols compared to open departments. This is consistent with (Mohamad et al., 2022) who reported in his study that the Closed departments, such as intensive care units (ICUs) and operating rooms, typically exhibit higher IPC compliance rates than open departments due to stricter protocols and more controlled environments and the structured nature of closed departments enables more consistent monitoring and enforcement of IPC practices, including regular audits and feedback systems. In contrast, open departments like emergency rooms encounter challenges such as high patient turnover and increased foot traffic, complicating adherence to IPC standards.

5.2.6 .3 Current Job Position and IPC Compliance:

Head nurses displayed significantly higher compliance compared to practitioners, a trend consistent with findings from (Alhumaid et al., 2021),who highlighted that supervisory roles often come with additional training and a heightened sense of accountability. This supervisory responsibility likely contributes to increased adherence, as head nurses play a critical role in setting standards and monitoring IPC practices among their teams. Some studies suggest that practitioners may face barriers such as insufficient training or unclear guidelines, which impact compliance ((Kashkash, 2018).

5.2.6 .4 Impact of Hepatitis-B Vaccination on Compliance:

The study found that nurses vaccinated against Hepatitis-B exhibited significantly higher IPC compliance compared to those unvaccinated. This aligns with research indicating that immunization status positively influences compliance, reflecting a broader awareness and commitment to infection control measures. Local studies, such as those by (Al-Ramahi et al., 2018), emphasize that vaccination campaigns, coupled with IPC education, are effective in fostering a culture of safety among healthcare workers. This suggests that vaccination status can be an indicator of broader engagement with IPC protocols, underscoring the importance of comprehensive immunization and awareness campaigns. However, this finding is puzzling, as all nurses should ideally be vaccinated. The discrepancy may point to lapses in the enforcement of vaccination policies or reluctance among some nurses to receive the vaccine due to personal beliefs or misinformation. Despite vaccination campaigns, some nurses might remain unvaccinated, which could negatively impact overall IPC compliance. The correlation between vaccination status and higher compliance suggests that those who are vaccinated are more likely to engage with IPC practices, highlighting the need for ensuring all healthcare workers are vaccinated and continuously educated on the importance of vaccination in infection control.

5.2.7 Differences in Barriers of adhering IPC protocols according to the Socio-demographic variables:

In this section of our study, analyze differences in the perceived barriers to adhering to Infection Prevention and Control (IPC) protocols across various socio-demographic variables. The findings suggest that education level and exposure to needle or sharp instrument injuries are significant factors affecting the perceived barriers to compliance with IPC protocols among nurses.

5.2.7.1 Education and Barriers to IPC Compliance:

This study reveals significant differences in compliance with IPC protocols based on educational levels, where nurses with Bachelor's and Master's degrees reported higher perceived barriers than those with Diplomas. This suggests that higher education might correlate with greater awareness of protocol complexities, a notion supported by global studies such as (Alhumaid et al., 2021)and local studies like (Elmadhoun, 2015).These studies collectively indicate that while education heightens awareness, it does not necessarily translate into compliance without adequate institutional support. (Al-Ramahi et al., 2018)similarly highlight the absence of standardized protocols and stress the need for clear guidelines, which aligns with the findings that even highly educated nurses face systemic barriers. Furthermore, (Tomczyk et al., 2021)emphasize the necessity of systemic support, including clear, accessible guidelines, for compliance in low-resource settings, reinforcing the idea that institutional backing is crucial regardless of educational level. (Hughes et al., 2020)also discuss the importance of organizational and management support in infection prevention, noting that educational level alone is insufficient without supportive policies. Overall, these insights from both local and global research underscore that while higher education can lead to increased awareness of IPC challenges, it does not automatically result in better compliance, highlighting the essential role of institutional support, clear guidelines, and systemic improvements across all educational levels.

5.2.7.2 Exposure to Needle or Sharp Instrument Injuries and IPC Compliance:

The study revealed that respondents exposed to injuries from used needles or sharp surgical instruments had a significantly high compared to those not exposed. This suggests a direct relationship between occupational injuries and increased perceived barriers to compliance with infection prevention and control (IPC) protocols.
This finding is consistent with previous local studies. For example, (Kashkash, 2018)found that 55.8% of healthcare providers in Gaza's hemodialysis units reported injuries from needle or sharp instruments, highlighting this as a significant barrier to IPC compliance. Similarly, (Eljedi & Dalo, 2014) noted that lack of training and awareness, compounded by exposure to such injuries, increased the perceived challenges in adhering to IPC protocols in Palestinian pediatric hospitals. (Khair, 2013)also reported that in Palestinian NICUs, sharp injuries were common due to inadequate staffing and training, indicating that these injuries not only impact compliance but also highlight systemic issues within healthcare settings. Globally, needlestick and sharp injuries are recognized as significant occupational hazards that impede compliance with IPC protocols. (Alhumaid et al., 2021)emphasized the critical need for proper training and protective equipment to reduce these injuries, thereby improving compliance. Additionally, (Raoofi et al., 2023)underscored the role of organizational support in mitigating the risks associated with sharp injuries, suggesting that comprehensive strategies are necessary to address these challenges effectively.

The study aligns with both local and global findings that emphasize the importance of addressing occupational hazards as part of comprehensive IPC strategies. By focusing on training, protective measures, and organizational support, healthcare facilities can reduce barriers and enhance compliance, ultimately improving patient safety and care quality.

The association between exposure to needle or sharp instrument injuries and increased barriers highlights the need for targeted interventions. Implementing comprehensive training programs, ensuring the availability of protective equipment, and fostering a supportive organizational culture are essential steps to enhance compliance with IPC protocols.

5.3 Recommendations

Based on the study results and identified barriers, the following tailored and actionable recommendations are proposed:

- Healthcare policymakers play a crucial role in strengthening Infection Prevention and Control (IPC) measures by establishing clear regulatory frameworks, ensuring adequate resource allocation, and enforcing compliance across healthcare facilities. Governments and health ministries should develop national IPC policies that mandate regular staff training, ensure equitable distribution of essential protective equipment, and incorporate infection control protocols into licensing and accreditation standards. Additionally, implementing incentive-based programs can encourage adherence, while continuous monitoring systems should be mandated to track IPC compliance and infection rates. Strengthening legal and financial support for healthcare institutions, particularly in low-resource settings, will further enable sustainable improvements in infection control practices, ultimately safeguarding public health and reducing the burden of healthcare-associated infections.
- Improving infection prevention and control (IPC) starts with enhancing knowledge and education. Regular training sessions tailored to different groups, such as nurses working night or mixed shifts, can help address specific compliance issues. Workshops for nurses handling emergencies should focus on quickly and effectively following IPC protocols under pressure. Occupational safety training should also be a priority, with courses on handling incidents like needle-stick injuries to improve response and reduce anxiety. Psychological support sessions can further help nurses manage workplace injuries and build confidence. Additionally, incorporating IPC protocols into nursing education at both undergraduate and postgraduate levels ensures that future healthcare workers are well-prepared.
- Encouraging good practices and positive attitudes is equally important. Recognizing and rewarding nurses who consistently follow IPC protocols can reinforce compliance. Peer-monitoring systems, where nurses support each other in maintaining high standards and sharing best practices, can also be beneficial. Regular feedback based on audits and performance reviews should focus on constructive improvements rather than punishment, creating a supportive environment for adherence.
- Having the right resources in place and distributing them fairly is critical. A system should be developed to allocate supplies efficiently, prioritizing high-risk departments. Tracking resource usage can help detect shortages early and ensure timely redistribution. Partnering with local suppliers can keep essential IPC materials like gloves, gowns, masks, and disinfectants in steady supply. Building buffer stocks of critical resources can prevent shortages during emergencies. Expanding PPE inventory particularly for items like N95 masks, shoe covers, and goggles will further support high-risk procedures.
- Optimizing the physical environment can also make a big difference. Open wards should be redesigned with partitions or barriers to reduce cross-infection. Creating separate areas for clean and contaminated equipment can help minimize environmental contamination risks. Upgrading ventilation systems to meet global infection control standards will ensure proper air exchange, temperature regulation, and humidity control. Infrastructure improvements should include more isolation rooms with negative pressure systems and enough sinks to meet infection control requirements.
- Managing workloads and ensuring a balanced workforce are essential for effective IPC. Flexible shift planning can reduce stress, helping nurses maintain IPC practices. Increasing staff numbers will ease workloads, allowing nurses to focus better on infection control. Work-life balance programs, including stress management workshops and mental health

support, should be available to prevent burnout and help nurses cope with job-related challenges.

- Monitoring and evaluation systems help sustain long-term IPC improvements. Oversight committees should regularly assess compliance, identify gaps, and provide actionable feedback. Specific tools should track nurses' adherence to IPC protocols, linking performance evaluations to infection control standards. Surveillance systems can monitor infection rates and compliance, using the data to refine strategies and make evidence-based improvements.
- To address barriers and maintain sustainable IPC practices, streamlining workflows can help reduce the time nurses spend on non-essential tasks, enabling better compliance. On-demand training modules should be accessible, particularly for nurses with lower educational backgrounds, to fill knowledge gaps. Making IPC materials easily available within departments will further support adherence.
- A long-term commitment to infection control is essential. Strengthening hospital policies should reinforce management's role in ensuring strict IPC compliance through regular audits and a visible commitment to infection prevention. Psychological support should also be available, offering counseling and debriefing sessions for staff exposed to occupational hazards. These measures will help create a safer and more supportive work environment, ultimately protecting both healthcare workers and patients while fostering a culture of continuous improvement in infection control.
- Future research should focus on evaluating the long-term impact of specific interventions, such as the effectiveness of structured training programs and the availability of critical IPC resources in low-resource settings. Additionally, observational studies and qualitative research could be particularly useful in exploring the barriers faced by healthcare workers in such settings and understanding their experiences and perceptions in-depth. These types of studies could provide valuable insights into the practical challenge's healthcare workers face in adhering to IPC protocols. Further studies can also investigate how to address these barriers, ensuring more effective implementation of IPC practices. The findings from this study can inform policy changes and practical interventions, driving improvements in IPC practices and the overall quality of care in healthcare facilities. By strengthening these areas, healthcare systems can further enhance their response to emerging infection control challenges and improve public health outcomes.

  By implementing these tailored recommendations, healthcare facilities can improve compliance with IPC protocols, address specific barriers, and enhance the overall quality of care while protecting both patients and healthcare workers.

5.4 Conclusion

This study assessed nurses' adherence to the National Palestinian Infection Prevention and Control (IPC) Protocol in governmental hospitals in Hebron Governorate. The results indicate a high overall compliance rate of 88.3%, suggesting a strong commitment among nurses to follow IPC practices, including hand hygiene, the use of personal protective equipment (PPE), and proper waste disposal. This high compliance reflects the effectiveness of current IPC measures and underscores the nurses' dedication to safeguarding both patients and staff. Nurses demonstrated a solid understanding and favorable attitudes towards IPC, with a mean agreement of 88.7% on the importance of key practices like hand hygiene and glove use, and 90% agreement on the significance of recurrent handwashing, PPE use, and waste disposal in preventing hospital-acquired infections (HAIs).

This study makes a unique contribution by highlighting how infection prevention and control can be maintained effectively within low-resource settings such as Palestine, where limitations in infrastructure and resources persist. Despite these constraints, the study shows a high level of awareness and commitment to IPC protocols among healthcare workers in the region. The findings are consistent with other regional studies, showing a shared commitment to infection control practices across Palestine.

Training and education were key drivers of compliance, but the study also revealed gaps in training frequency. Although there was an increase in training participation compared to previous years, only 20% of nurses received regular IPC training, revealing the need for continuous, structured educational programs. Nurses expressed a strong desire for more knowledge, with 86% indicating a need to learn more about infection control practices.

Organizational factors, including the availability of IPC protocols and guidelines, were also crucial. While access to basic antiseptic materials and gloves was widespread, essential items like N95 masks and goggles were found to be significantly lacking. Additionally, environmental factors posed challenges, such as inadequate infrastructure for infection control, including the absence of isolation rooms and insufficient ventilation systems.

The study found that higher compliance was associated with factors such as knowledge, attitudes, training, organizational support, and favorable environmental conditions. Nurses with more knowledge about IPC practices, positive attitudes, and those who received regular training had higher levels of compliance. Furthermore, supportive policies, available resources, and adequate supervision were positively linked to improved adherence. On the other hand, barriers such as limited knowledge, insufficient training, and poor environmental conditions were identified as obstacles to optimal compliance.

This research highlights the dedication of nurses in Hebron's governmental hospitals to IPC protocols, contributing significantly to patient safety and the reduction of HAIs. Despite the progress made, challenges remain, particularly in training consistency, resource availability, and environmental infrastructure. Addressing these gaps through strategic interventions can sustain and improve compliance levels, ultimately leading to reduced HAI rates and improved patient outcomes.

Future research should focus on evaluating the long-term impact of specific interventions, such as the effectiveness of structured training programs and the availability of critical IPC resources in low-resource settings. Additionally, further studies can explore the barriers faced by healthcare workers in such settings and how to address them. The findings from this study can inform policy changes and practical interventions, driving improvements in IPC practices and the overall quality of care in healthcare facilities. By strengthening these areas, healthcare systems can further enhance their response to emerging infection control challenges and improve public health outcomes.

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Appendices

Appendix One: Al-Quds University Ethical Committee Approval

Al-Quds University
Jerusalem
School of Public Health

جـامـعـة الـقـدس
القدس
كلية الصحة العامة

التاريخ: 2024/6/5
الرقم: REF.21/24

عزيزي الطالب محمد رشيد المحترم
برنامج ماجستير الوقاية وضبط الامراض المعدية

الموضوع: موافقة لجنة اخلاقيات البحث العلمي

قامت اللجنة الفرعية لأخلاقيات البحث التابعة لكلية الصحة العامة بمراجعة مشروع الرسالة بعنوان:

"Evaluation of Nurses Compliance to The National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate"

المقدم من (مشرف البحث/د. عبدالله الواوي).

يعتبر مشروعك مستوفيًا لمتطلبات أخلاقيات البحث في جامعة القدس.

نتمنى لكم كل التوفيق في تسيير المشروع.

ملاحظة: في حالة الحاجة الى موافقة من اللجنة المركزية في الجامعة، تستطيع التقدم باستخدام هذه الموافقة على الرابط.https://research.alquds.edu/en/ethics/48-how-to-apply.html

رئيسة اللجنة الفرعية لاخلاقيات البحث
كلية الصحة العامة
د. نهـى الشريف

نسخة/ أعضاء لجنة البحث
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P.O. box 51000 Jerusalem

Appendix Two: Approval Letter from The Palestinian Ministry of Health.

State of Palestine
Ministry of Health
Education in Health and Scientific
Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

Ref.: .....
Date:.....

الرقم: ٢٠٢١/١٢٢٩/١٢٢
التاريخ: ٢٠٢١/٧/١٤

الأخ مدير عام الادارة العامة للمستشفيات المحترم،،،

تحية واحترام،،

الموضـــوع: تسهيل مهمة بحث

يرجى تسهيل مهمة **الطالب: محمد عيسى رشيد– ماجستير الوقاية وضبط الامراض المعدية/ جامعة القدس**، وباشراف د. عبد الله الواوي، في عمل بحث بعنوان:

Evaluation of Nurse Compliance to The National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate.

من خلال السماح للطالب بجمع المعلومات عن طريق تعبئة استبانة من قبل الطاقم التمريضي بعد اخذ موافقتهم، وذلك في:

– مستشفى عاليه – مستشفى حلحول – مستشفى يطا
مستشفى المحتسب – مستشفى دورا

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، والحفاظ على سرية المعلومات.
على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحترام،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: عميد كلية الصحة العامة المحترم/ جامعة القدس

Telfax.:09-2333901 scientificresearch.dep@gmail.com تلفاكس: 09-2333901

Appendix Three: Study Participants Inform consent English

Al Quds University School of public health
Inform consent

Dear Nurse

Mohammad Rasheed from Al-Quds University is working on a master's thesis titled Evaluation of Nurses Compliance to the National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate.

Your participation in this study is important to us and your accurate completion of the attached questionnaire is appreciated.

Completing the attached questionnaire constitutes your written and voluntary consent to participate in this study.

The information you provide will be used for scientific research purposes only and will contribute to the development of strategic plans to develop infection control methods in Palestinian hospitals, and the information will be treated with confidentiality and privacy.

The time required to fill out the questionnaire is approximately 10-15 minutes.

If you have any questions about the study and its objectives or for any other reasons related to the study, please contact the principal investigator at the following address:

Mohammad Issa Rasheed

Al-Quds University

Mobile: 0569039022

Email: mohammadrasheed1989@gmail.com

Thank you very much for participating in this study

Appendix four: Participants Arabic Inform consent

جامعة القدس

كلية الصحة العامة

استبانة

عزيزي الممرض/ الممرضة

يقوم الطالب محمد رشيد من جامعة القدس بعمل رسالة ماجستير بعنوان تقييم مدى امتثال الممرضين والممرضات للبروتوكول الوطني الفلسطيني للوقاية من العدوى ومكافحتها في المستشفيات الحكومية في محافظة الخليل.

Evaluation of Nurses Compliance to the National Palestinian Infection Prevention and Control Protocol at Governmental Hospitals in Hebron Governorate.

إن مشاركتك في هذه الدراسة هو محط اهتمامنا وتعبئة الاستبيان المرفق بكل دقة هو محط تقديرنا.

إن تعبئة الاستبيان المرفق تعتبر موافقة خطية وإرادية للاشتراك في هذه الدراسة.

علما بان المعلومات التي تدلي بها سوف تستخدم لأغراض البحث العلمي فقط وسوف تساهم في وضع خطط استراتيجية لتطوير أساليب مكافحة ضبط العدوى في المستشفيات الفلسطينية وسوف تعامل المعلومات بكل سرية وخصوصية.

علما بان الوقت اللازم لتعبئة الاستبيان هو ما يقارب 15 – 10دقيقة.

في حال وجود أي استفسار عن الدراسة وأهدافها أو لأي أسباب أخرى متعلقة بالدراسة الرجاء الاتصال بالباحث الرئيسي على العنوان التالي:

محمد عيسى رشيد

جامعة القدس

جوال 0569039022

Email : mohammadrasheed1989@gmail.com

وشكرا جزيلا للاشتراك في هذه الدراسة

Appendix five: Questioners in English language

Section 1: profile of the respondents

	Nam of hospital	Hebron Governmental Hospital Yatta Governmental Hospital	Muhammad Ali Muhtasib Governmental Hospital Dura Governmental Hospital President Mahmoud Abbas Governmental Hospital
2.	Gender	□1. Male	□2. Female
3.	Age **29-20** **39-30** **49- 40** **59-50** **60**and more		
4	Marital status	□ 1. Married □ 2. Single □ 3. Widow	
5.	Type of shift	1. Morning shift □2. Evening shift 3. Night shift	□4. Mixed shift (morning, evening, night)
6	Nature of the department you work in	Open department (emergency, clinics, surgery, internal, gynecology, gynecology, pediatrics .....) Closed department (intensive care, premature, operations, cardiac, burns, catheterization)	
7.	Education	□ 1. Diploma □ 2. Bachelor □3. Master	
8	Current job position	□1. Director □2. Head nurse □3. Practitioner	
9	Employment Status	Full-time Part-time	
10	Total years of experience: 1-9years 10-19 years 20-29 years 30 and more		

11	Have you ever been vaccinated for hepatitis B? if no, skip to Qs 12	yes no
12.	If yes, how many doses you have had? □1. One □2. Two □3. Three 4. three doses and a booster shot	
13.	Have you been exposed to any injury from used needle or sharp surgical instrument?	yes no

Section 2: individual factors

A.	Knowledge					
14.	Do you know about the standard precaution for IPC?	☐ yes ☐ no				
15.	standard precautions are designed for: (you can choose more than one choice) ☐ 1. The care of all patients regardless of whether or not they are infected. ☐ 2. Standard Precautions apply to blood and all other body fluids, secretions and excretions ☐ 3. Their implementation is mean to reduce the risk of transmitting microorganisms from known or unknown sources of infection					
	Give your opinion	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
16.	Initial testing for hepatitis and HIV should be done for all patients and staff.					
17.	The doors to the rooms of patients with airborne diseases should always be kept closed.					
18	Personal protective equipment is used in the event of an emergency					
19.	Glove use for all patients is a useful strategy for reducing risk of surgical site infection.					

20.	Performing hand hygiene in the recommended situations can reduce patient mortality.					
21	Infection prevention and control can reduce medical costs associated with HAIs.					

B.	Attitudes	Strongly disagree	Disagree	neutral	agree	Strongly agree
22.	Complying with IPC protocol is very essential for infection prevention.					
23.	Recurrent hand washing is essential to prevent hospital acquired infection.					
24.	The personal protective equipment (gloves, gown, apron and eye glasses) decrease the infection.					
25.	The influence of IPC protocol on your practice is positive.					
26.	Insuring the client's safety and preventing them of getting HAIs is the healthcare provider's responsibility.					
27.	Safe and proper waste disposal decreases or prevent infection.					
C.	Training and Education					
28.	Does your hospital provide on job or in-service training and education about? IPC? □1. Never □2. Yes sometimes □3. yes regularly					
29	Do you hold any professional certifications related to infection control? 1. yes □2. No					
30.	Have you ever attended an education session or workshop on IPC? □ 1. Never □2. yes, last year □ 3.yes in the past 2 years □4. yes, more than 2 years					

31.	If yes, how would you describe the effectiveness of the training? 1- Very effective □ 2- Effective □ 1- Neutral □ 2- Ineffective □ 1- Not at all effective	
32.	Do you feel that you need to learn more about infection prevention and control?	☐ yes ☐ no
33.	Does your basic education curriculum incorporate training about the IPC protocols and guidelines?	☐ yes ☐ no
34.	Is program of orientation of new personnel on IPC implemented in your facility?	☐ yes ☐ no

Section 3: practices

No.	Practices	no	rarely	Sometimes	often	always
35.	Do you use personal protective equipment (gloves, mask, head cover, goggles, gown, and shoe cover) as recommended when handling patients during any procedure?					
36.	Do you properly handle contaminated equipment to prevent cross infection?					
37	Performs hand hygiene and hand washing (using soap and water or hand sanitizer) in the recommended five moments (5 moments)?					
38.	You wash your hands when arriving at work.					
39.	When washing hands, you remove jewelry, watch and rings.					

40.	You wash your hands after any contact with blood, body fluids, secretions, and excretions.					
41.	Make sure medical instruments are properly sterilized before use.					
42.	You wash your hands before you leave the department					
43.	Do you consistently follow disposal protocols for medical waste?					
44.	Do you consistently follow protocols for disposing of sharp waste, such as needles and surgical instruments?					
No	Practices	no	rarely	Sometimes	often	always
45.	Wearing gloves when you come in contact with blood, body fluids, secretions, mucous membranes and excretions.					
46.	You don't recap the used needles before disposal.					
47.	You don’t break or bend the used needle before disposal.					
48.	You don't remove used needles from syringes before disposal.					

49.	You clean and disinfect surfaces in patient care areas?					

Section 4: Organizational Factors

A.	Availability of protocols and guidelines	
50.	Do you know if there is a Palestinian infection prevention and control protocol?	☐ yes ☐ no
51.	Do you have a copy of the Palestinian IPC protocol in your ward? ☐ Yes ☐ No ☐ DK	
52.	If no, have you access to the copy?	☐ yes ☐ no
53.	If Yes, are you currently applying the IPC protocols within your department? ☐ always ☐ sometimes ☐ never	

54.	Where it is located? ☐ present in the drawer ☐ present on the shelf of the room where services are provided ☐ present in the cupboard ☐ I don't know

55.	If no, what are the barriers that prevent you from using the protocol? Tick all that apply □ 1- Lack of knowledge and education regarding IPC □ 2- Lack of materials and equipment □ 3- Difficult to understand □ 4- Low job satisfaction among employee □ 5- Unsuitable design and infrastructure of the department □ 6- Lack of time and work overload □7- Insufficient training □ 8- Lack of supportive policy □ **-9** Poor monitoring and evaluation
56.	What is the source of the protocols you have? □ WHO □ MOH □ National □ Developed by hospital □ Don't know
B.	Availability of Materials and Equipment
57.	The antiseptic and disinfectant materials and equipment are available in your department? □ a. yes □ b. no □ c. don't know
58.	Water, soap and 70% alcohol gel are available in all patient care areas. □ a. yes □ b. no □ c. don't know
59.	Which of the Personal Protective equipment are available in your department? □ a. gowns □ b. eye glasses □ c. masks □ d. shoe cover □ e. head cover □ f. plastic apron □ g. gloves
60	How adequate are resources such as PPE and disinfectants to support compliance with infection control protocols?
61.	Sharp boxes are Available in all patient care settings? □ a. yes □ b. no □ c. doesn't know
62.	There is a sufficient number of sinks in accordance with the number of rooms □ a. yes □ b. no □ c. doesn't know

C.	Supportive policies
63.	Does hospital management adopt policies and regulations to support the compliance to the IPC protocols? □ a. yes □ b. no □ c. dk

64.	The degree to which hospital management is supportive in promoting and facilitating compliance with infection prevention and control protocols? □ a. Very supportive □ b. Supportive □ c. Neutral □ c. Unsupportive □ c. Very Unsupportive					
65.	Is there an auditing program to ensure that policies have been implemented? □ a. yes □ b. no □ c. dk					
66.	Is infection prevention and control program included in the hospital quality assurance program? □ a. yes □ b. no □ c. dk					
D.	Supervision, Monitoring and Evaluation					
67.	Is there an infection control committee in your hospital as a supervisory body? □ a. yes □ b. no □ c. dk					
68.	Are designated IC practitioners/nurses available? □ a. yes □ b. no □ c. dk					
69	Do have in use surveillance system about infection rate in your facility? □ yes □ occasionally □ no □ dk					
70.	Has your facility ever carried out a follow up / supervision of your practice regarding the infection prevention implementation? □ yes □ no □ dk					
71.	Did you receive any feedback after your supervisor's visit regarding your IPC practices? □ Yes, written feedback □ Yes verbal feedback □ Not at all					
72.	If yes, what you do with the feedback? □ keep it in the files without discussion □ Discuss it with concerned people □ Use it in developing improvement strategies □					
E.	Workload and workforce	strongly disagree	disagree	neutral	agree	strongly agree
73.	Lack of staff in hospital wards increases the risk of hospital acquired infections.					
74.	Increased workload affects the IPC practices and increase HAI.					

Section 5: Physical environmental factors

A.	Design

75.	Infrastructure and departmental design (water, laundry, ventilation, lighting and storage areas .....) are suitable for infection control strategies. □ a. yes □ b. no □ c. dk
76.	In your department or hospital, there are special rooms with a negative pressure system such as isolation rooms or others. □ a. yes □ b. no □ c. dk
B.	Flow
77.	The traffic flow system within the departments (operations, laundry, sterilization) is in line with the principles of infection control, one-way movement and separation of clean and sterile areas from unclean and non-sterile areas. □ a. yes □ b. no □ c. dk
78.	Traffic in and out of isolation rooms has no effect on HAIs. □ a. yes □ b. no □ c. dk
C.	Air quality
79.	There is a system for controlling the environmental temperature and humidity that ensures safe limits for anaesthetized patients. □ a. yes □ b. no □ c. dk
80	The air ventilation system of the department is complying to infection control standards. □ a. yes □ b. no □ c. dk

Appendix six: Questioners in Arabic language

القسم الأول: معلومات عن المشاركين				
1	اسم المستشفى		☐ 1- مستشفى الخليل الحكومي ☐ 2- مستشفى يطا الحكومي	☐ 3- مستشفى محمد علي المحتسب الحكومي ☐ 4- مستشفى دورا الحكومي ☐ 5- مستشفى الرئيس محمود عباس الحكومي
1	الجنس		☐ 1- ذكر	☐ 2انثى
3	العمر 29-20 39-30 49- 40 59-50 60 فأكثر			
4	الحالة الاجتماعية		☐ 1- متزوج\ة ☐ 2- اعزب\اعزباء	☐ 3- ارمل\ة
5	نوع الدوام \الوردية		☐ دوام صباحي ☐ دوام مسائي	☐ دوام ليلي ☐ دوام مختلط (صباحي ,مسائي ,ليلي)
6	طبيعة القسم الذي تعمل به		☐ قسم مغلق (قسم العناية المركزة ,الخداج ,العمليات ,القلب ,الحروق القسطرة)	☐ قسم مفتوح (طوارئ ,عيادات ,جراحة ,باطني ,نسائية ,أطفال .....)
7	الدرجة العلمية		☐ 1- دبلوم ☐ 2- بكالوريوس	☐ 3- ماجستير

8	الوظيفة الحالية	□ 1- مدير □ 2- رئيس قسم	□ 3- موظف بدون صفة إدارية
9	الحالة الوظيفية	□ دوام كامل □ دوام جزئي	
10	عدد سنوات الخبرة 1-9 سنوات 10-19 20-29 30 فاكثر		
11	هل سبق وأن تطعيمات لالتهاب الكبد الوبائي B؟ □ 1- نعم □ 2- لا		
12	إذا كانت الإجابة نعم، فكم جرعة تلقيت؟□1- واحدة □ 2- اثنتان □ 3- ثلاثة 4□-ثلاثة جرعات وجرعة معززة		
13	هل سبق لك أن تعرضت لوخز بواسطة ابر أو أدوات جراحية حادة مستخدمة؟ □1- نعم □ 2- لا		

القسم الثاني: العوامل الفردية						
أ	المعرفة					
14	هل تعرف عن وجود الاحتياطات المعيارية لمكافحة وضبط العدوى؟ □ 1- نعم □ 2- لا					
	الاحتياطات المعيارية صممت من اجل :(بإمكانك اختيار أكثر من إجابة) □ رعاية جميع المرضى سواء كانوا مصابين بالعدوى أم لا □ تستخدم للتعامل مع كل سوائل الجسم سواء دم أو أي إفرازات أخرى □ تطبيقها وسيلة لتقليل خطر انتقال الميكروبات من مصادر معروفة أو غير معروفة					
	الرجاء إعطاء رأيك فيما يلي	لا أوافق بشدة 1	لا أوافق 2	محايد 3	أوافق 4	أوافق بشدة 5
16	الاختبار المبدئي لالتهاب الكبد الوبائي وفيروس نقص المناعة					

	المكتسبة يجب أن يعمل لجميع المرضى والعاملين.					
17	يجب الإبقاء دائما على أبواب غرف المرضى المصابون بأمراض تنتقل عن طريق الهواء مغلقة.					
18	تستخدم معدات الوقاية الشخصية في حالة الطوارئ					
19	استخدام القفازات مع كل المرضى يعتبر إستراتيجية مفيدة لتقليل عدوى المستشفيات					
20	غسل اليدين في اللحظات الموصى بها يقلل من نسبة المراضة والوفيات.					
21.	مكافحة وضبط العدوى يقلل من التكاليف الطبية الناتجة عن عدوى المستشفيات.					
ب	المواقف والتوجهات	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
22.	الامتثال لبروتوكولات مكافحة وضبط العدوى مهم جدا لمنع حدوث العدوى.					
23	غسل الايدي المتكرر ضروري لمنع العدوى المكتسبة في المستشفيات.					
24	استخدام معدات الوقاية الشخصية (مثل القفازات والنظارات والكمامة والملابس (الواقية) يقلل نقل العدوى.					
25	تؤثر برتوكولات مكافحة العدوى ايجابيا على أدائك					
26	حفظ سلامة المرضى ومنعهم من الحصول على عدوى					

	المستشفيات هي مسؤولية مقدمي الخدمات الصحية.					
27	التخلص الصحيح والآمن من المخلفات والنفايات الطبية يقلل أو يمنع العدوى					
ج	التدريب والتعليم					
28.	هل يقدم المستشفى الذي تعمل به تدريبا وتعليما في مكان العمل عن مكافحة وضبط العدوى؟ □1- ابدا □2- نعم أحيانا □ 3- نعم بانتظام					
29	هل تحمل أي شهادات مهنية تتعلق بمكافحة وضبط العدوى ؟ □ 1- نعم □ 2- لا					
30.	هل سبق وان شاركت بحضور جلسة تعليمة أو ورشة عمل عن مكافحة وضبط العدوى؟ □1- أبدا □2نعم، السنة الماضية□ 3نعم، في السنتين الماضيتين □4- نعم، منذ أكثر من عامين					
31.	إذا كانت الإجابة نعم كيف تصف فعالية التدريب؟ □ 1- فعال جدا □ 2- فعال □ 1- محايد □ 2- غير فعال □ 1- غير فعال على الاطلاق					
32.	هل تعتقد أنك بحاجة لمزيد من التدريب والتعليم عن طرق مكافحة وضبط العدوى ؟ □ 1- نعم □ 2- لا					
33.	هل منهاجك الدراسي الأساسي اشتمل على تدريبات حول بروتوكولات مكافحة وضبط العدوى ؟ □ 1- نعم □ 2- لا					
34	هل يطبق مستشفاكم برامج لتعريف الموظفين الجدد على مكافحة وضبط العدوى ؟□ 1- نعم □ 2- لا					

القسم الثالث: الممارسات						
	الممارسات	لا التزم	نادرا	أحيانا	غالبا	دائما
35	هل تستخدم معدات الوقاية الشخصية (القفازات، الكمامة، غطاء الرأس، النظارات المريول، وغطاء الحذاء) على النحو الموصى به عند التعامل مع المرضى عند أي اجراء ؟					
36	هل تتناول المعدات والأدوات الملوثة بطريقة صحيحة للتقليل من احتمالية انتقال العدوى					

37	تقوم (بنظافة وغسل اليدين) باستخدام الماء والصابون أو معقم اليدين في اللحظات الخمس الموصى بها ((5 moments؟					
38	تغسل يديك فور وصولك إلى العمل					
39	التزم بخلع الساعة والمجوهرات والخاتم عند غسل الأيدي					
40	تغسل يديك إذا لمست دم، أو أي من سوائل أو إفرازات جسم المريض بالماء والصابون.					
41	تتأكد من تعقيم الأدوات الطبية بشكل صحيح قبل الاستخدام؟					
42	تقوم بغسل يديك قبل مغادرتك القسم					
43	هل تتبع باستمرار بروتوكولات التخلص من النفايات والمخلفات الطبية؟					
44	هل تتبع باستمرار بروتوكولات التخلص من الادوات الحادة، مثل الإبر والأدوات الجراحية؟					
45	ترتدي القفازات عندما تتعامل مع الأدوات الملوثة أو إفرازات الجسم.					
46	لا تقوم بغطاء الإبر قبل التخلص منها.					
47	لا تقوم بثني أو كسر الإبر قبل التخلص منها.					
48	لا تقوم بفصل الإبر عن السرنجات قبل التخلص منها					
49	تقوم بتنظيف وتطهير الأسطح في مناطق رعاية المرضى؟					

القسم الرابع: العوامل التنظيمية	
أ.	توافر البروتوكولات والمبادئ التوجيهية
50	هل تعرف بوجود بروتوكول فلسطيني لمكافحة وضبط العدوى □1- نعم □ 2- لا

51	هل يوجد نسخة من بروتوكول مكافحة وضبط العدوى الفلسطيني في قسمك؟ □ 1- نعم رأيتها □ 2- نعم لم ارها □ 3- لا □ 4- لا اعرف
52	إذا لا، هل يسهل عليك الحصول على هذه النسخة؟□1- نعم □ 2- لا
53	إذا نعم، هل تقوم حاليا بتطبيق البروتوكولات في قسمك؟ □1- نعم دائما □2- نعم أحيانا □ 3-لا ابدا
54	إذا كانت هناك نسخة من البرتوكولات في قسمك فأين توجد؟ □ 1 في الدرج □ 2على الرف، في غرفة تقديم الخدمة□ 3- في الخزانة □ 5- لا اعرف
55	حسب رأيك ما الذي يعيق الالتزام ببرتوكولات مكافحة وضبط العدوى؟ أشر على كل من ينطبق عليه □ 1- - قلة المعرفة والتعليم حول ضبط ومكافحة العدوى. □ 2- نقص المواد والمعدات اللازمة لتطبيق ممارسات مكافحة وضبط العدوى. □ 3- صعوبة فهم البروتوكولات والتوجيهات. □ 4- قلة الرضا الوظيفي لدى العاملين. □ 5- تصميم الاقسام غير مناسب لتطبيق مكافحة وضبط العدوى. □ 6- قلة الوقت و زيادة عبء العمل. □ 7- قلة البرامج التدريبية حول مكافحة وضبط العدوى □ 8- ضعف السياسات الداعمة. □ 9_ ضعف المتابعة والتقييم المستمر

56	ما هو مصدر البروتوكولات لديك □ 1- وطني □ 2- منظمة الصحة العالمية□ 3- وزارة الصحة□4- من تطوير المستشفى□ 5- لا اعرف
ب.	توافر المواد والمعدات
57	المواد المطهرة والمعقمة متوفرة في قسمك □ 1- نعم □2- لا □ 3- لا اعرف
58	الماء والصابون والجل الكحولي بتركيز 70% متوفر في جميع مناطق رعاية المرضى؟ □ 1- نعم □2- لا □ 3- لا اعرف
59	□ اي من المعدات الواقية الشخصية متوفرة؟ □ المريول □ واقي العينين□ الكمامة □ غطاء الأحذية□ غطاء الرأس□ المريول البلاستيك □ القفازات
60	ما مدى كفاية الموارد مثل معدات الوقاية الشخصية والمطهرات لدعم الامتثال لبروتوكولات مكافحة العدوى؟ □ كافية جدا □ كافية □ محايد□ غير كافيه □ غير كافية جدا
61	صندوق التخلص المواد الحادة متوفر في كل أماكن تقديم الخدمة الطبية للمرضى □ 1- نعم □ 2- لا □3- لا اعرف
62	•يوجد عدد كافي من المغاسل يتناسب مع عدد الغرف□ 1- نعم □ 2- لا □3- لا اعرف
ج.	السياسات الداعمة
63	هل تتبنى إدارة المستشفى سياسات وتعليمات تدعم الامتثال لبروتوكولات مكافحة وضبط العدوى؟ □ 1- نعم □ 2- لا □ 3- لا اعرف
64	ما مدى دعم إدارة المستشفى في تعزيز وتسهيل الامتثال لبروتوكولات مكافحة وضبط العدوى؟

	□1- داعمة جدا □ 2- داعمة □ 3- محايد □ 2- غير داعمة □ 3- غير داعمة للغاية
65	هل يوجد برامج تدقيق للتأكد من تطبيق البروتوكولات؟ □ 1- نعم □ 2- لا □ 3- لا اعرف
66	هل يشتمل برنامج ضمان الجودة في المستشفى برنامج لمكافحة وضبط العدوى؟ □ 1- نعم □ 2- لا □ 3- لا اعرف
د.	الإشراف والمراقبة والتقييم
67	هل يوجد لجنة مكافحة وضبط العدوى في مستشفاكم كجسم إشرافي؟ □ 1- نعم □ 2- لا □ 3- لا اعرف
68 .	هل يوجد مهنيين مخصصون / ممرضون لمكافحة وضبط العدوى؟ □ 1- نعم □ 2- لا □ 3- لا اعرف
69	هل يوجد نظام مستخدم لرصد معدلات العدوى مثل (SSI, CAUTI, VAP,CLABSI □1- نعم □2- احينا □3- لا □4- لا اعرف
70	هل حصل وأن تم متابعة وتقييم تطبيقاتك وممارساتك بما يخص بروتوكولات مكافحة وضبط العدوى؟ □1- نعم □ 2- لا □3- لا اعرف
71	هل تسلمت أي تغذية راجعة (ملاحظات) بعد زيارة مسئولك لك بخصوص تطبيق ممارسات مكافحة وضبط العدوى ؟ □1 - نعم، ملاحظات مكتوبة□ 2- نعم، ملاحظات شفهية□ 3- لا على الإطلاق
72	إذا نعم، ماذا تفعل بهذه الملاحظات؟ □ 1- تحتفظ بها في ملفك دون مناقشتها□ 2 تناقشها مع المعنيين□ 3- تستخدمها في إطار استراتيجيات تحسين العمل

هـ	القوى العاملة وعبء العمل	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
73	نقص القوى البشرية في اقسام المستشفى يزيد احتمالية حصول عدوى المستشفيات.					
74	زيادة عبء العمل يؤثر على ممارسات مكافحة وضبط العدوى ويزيد عدوى المستشفيات.					

القسم الخامس: العوامل البيئية الطبيعية	
أ.	تصميم اقسام المستشفى
75	البنية التحتية وتصميم الأقسام (الماء، الغسيل، التهوية الإضاءة وأماكن التخزين.....) مناسب لاستراتيجيات مكافحة وضبط العدوى. □1- نعم □2- لا □3- لا اعرف
76	يوجد في قسمك او في المستشفى غرف خاصة مزودة بنظام الضغط السلبي مثل غرف العزل او غيره. 1- نعم □2- لا □3- لا اعرف
ب.	نظام الحركة
77	الحركة داخل اقسام(العمليات ,المغسلة ,التعقيم) تتماشى ومبادئ مكافحة وضبط العدوى، الحركة في اتجاه واحد وفصل المناطق النظيفة و المعقمة عن المناطق الغير نظيف والغير معقمة □ 1- نعم □ 2- لا □ 3- لا اعرف
78	التحرك داخل وخارج غرف العزل ليس له تأثير على عدوى المستشفيات □ 1- نعم □2- لا □3- لا اعرف
ج.	التهوية
79	هناك نظام للتحكم في درجة الرطوبة والحرارة التي تضمن حدودا آمنة للمرضى □1- نعم □2- لا □3- لا اعرف

80	نظام التهوية داخل الأقسام وغرف المرضى يلبي معايير مكافحة وضبط العدوى □ 1- نعم □2- لا □ 3- لا اعرف

Appendix seven: List of experts who performed the Questioner validation

Nam	Title
Dr: Abdallah Alwawi	Assistant professor of Medical & Critical care CMH, PGND, PCN Practitioner, PhD Certified Trauma Care Practitioner Head of Anesthesia and Resuscitation Technology Dept. Training Center Administrator of AHA AQU Faculty of Health Professions Al-Quds University
Dr: Abed Alra'oof M. Saleem	PhD, MCLS, CHS, WHO Consultant PSQ. Technical Affairs Coordinator Deputy Minister Office Former Head of the Quality and Infection Control Unit at the Palestinian Ministry of Health
Dr: Imad Fashafsheh	PhD, MSN, RN Arab American University
Dr: Asad Alramlawi	PhD, Deputy Minister of Health, infectious disease spatiality
Nimer Aldaghameen	Head of Quality and Infection Control at the Ministry of Health
Mustaf Alqawasmi	Biostatistician

تقييم مدى امتثال الممرضين والممرضات للبروتوكول الوطني الفلسطيني للوقاية من العدوى ومكافحتها في المستشفيات الحكومية في محافظة الخليل.

اعداد الباحث: محمد عيسى رشيد

اشراف الدكتور: عبد الله الواوي

الملخص

تشكل العدوى المرتبطة بالرعاية الصحية تحدياً عالمياً كبيراً في مجال الصحة العامة، لا سيما في الأماكن المحدودة الموارد مثل فلسطين. هدفت هذه الدراسة الوصفية التحليلية المقطعية إلى تقييم امتثال الممرضين والممرضات للبروتوكول الوطني الفلسطيني للوقاية من العدوى ومكافحتها في المستشفيات الحكومية في محافظة الخليل. قيمت الدراسة مستويات الامتثال، وحددت العوائق التي تحول دون الالتزام، واستكشفت العوامل التي تؤثر على ممارسات الوقاية من العدوى ومكافحتها. أُجري البحث في خمسة مستشفيات حكومية في محافظة الخليل، تمثل بيئات رعاية صحية متنوعة. استُخدم أسلوب أخذ العينات العشوائية البسيطة لاختيار 212 ممرضة من إجمالي مجتمع الدراسة البالغ 442 ممرض وممرضة. تم جمع البيانات باستخدام استبيان منظم تم توزيعه عبر استمارات، مما حقق معدل استجابة مرتفع بلغ 96%. كشفت النتائج عن معدل امتثال عام مرتفع بلغ 88.3% بين الممرضين والممرضات للبروتوكول الوطني الفلسطيني للوقاية من العدوى ومكافحتها. أظهرت ممارسات محددة مثل نظافة اليدين (95.8%)، واستخدام معدات الحماية الشخصية (94%)، والتخلص الآمن من النفايات الحادة (93.9%) التزامًا قويًا بشكل خاص. أظهر الممرضون والممرضات مستويات معرفة عالية جدًا (88.7%) ومواقف إيجابية (90% موافقة) تجاه ممارسات الوقاية المتكاملة. على الرغم من الامتثال العالي، تم تحديد العديد من العوائق. وشملت التحديات الأكثر أهمية ضيق الوقت وعبء العمل الزائد (62.7%)، وعدم كفاية المعرفة والتعليم (61.3%)، ونقص المواد الضرورية مثل أقنعة N95 (متوفرة في 17% فقط من الأقسام). في حين أن 76% من الممرضين والممرضات كانوا على دراية بالبروتوكول الفلسطيني للوقاية من العدوى ومكافحتها (59% فقط) لديهم نسخة من البرتوكول الوطني الفلسطيني الخاص بمكافحة وضبط العدوى.

زادت العوامل البيئية مثل عدم مطابقة البنية التحتية (47.6%) ونقص غرف العزل المتخصصة (53%) من تعقيد الالتزام ببروتوكولات مكافحة وضبط العدوى. تباين الدعم التنظيمي، حيث أقر 68% من الممرضين والممرضات بتبني الإدارة لسياسات داعمة. ومع ذلك، أفاد 20% فقط من الممرضين والممرضات بتلقي تدريب منتظم على البرتوكولات الخاصة بمكافحة وضبط العدوى، مما يسلط الضوء

على الحاجة إلى برامج تعليمية أكثر اتساقًا. كانت أنظمة الإشراف والمراقبة موجودة ولكن غير متناسقة، حيث أفاد 78% من الممرضات بوجود لجان لمكافحة العدوى ولكن 45% منهن لم يكن على علم بأنظمة مراقبة معدلات العدوى. وجدت الدراسة علاقات إيجابية بين الامتثال وعوامل مثل المعرفة والمواقف والتدريب وتوافر الموارد والسياسات الداعمة. أظهر الممرضين والممرضات العاملين في الورديات الصباحية والعاملين في الأقسام المغلقة (مثل وحدات العناية المركزة) ورؤساء الأقسام التمريضية والممرضين والممرضات الذين تم تطعيمهن ضد التهاب الكبد B امتثالاً أعلى لبروتوكولات مكافحة وضبط العدوى.

استنادًا إلى هذه النتائج، توصي الدراسة بتنفيذ دورات تدريبية منتظمة ومنظمة في مجال الرعاية الصحية المتكاملة وتحسين إدارة الموارد لضمان الوصول إلى المواد الأساسية، وتعزيز السياسات الداعمة بما في ذلك آليات التدقيق المستمر والتغذية الراجعة، والاستثمار في تحسين البنية التحتية. بالإضافة إلى ذلك، فإن تحسين ظروف العمل، وتعزيز التعليم المستمر، وتعزيز أنظمة الإشراف والمراقبة أمر بالغ الأهمية لاستدامة وتحسين الامتثال في مجال الوقاية من العدوى ومكافحتها.

يوفر هذا التقييم الشامل لمدى امتثال المستشفيات الحكومية في محافظة الخليل لمعايير الامتثال للمراقبة المتكاملة في المستشفيات الحكومية في محافظة الخليل رؤى قيمة لمسؤولي الرعاية الصحية وصانعي السياسات. ومن خلال معالجة العوائق التي تم تحديدها والاستفادة من نقاط القوة الموجودة، يمكن تطوير تدخلات مستهدفة لتعزيز ممارسات الرقابة الصحية المتكاملة والامتثال للرقابة الصحية المتكاملة، مما يقلل في نهاية المطاف من عبء العدوى المكتسبة وتحسين سلامة المرضى في أماكن الرعاية الصحية الفلسطينية .