**Deanship of Graduate Studies**

**Al-Quds University**

# Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospitals - Gaza Governorates

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**MPH Thesis**

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# Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospitals - Gaza Governorates

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# Thesis Approval

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## Dedication

To my mother and my father who taught me how to give …..

To my wife who supported me on the front line wholeheartedly…..

To my kids who taught us patience and love…..

To my brothers who spared no effort to help…

To all of them I dedicate this work

## 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.

Signed: ……..

Shareif Mohammed El-Dalow

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Shareif Mohammed El-Dalow

## Abstract

Nosocomial infection is a significant burden for both the patient and health system as well. The Palestinian Ministry of Health has adopted the National Infection Prevention and Control (IPC) protocol in 2004, aiming to combat infections among health care providers, clients, community and the environment. However, the compliance with the infection prevention and control protocols were poorly assessed. The aim of this study is to assess the compliance of health care providers with the infection prevention and control protocols in the governmental pediatric hospitals in Gaza in order to contribute to decreasing the childhood morbidity and mortality resulted from infection.

The design of the study is a descriptive cross sectional one that included a self-administered questionnaire for all doctors, nurses, and physiotherapists (334); an observation checklist for the health care providers' practices that was repeated three times for each of them (1002), and an observation checklist for the health facility three times for each department (69). All of these data were analyzed using SPSS (version 18). The reliability of the instrument was assured and the response rate was 92%.

In addition, ten in-depth interviews with purposively selected key informants were conducted.

The study revealed that 69.4% of respondents were males; the majority of study populations were married (80.5%), 30.9% were physicians and 66.5% were nurses. About 80% of the study population had less than fifteen years experience. Only 2.3% of respondents have a copy of the IPC protocol, while 65.8% did not know about its existence. There was no real hospital surveillance program; only 16.9% of respondents had participated in training session about IPC. 63.2% had received three doses of the hepatitis B vaccine, and 66.1% have been exposed to an injury from used needles.

Despite the high concern of health care providers about the importance of the IPC practices, their compliance with IPC recommended practices as the questionnaire results were: compliance with wearing uniform (90.9%); hand washing (79.7%); wearing gloves (89.1%); using antiseptic and disinfectant (79.8%); and safe work practices (45.3%) but their observed practices revealed lower level of compliance; such as wearing uniform practices (86.6%); hand washing (45.9%); wearing gloves (40.7%); using antiseptic and disinfectant (49.16%); and safe work practices (45.3%).

Health facility checklist indicates the absence of some essential equipment and materials needed such as the absence of protocol copies, covered waste containers, and heavy duty gloves. The most important reasons for non-compliance with the IPC protocol were: Absence of education or training program (61.5%), lack of knowledge (52.4%) and scarcity of the required supplies (46.9%). These results were confirmed through the in-depth interviews with key informants.

The study recommended that the IPC protocol should be available in all the departments; intensifying education, training, and supervision by a highly qualified team of infection control committee and providing the needed equipment and facilities.

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## List of abbreviations

| | |
|---|---|
| CDC | Center for Disease Control |
| GS | Gaza Strip |
| H1N1 | Swine flu |
| H5N1 | Avian Influenza |
| HAI | Hospital associated infections |
| HCP | Health care provider |
| ICU | Intensive Care Unit |
| IPC | Infection prevention and control |
| MOH | Ministry of Health |
| NGOs | Nongovernmental organizations |
| PCBS | Palestinian Central Bureau of statistics |
| PMOH | Palestinian Ministry of Health |
| PPE | Personal Protective Equipment |
| RSPH | Dr Abdel -Aziz El-Rantesy specialized pediatric hospital |
| SARS | Severe Acute Respiratory Syndrome |
| SPSS | Statistical Package for Social Sciences |
| sq.km | Square kilometers |
| UNRWA | United Nation Relief and Work agency |
| WHO | World Heath Organization |

# Chapter 1: Introduction

## 1.1 Background

Children are more liable to get infection than any other population age groups. Many of pediatric morbidities are due to infections and infectious diseases. 10% of death in children under the age of five is due to infections or infectious diseases (Palestine, Ministry of Health (MOH), 2006).

Infection prevention and control (IPC) is an integral part of pediatric practice. All employees should be educated; regarding the routes of transmission and techniques used to prevent transmission of infectious agents, policies for infection control and prevention should be written, readily available, annually updated and enforced (Drummond, 2000). Each health institution used to adopt specific infection control and prevention activities or protocol. Employees working in pediatric hospitals are supposed to take precautions to protect both clients and the staff likely to expose to potentially infectious materials while in the job.

Infection prevention standard precautions represent a system of barriers precautions to be used by all personnel for contact with all patients regardless of patient's diagnosis, and these precautions are slightly different according to the state policies and protocols. The precautions are the "standards of care" but basically their components are: consider every person as potentially infectious; washing hands; wearing gloves; using physical barriers; using safe work practices; process of instrument re-cleaning and protect workers (Palestine, MOH, 2004).

An IPC protocol is the activities aiming to prevent the spread of infection among patients: from health care provider (HCP) to patient and from patient to HCP in the health care setting (World Heath Organization (WHO), 2003). Infection control measures are based on how an infectious agent transmitted and methods used to prevent this transmission (Centers for Disease Control and Prevention (CDC), 2003).

Over the last 10 years, several new viral pathogens have appeared in human populations such as: (Avian Influenza (H5N1), *Severe Acute Respiratory Syndrome* (SARS), Swine flu (H1N1), and many others). We have also seen the re-emergence of other well-known infectious diseases such as measles and Tuberculosis (TB). It is time to reassess our current practice patterns and to commit to new standards for IPC in all patient settings (Matlow, 2004).

Hospitals are considered as appropriate settings for health promotion. The hospital environment should be supportive to health and benefiting not only the staff but also the patients and the community. A hospital should not only be a place to treat what affects the body but also to prevent harm to the patient, and to offer a source of comfort to the mind and the spirit as well (Malaysia MOH, 2003). The patient expects safety, security, support, competence, physical and psychological comfort in the health care service environment (Fottler et al., 2000).

Our kids are the best we own; they are our hope in life and the leaders of our promising future. Gaza Strip is characterized by the youth population, 49% are less than 15 years old, (Palestine, MOH, 2006). As a result Gaza has three pediatric hospitals and also pediatric departments in most of other Gaza's hospitals. The separation between both sexes started at the age of puberty related to Islamic and traditional norms in the Palestinian society, so our pediatric hospitals deal with children till the age of twelve.

Hospital associated infections (HAI), also known as Nosocomial infections are an important focus of infection prevention in all countries, but in developing countries they are a major cause of preventing diseases and deaths. HAI is a problem that persists through the world, but it is estimated to be around 10% of all hospital admissions, HAI does not only increase morbidity and mortality in patients but also causes considerable economic loss and an extra burden on the health care facilities (WHO, 2003).

In Canada, for example hospital acquired infections costs an additional $10 000 - $24 000 in care per infected patient, increases the overall length of stay, and it kills 8,000-12,000 people every year (Janet et al., 2010).

Infection control activities must be integrated into the routine hospital activities, the management of these activities should be through a hospital infection control committee with a full time infection control nurse who should coordinate various activities. The committee should identify priorities, implement the plan and continuously monitor the situation for assuring quality and its continuous improvement (WHO, 2003).

Adopting IPC activities decreases many preventable deaths and also decreases the incidence of morbidities related to infections and infectious diseases, so most of the international agencies all around the world have recently developed modules or strategies for infection prevention and control, among those agencies was the CDC. The Palestinian IPC protocol was derived from the CDC guide lines to protect the health of workers, clients, the community and the environment (Palestine, MOH, 2004).

Key principle of infection control includes the following: hand washing before and after every patient contact, separation of contagious children from other patients, safe handling and disposal of needles and sharp medical devices, appropriate use of personal protection equipment such as gloves, appropriate sterilization and antiseptics use, vaccination, and judicious use of antibiotics (American Academy of Pediatrics (AAP), 2001).

The Palestinian IPC protocol has been developed to protect the health of HCP, clients, the community, and the environment with technical and financial support from MARAM project stuff in full collaboration with a group of national experts representing all medical specialties. IPC protocol has been approved by the Palestinian MOH after holding the training course of trainers who came from all of the MOH institutions in 2004. The protocol focuses on the following: hand hygiene, wearing gloves, using physical barriers, using antiseptic agents, using safe work practices, including safe handling of needles and sharp instruments, safe disposal of infectious waste materials, and prevent spread of infection to the community, processes instrument through cleaning, high level disinfecting , and use of relevant vaccinations (Palestine, MOH, 2004).

### 1.2 Problem statement

Patient safety in hospital care depends mainly on effective IPC programs. The health care providers in governmental pediatric hospitals did not recognize the Palestinian IPC protocol which explains the IPC program and practices.

In Palestine, about 10% of hospitalized children are related to Nosocomial infection, in addition to about 12.2% of deaths 1-4 years of age are related to infectious diseases,

meningitis, pneumonia and respiratory diseases (4.1, 2.3, 5.8% respectively) (Palestine, MOH, 2007). According to World Heath Organization (WHO) report (2006), birth asphyxia and infections are the main cause of most deaths among infants.

The IPC practices reduce the probability of cross infection among hospitalized patients while nosocomial infections cause considerable economic loss and an extra burden on the health care facilities (WHO, 2003).

The Palestinian MOH has adopted the IPC protocol in 2004; the researcher will try to assess the health care provider's compliance with the IPC protocol in governmental pediatric hospitals in Gaza governorates hoping to contribute in improving the infection prevention and control practices which will lead to decrease childhood mortality and morbidity.

### 1.3 Justification of the study

Nosocomial infection occurs worldwide and it affects both developed and developing countries. Infections acquired in hospitals are among the major causes of death and increased morbidity of hospitalized patients. Hospital acquired infections are a significant burden for both patient and public health as well. HAI is one of the top ten leading causes of death in the United States. The CDC estimates that there are around 1.7 million healthcare-associated infections in American hospitals each year, with 99,000 associated deaths (CDC, 2007). The highest frequency of Nosocomial infection is reported from hospitals in our region, the Eastern Mediterranean Sea region 11.8% (WHO, 2002).

In Gaza hospitals, cross infection causes 10% of hospitalization causes, (Palestine, MOH, 2005). Infants are more vulnerable to infections; they need longer hospitalization for treatment (Palestine, MOH, 2007). PMOH adopts the IPC protocol in 2004, but the adherence with IPC protocols is poorly assessed in pediatric hospitals. The researcher of this study is assigned as infection prevention and control nurse at El-Dorra pediatric hospital, hoping to provide better results for preventing cross infection, and to be efficient at work. The researcher has decided to make sure if the existing protocol meets the needs of IPC or not, however researcher should first make sure if the health care providers are compliant with the existing IPC protocol, which

will lead to reduction of HAI and so the morbidity and mortality of hospitalized children in governmental pediatric hospitals in Gaza governorates.

### 1.4 The aim of the study

The aim of this study is to assess the compliance of health care providers with the infection prevention and control protocols in governmental pediatric hospitals in Gaza governorates, so as to enhance their practices and to minimize nosocomial infection between infants and children which have direct impact in decreasing morbidity and mortality of infants and children.

### 1.5 Research Objectives

- To assess compliance of health care providers in pediatric hospitals with the infection prevention and control protocol.
- To describe health care provider's knowledge, and practice in pediatric hospitals towards IPC.
- To assess the relationship between health care provider's practices in infection prevention and control and their personal characteristics.
- To evaluate physical environmental fitness to implement infection prevention and control protocol in pediatric hospitals.
- To explore barriers that prevents health care providers to adhere with infection prevention and control protocol.
- To provide a set of recommendations to enhance HCP's adherence with infection prevention and control protocol in pediatric hospitals.

### 1.6 Research questions

- What is the health care provider's knowledge about the Palestinian infection prevention and control protocol?
- What is the difference between the health care provider's practices in infection prevention and the Palestinian IPC protocol recommendations?
- Do health care providers in pediatric hospitals receive any training about the Palestinian IPC protocol?
- Do experience and type of profession affect the adherence of HCPs in pediatric hospitals with IPC protocol?
- Have the differences in working place or gender reflected any differences on the compliance of HCPs with IPC protocol?
- How fit is the physical environment of pediatric hospitals to the application of IPC protocol?
- What are the barriers that prevent the health care providers to comply with IPC protocol?
- What are the researcher's recommendations to enhance HCP's compliance with IPC protocol?

### 1.7 Context of the study

This study was conducted in the governmental pediatric hospitals in Gaza governorate. Therefore, it is worthwhile to understand the circumstances that contribute in forming the Palestinian health care system’s features and their effect on the Palestinian population. So the researcher represents some background information about the demographical context, Palestinian population, and Palestinian economy that may interact with each others to influence the health situation and health care services in Palestine.

#### 1.7.1. Demographic context of Palestine

Palestine is situated on the eastern coast of the Mediterranean Sea, with an entire area of 27,000 square kilometers (sq.km), it stretches from Ras Al- Nakoura in the north to Rafah in the south.

Palestine has an important strategic geographic location as it is situated on the western edge of the continent of Asia, the eastern coastal extremely of the Mediterranean Sea, it is boarded by Lebanon in the north, the Gulf of Aqaba in the south, Syria and Jordan in the east and by Egypt and Mediterranean Sea in the west (Appendix 1) (Abu-Lughod, 1971).

Now Palestine is limited to two geographically separated areas, Gaza Strip (GS), and West Bank (WB) with total areas of 6020 sq.km which represents 22% of historical Palestine area (Palestine, MOH, 2006). The total population was estimated 3,761,646 in 2007. Out of total number 2,345,107 in the WB and 1,416,539 in Gaza Strip (GS) with percentages of 62.3% and 37.7% respectively. The Palestinian population appears to be relatively well educated. In 2006, the illiteracy rate among individuals 15 years and over in the Palestinian Territories reached 6.5%, it was decreased in the period 1995-2006 from 15.7% to 6.5% (PCBS, 2007).

### 1.7.2. Demographic context of Gaza:

Gaza Strip is a narrow land, located on the south of Palestine on the coast of Mediterranean sea (Appendix 2). Its length from Rafah in the south to Beit-Hanoon in the north is measured 50 kilometers long and 5-12 kilometer wide. Gaza Strip is considered as an overcrowded area, where approximately 1.5 million live in 365sq.km, estimated density is 4,000 people per sq.km, the population is concentrated in 7 towns, 10 villages, and 8 camps (PCBS, 2008). The density increases in refugee camps (UNRWA, 2005). The population under 15 years old percentage in Gaza Strip, is 49% and 2.5% of population aged 65years or more (Palestine, MOH, 2006).

Gaza strip administratively is divided into five governorates: north of Gaza which represents 17% of the total area of Gaza strip with area of 61sq.km. Gaza constitutes 20.3% of the total area of 74sq.km. Mid zone constitutes about 15% of the total area of Gaza strip with area of 58sq.km. Khanyounis constitutes about 30.5% of the total area of Gaza strip with area of 108sq.km. Rafah constitutes about 16.2% of the total area of Gaza strip with area of 64sq.km (Palestine, MOH, 2005).

The natural population growth rate has increased in Palestine about 3.3% (3.0% in WB and 3.8% in GS). MOH has reported that Population natural growth rate in Palestine is 2.5% in 2005 (3.1% GS and 2.1% WB) (PCBS, 2007).

### 1.7.3. Palestinian economy

During the last five years, there were high fluctuations in economic status. According to World Bank report, the Palestinian economy is highly sensitive to external stimuli, due to its degree of dependence on Israel and in foreign assistance; the impact of the suspension of clearance revenue transfers and restrictions on movement. The report stated that, suspending revenue transfers, constraining Palestinian movement and access and reducing aid flows would cause severe economic damage. Real Gross Domestic Product (GDP) per capita declines by 27 percent in 2006, and personal incomes by 30 percent. By 2008, unemployment hits 47% and poverty 74 % (World Bank, 2007).

## 1.8 Health care System

The health care system in the West Bank and Gaza is extraordinarily complex and fragmented. It has various layers, there are four major providers:

Ministry of Health, United Nation Relief and Works Agency (UNRWA), nongovernmental organizations (NGOs), and private sector (non and for-profit hospitals).

There are two Palestinian governments and two ministries of health that have a role in the provision and control of health system, one of them in Gaza and the other in West bank, part of the employees working as health care providers receives their salaries from each of the two governments, *The MOH* is the main health care provider; it provides primary, secondary and tertiary care beside its role for supervision and control over all other healthcare providers.

*UNRWA* provides mainly primary health care services to the refugees, and the *nongovernmental organization* sector is extensive: from hospitals to facilities supported by international organizations, to community health centers, the *private for-profit* health sector also provides the three levels of care through a wide range of practices (WHO, 2005).

The health condition in GS faces new challenges exacerbated by the intensified Israeli closure. The WHO expressed its concerns about the sequences of the Palestinian internal political fragmentation; the socioeconomic decline; military actions; and the physical, psychological and economic isolation in the health of the population in GS (WHO, 2009).

### 1.9 Pediatric hospitals

Gaza governorates have three pediatric hospitals that are located at Gaza city. These hospitals are directed and owned by the Palestinian Ministry of Health as follows: El-Nassr pediatric hospital, El-Durra pediatric hospital, and Dr Abd El-Azeez El-Ranteesy specialized pediatric hospital (RSPH). All the three hospitals contain an administrative employees and clerks, and supportive medical departments as laboratory, X-ray, kitchen and laundry departments, and serve as internal medicine for children aged from one month up to twelve years old, except El-Nassr pediatric hospital which contains a nursery department that serves the newly-born infants since birth.

Most of the employees in the three governmental pediatric hospitals are official employees, who receive their salary from one of the two Palestinian's governments, but there are little number of employees with temporary contracts paid by the UNRWA, and other health care providers work as volunteers or for training purpose.

**El-Nassr pediatric hospital** is the oldest pediatric hospital in Gaza governorates which was established in 1962 on an area of 2200 square meters, it is located at the south-eastern of Gaza city at El-Nasser area, and it contains 146 beds in seven departments which are: pediatric intensive care unit, neonatal intensive care unit (nursery), general pediatric 1, general pediatric 2, general pediatric 3, reception and out patient department. There are 45 doctors, 101 nurses, and three physiotherapists, providing health care services in direct contact with the clients.

**El-Durra pediatric hospital** is relatively a newly - established pediatric hospital. It was constructed by the year of 2000, located at the north-eastern of Gaza city in Al-Toffah district. It serves the eastern areas of Gaza city which include the old and crowded parts of the city, the hospital is held on an area of 2000 square meters, and it contains 90 beds in five departments which are: pediatric intensive care unit; general pediatric 1; general pediatric 2; reception and out patient department. There are 56 nurses and 31 doctors, and 3 physiotherapists all of them work in direct contact with patients and provide health care services.

**Dr Abd El Azeez El-Ranteesy specialized pediatric hospital (RSPH )**is a new hospital, started its internal departments work at April 2008, it contains 53 beds in eight departments which are: pediatric intensive care unit; the cardiology, gastrointestinal, and chest diseases

departments are compressed in one department; the neurology and the nephrology units are in one department; the endoscopy unit, pediatric oncology department; pediatric hemodialysis unit; reception; and out patient department. RSPH is the only one of the three hospitals which was built as a pediatric hospital; it contains relatively advanced equipments and facilities. There are 45 doctors, 71 nurses and three physiotherapists as well as other supporting teams working in the hospital.

### 1.10 Operational definitions

**Compliance** is defined as: 'The extent to which the client's behavior matches the prescriber's recommendations (Horne et al., 2005).

**Adherence** is defined as: 'The extent to which the client's behavior matches agreed recommendations from the prescriber".

Or generally defined as the extent to which person's behavior – taking medication, following a diet, or executing lifestyle changes corresponds with agreed recommendations (International council of Nurses, 2008).

**Compliance:** For purposes of this research study the researcher uses adherence and compliance in the same meaning and defines it as: The HCP's practices in infection prevention and control that match the Palestinian IPC protocol which are wearing uniform, hand washing, using gloves properly, using antiseptics and disinfectants, proper sharp use and disposal, and proper medical wastes disposals.

**Infection Prevention and Control:** Evidence-based practices and procedures that, when applied consistently in health care settings, can prevent or reduce the risk of transmission of microorganisms to health care workers, other clients/patients and visitors. (Canada, Ministry of Health, 2008).

**Protocol**: the system of rules and acceptable behavior used at official ceremonies and occasions (Cambridge Advanced Learner's Dictionary, 2010).

When the world "protocol" is mentioned in this research study the researcher points to the Palestinian IPC protocol.

**Palestinian infection prevention and control protocol:** It is the hard work and dedication of the USAID funded by MARAM project staff in full collaboration with a group of national experts representing all medical specialties, and with the support and technical back-up from Intra Health International, inc., an affiliate of the University of North Carolina at Chapel Hill in the USA aiming to provide the best appropriate infection prevention and control practices based on each setting needs (Palestine MOH, 2004).

**Healthcare provider** - a person who helps in identifying, preventing or treating illness or disability (Cambridge Advanced Learner's Dictionary, 2010).

**Healthcare provider (HCP):** For purposes of this research study, health care provider is defined as a health care professional who work in governmental pediatric hospital, provide health care services and has the potential for exposure to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air and it includes all doctors, nurses, and physiotherapists **(**Healthcare personnel safety component protocol, 2009**)**

**Healthcare Associated Infection (HCAI):** Encompasses any infection, by any infectious agent acquired as a consequence of treatment for a medical condition, or acquired by a healthcare worker in the course of their duties, (Code of Practice for the Prevention and Control of Healthcare Associated Infection England, 2009)

**Aseptic technique**: Any health care procedure in which added precautions, such as the use of sterile gloves and instruments, are used to prevent contamination of a person, an object, or an area by microorganisms (Mosby's Medical Dictionary, 2009).

**Hand Hygiene:** It is the process of removing soil and transient microorganisms from hands. Hand hygiene accomplished by using soap and running water for at least fifteen seconds after removing jewelry. (Ministry of Health and Long-Term Care, Public Health Division, 2008).

**Personal protective equipment**: This equipment refers to items specifically used to protect the health care worker from exposure to body substances or from droplet or airborne organisms. Personal protective equipment includes gloves, gowns, caps, masks and cover shoes (Republic of South Africa, 2007).

## 2. Literature review

This chapter has illustrated issues that are related to infection prevention and control protocol. It begins with the conceptual framework of the study that clarifies the main factors that affect in improving health care provider's compliance with the Palestinian infection prevention and control protocol. Then it has depicted definitions of infection prevention and control, description of standard precautions and its contents, explaining the infection transmission cycle, the hospital acquired infection, assessment of the compliance with infection prevention and control, barriers that prevent HCPs to comply with the IPC protocol, and finally explained methods for improvement.

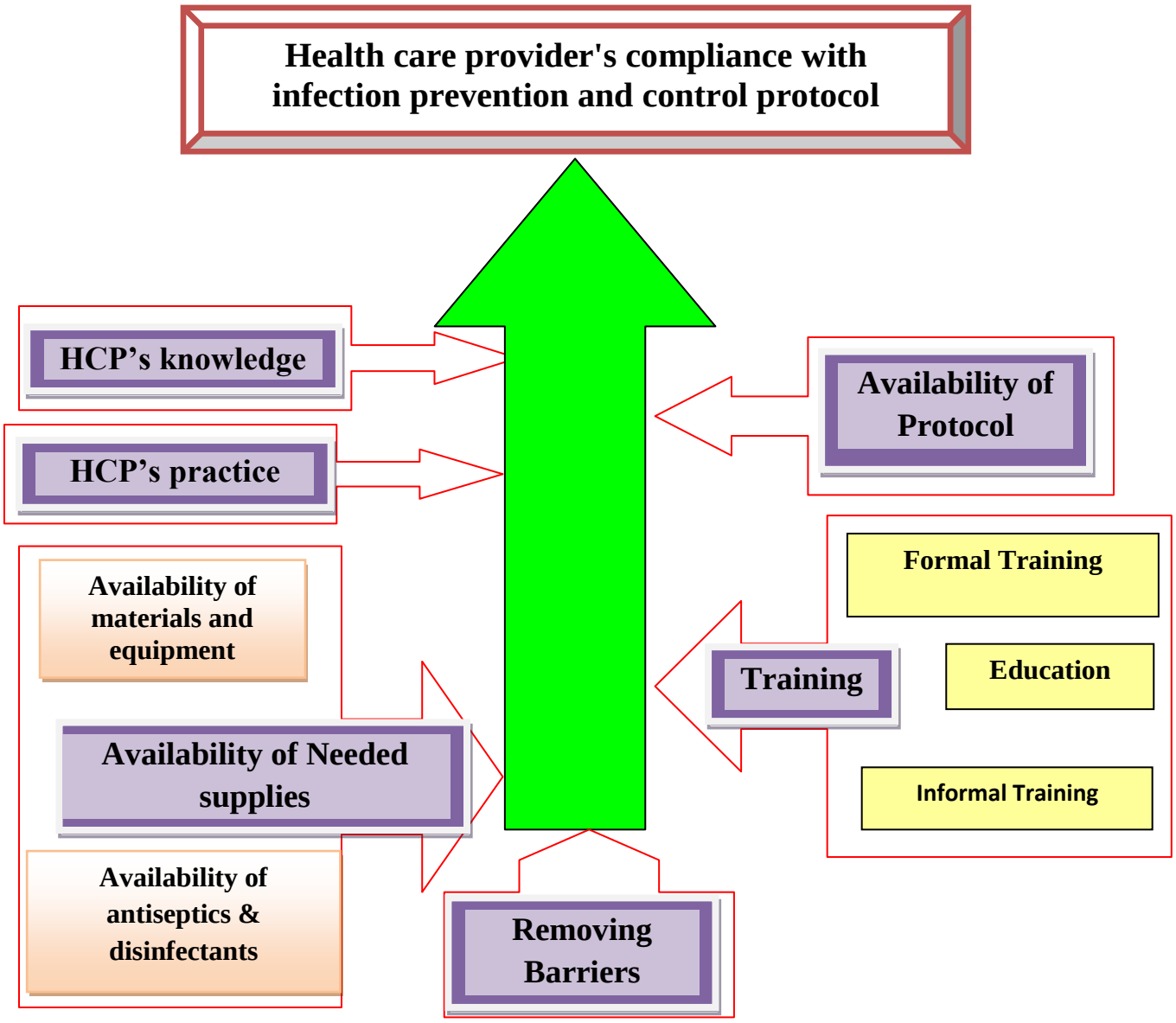
### 2.1 Conceptual framework

The researcher has established this conceptual framework to addresses the main factors that could influence the compliance of the health care providers to infection prevention and control standards and protocols. After reviewing the available literatures, the researcher concentrates on the main factors that may contribute in health care provider's compliance with the IPC protocol which were congruent with WHO guide lines which are: The availability of the protocol; the health care provider's knowledge, the health care provider's IPC practices , the availability of the needed supplies which include the provision of materials, equipments, and antiseptics needed ; the adoption of training by its types and removing of barriers that prevent the healthcare provider's adherence to IPC protocols.

In a previous study of (Luby et al., 2005) report the results of a trial to evaluate the impact of hand hygiene promotion on leading childhood infectious diseases for the low income population living in the squatter settlements of Karachi, Pakistan. The use of soap and adoption of education have greatly decreased impetigo by 34%, diarrhea by 53%, and pneumonia by 50%. Disease duration was shorter, thus probably reducing the duration of infectivity for household contacts. Children were 56% less likely to consult a health care practitioner for diarrhea and 26% less likely to be hospitalized. The Karachi intervention was multimodal with intensive ongoing education and encouragement, distribution of soap for free, and possibly, focused group discussion.

Multimodal interventions have more chance of success than programs focusing on a single element only and were the only ones with sustained effect. Successful promotion in health care settings requires system change, education and motivation of caregivers, leadership and administrative support, and in some conditions patient empowerment.

Improvement in HCPs compliance to infection prevention practices decreases HAI which will lead to minimizing childhood cross-infection with communicable diseases and decreases childhood morbidity and mortality.



## 2.2 Infection prevention and control

An infection is the invasion of the body's natural barriers by microscopic organisms — bacterial, fungal, viral, or parasitic — which multiply to create symptoms. The infectivity of the microorganisms depends on the three factors known as epidemiological triangle which are the host characteristics, the agent pathogenicity, and the environmental physical, social and biological characteristics (Infectious Diseases Society of America, 2003).

Most of the literature studies related to the term of infection prevention have depended on the definitions of WHO, and CDC, one definition of infection prevention is that: Prevention of infection included activities by patients, physicians, nurses, and public health professionals aimed at reducing the likelihood of microbial invasion and multiplication (Infectious Diseases Society of America, 2003).

The CDC defines IPC as: measures done by the healthcare facility that minimize the spread of infectious agents between personnel (CDC, 2003). It can also be defined as: Infection prevention and control are those practices that must be used appropriately by all healthcare providers- including doctors, nurses, physiotherapists- to limit the spread of infections (WHO, 2004).

Millennium Development Goals (MDGs) numbers 4 and 6 deals with reducing childhood mortality, and combat HIV/AIDS, malaria and other infectious dangerous diseases (United Nation, 2010).

Infection prevention includes all strategies and practices used to avoid the spread of infection. Before 1980, infection prevention has been based up on isolating risky patients and giving them specific treatment which failed to protect them from Nosocomial infections due to the presence of symptomatic cases and diseases in latent periods. By the mid of 1980, the Acquired Immune Deficiency Syndrome (AIDS) epidemic fosters the establishment of new strategies to protect health care workers from cross infection (CDC, 2007). Recently, the IPC includes many principles that guarantee the complete protection of patient, health care workers, and the community and decrease the incidence of Nosocomial infections (WHO, 2009).

## 2.3 Infection transmission cycle

A model used to clarify the infection process, is the chain of infection, a circle of links, each represents a component in the cycle. Each link *mus*t be present and in sequential order for an infection to occur. As seen in (annex 3) as follows:

1. Causative agent which may be any kind of microorganisms (bacteria, fungi, virus, or parasite 2. Reservoir which is the place where the invading organisms live and multiply; and it could be human, animal, soil, or inanimate matter; the human reservoir is either case or carrier. 3. Place of exit, meaning the body system where the organisms exit through it such as respiratory system, gastrointestinal system, genitourinary system, skin lesion or blood stream. 4. Mode of transmission that describes how agents move from a place to another which could be direct by direct contact, droplet or indirect through vehicle that could be air born, or vector. 5. Mode of entry which describes the portal of entering the body through any body system or a broken or injured skin, the prevention strategy is built on our knowledge with the portal of entry. 6. Susceptible host which depends on the characteristics of person such as age, sex, nutrition, general health status, immunity and vaccination, and the number of organisms (Domani, 2003).

Epidemiologists are used to study this circle to explore the weakest point that they can destroy to cut this circle. It is the easiest and effective action they can do to overcome infectious diseases, and out breaks. In some recent new emerging infections or that they can't determine the circle clearly; they recommend following standard precautions in addition to specific precautions that suit the disease such as air contact precautions, and direct contact precautions.

Other researchers focus on the destruction of infection chain to achieve infection prevention (Alvre, 2005).

Preventing infection means to observe and watch your habits, lifestyles, and surroundings and then assessing for those things that may promote infection. By identifying those things in the infection chain, we can take steps to eliminate infection by cutting that chain at the easiest possible point (Mark, 2006).

## 2.4 Hospital acquired infection

Hospital acquired infection is also called "A nosocomial infection" can be defined as: An infection acquired in hospital by a patient who was admitted for a reason other than that infection. It also can be defined as an infection occurring in a patient in a hospital in whom the infection was not present or incubating at the time of admission. This includes infections that are acquired in the hospital and appear after discharge, and it also includes the occupational infections among staff of the facility (WHO, 2002).

The costs of health care-associated infections vary from country to country, however they are substantial everywhere. Current statistics indicate that health care-associated infections (HAIs) are approximately 1.7 million infections and 99,000 deaths each year. They are one of the ten Leading causes of death in the United States. Besides the significant financial repercussions for the institution. Estimates put excess health care costs for HAIs at between $4.5 billion and $5.7 billion (U.S.) annually (Barbara, 2008).

In England, for instance health care-associated infections are estimated £1000 million annually to the National Health Service. While in Trinidad and Tobago they represent 5% of the annual budget of a country hospital, and in Thailand some hospitals spend 10% of their annual budget on the management of infections. In Mexico, these costs represent 70% of the entire budget of the ministry of health (WHO, 2005).

The nosocomial infection rate in patients in a health care facility is a clear indication of quality and safety. The development of surveillance process is an essential step to identify local problems and priorities and to evaluate the effectiveness of infection control activities. Surveillance is an effective process to decrease the frequency of hospital acquired infections. WHO (2002) has mentioned, in the 2$^{nd}$ edition of the Practical guide of Prevention of hospital acquired infection, the main component of an integrated monitoring program which includes: limitation of transmission of organisms among patients in direct patient care through adequate hand washing, adequate gloves use, appropriate aseptic practices, isolation strategies, sterilization and disinfection, laundry, controlling environmental risks for infection, protecting patients with appropriate use of prophylactic antimicrobials, nutrition and vaccinations, minimizing invasive procedures and promoting optimal antimicrobial use, surveillance of infections, identifying and controlling outbreaks, prevention of infection in staff members, enhancing staff patient care practices, and continuing staff education.

Prevention of nosocomial infections is the responsibility of all individuals and services providing health care. Everyone must work cooperatively to reduce the risk of infection for patients and staff simultaneously. This includes personnel providing direct patient care, management, physical plant, provision of materials and products, and training of health workers (WHO, 2002).

Published reports discus methods of preventing HAIs and estimate that at least one-third of HAIs could be prevented using current WHO recommendations. More recent advances using "bundled" best practices have shown that hospitals can eliminate some infections for extended periods of time (Harbarth, & Gastmeier, 2003) & (Berenholtz et al, 2004).

### 2.5 The standard precautions

Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be divided into standard precautions. Such precautions must be applied to all patients at all time, regardless of diagnosis or infectious status, and additional (transmission-based) precautions which are specific to modes of transmission (airborne, droplet and contact) or that might be used in outbreaks.

The standard precautions can be defined as: Treating all patients in the health care facility with the same basic level of "standard" precautions. They involve work practices that are essential to provide a high level of protection to patients, health care workers and visitors. These include: hand washing and antisepsis (hand hygiene); use of personal protective equipment when handling blood, body substances, excretions and secretions, appropriate handling of patient care equipment and soiled linen; prevention of needle stick/sharp injuries; environmental cleaning and spills-management; and appropriate handling of waste (WHO, 2004).

The standard precautions are basically the same and some modifications are usually done every other year, and then approved by international agencies as WHO and CDC. WHO clarifies that standard precautions must be followed in all health care settings, and it this needs management support to achieve its intended goals (infection prevention) (WHO, 2007).

The previous study of (Michelle Kermode, 2005) has assessed HCPs knowledge and understanding of the standard universal precautions and states that: Knowledge and

understanding of universal precautions are partial, and universal precautions compliance is suboptimal, e.g., only 32% wear eye protection when indicated, and 40% recappes needles. After controlling for confounding, compliance with universal precautions is associated with: being in the job for time, knowledge of blood borne pathogen transmission, perceiving fewer barriers to safe practice and a strong commitment to workplace safety climate.

But still we have to follow specific standards and comply with practices so as to achieve IPC.

### 2.5.1. Hand washing and hand hygiene

Hands are the most common way in which microorganisms, particularly bacteria, might be transported and subsequently cause infection, especially to those who are more susceptible to infection. In order to prevent the spread of microorganisms among those who might develop serious infections by this route while receiving care, hand hygiene must be performed adequately. Hand washing is the single most important practice of reducing the transmission of infectious agents, including HAI, during delivery of care.

The basics of good hand washing include using adequate amount of soap, rubbing the hands together to create some friction, and rinsing under running water. The mechanical action of washing, rinsing and drying removes most of the transient bacteria present (Canada, Communicable Disease Report, 1998*)*

Hand hygiene includes many steps and a lot of criteria to be effective, by following all these steps including the hand hygiene process, e.g. preparation for hand hygiene (care of nails and jewelry), hand drying and hand care, you will ensure potentially harmful microorganisms which are not a factor in the spread of infectious agents (Health Protection Scotland, 2009).

Hand washing procedures are three types: *Routine hand washing:* with plane soap and running water which remove transient flora from the skin by following specific criteria such as: before starting, sleeves should be rolled up; removing ring, watch and bracelets; when washing hands you should include wrists, and to pay special attention to the area of the hand most frequently missed; and wash hands for fifteen seconds or more (Palestine, MOH, 2004).

***Alcohol-based hand rub (ABHR):*** An alcohol-containing preparation designed for application to the hands in order to reduce the number of viable micro-organisms with maximum efficacy and speed (Hand Hygiene Australia, 2009).

ABHR is rarely used in Gaza hospitals, since the basic material used in hand rubbing is not available except in little amounts came via donation which is inconsistent source. *Antiseptic hand wash:* Antiseptic containing preparation designed for frequent use. It reduces the number of micro-organisms on intact skin to an initial baseline level after adequate washing, rinsing and drying. It is broad spectrum, fast acting and, if possible persistent (CDC, 2002).

Many factors have contributed to poor hand washing compliance among health care workers, including a lack of knowledge among personnel about the importance of hand hygiene in reducing the spread of infection and how hands become contaminated, lack of understanding of correct hand hygiene technique, understaffing and overcrowding, poor access to hand washing facilities, irritant contact dermatitis associated with frequent exposure to soap and water, and lack of institutional commitment to good hand hygiene (Pittet, 2001).

### 2.5.2. Personal protective equipment

Personal protective equipment (PPE) is any type of face mask, glove, or clothing that acts as a barrier between infectious materials and the skin, mouth, nose, or eyes (mucous membranes). When used properly, personal protective equipment can help prevent the spread of infection from one person to another. Examples of PPE include: disposable gloves, gowns, laboratory coats, protective face shields, resuscitation masks or shields, and mouth pieces. Any equipment necessary to prevent exposure to blood or other potentially infectious material is considered PPE. Effective personal protective equipment must not allow potentially infectious materials to pass through or reach your skin, eyes, mouth, or clothes under normal conditions of use. General work clothes, such as uniforms, pants, shirts, or blouses, which are not intended to function as a protective barrier against hazards, are not considered to be PPE (Quality Safety Training, 2010).

The researcher in another study of the adherence to use protective equipments states: The majority of around (95.8%) has reported to have been using Personal Protective Equipment (PPEs) while performing various procedures. The most commonly used PPE are gloves

(32.4%) while the least used are boots (4.6%). The majority (39.7%) have been motivated to use PPEs as a means of preventing cross infection followed by 28.8% who were motivated by the availability of the PPEs (Michelle Kermode, 2005).

The researcher during this study dose not notice the presence of most of these protective equipments in the place of study, the only protective device noticed is gloves, with absence of all other types such as face masks, protective eye glasses, gowns, etc.

#### 2.5.2.1. Wearing gloves

Health care workers are exposed to the danger of infections or injuries almost every day at work. The rules and precautions are simple, but sometimes the health workers are just too busy to remember that they should take care of themselves. Blood borne pathogens are considered the most dangerous threat to health workers. A long list of diseases can be transmitted to (and from) health care provider. They get in contact with patients skin, wounds, secretions and it's very often that they may just forget or sometimes are too lazy to do a simple thing such as wearing a glove.

Wearing gloves is recommended to reduce the risk of healthcare provider's acquiring infection from patients, to prevent HCPs' flora from being transmitted to patients, and to reduce transient contamination of hands of HCPs by flora that can be transmitted from one patient to another. Gloves should be worn during all patient-care activities that may involve exposure to blood or body fluid. The effectiveness of gloves in preventing contamination of HCPs' hands has been confirmed in several studies; however, gloves do not provide complete protection against hand contamination. Therefore hands should be washed or disinfected with alcohol based hand rub after removal of gloves (Mona & Tariq, 2006).

Although the effectiveness of gloves in preventing contamination of health care providers' hands has been repeatedly confirmed (Tenorio et al, 2001), wearing gloves does not replace the need for hand washing. For example, even the best quality latex surgical gloves may have small, unapparent defects, gloves may be torn during use and hands can become contaminated during removal (Bagg, Jenkins, and Barker 1990; Davis 2001).

There are three types of gloves used in healthcare facilities: Surgical gloves should be used when performing invasive medical or surgical procedures.

Examination gloves provide protection to healthcare workers when performing many of their routine duties, and it is available in latex and non-latex. Utility or heavy-duty household gloves should be worn for processing instruments, equipment and other items; for handling and disposing of contaminated waste; and when cleaning contaminated surfaces. Some deficiencies were noted after using gloves, such as cracked, peeling or have detectable holes or tears that beside the possibility of developing allergic reaction. Allergic reactions to latex rubber gloves are being increasingly reported among healthcare providers, if possible, non-latex (nitrile) or low-allergen latex gloves should be used if allergy is suspected. In addition, wearing powder-free gloves is recommended. If this is not possible, then wearing cloth or vinyl gloves beneath latex gloves may help to prevent skin sensitization. It will not, however, prevent sensitization of the mucous membranes of the eyes and nose if these gloves are powdered (Garner and HICPAC, 1996).

### 2.5.3. Antiseptics and disinfectant

An antiseptic is a substance that inhibits the growth and development of microorganisms. Antiseptics are a diverse class of drugs that are applied to skin surfaces or mucous membranes for their anti-infective effects. This may be either bactericidal (kills bacteria) or bacteristatic (stops the growth of bacteria). Their uses include cleansing of skin and wound surfaces after injury, preparation of skin surfaces prior to injections or surgical procedures, and routine disinfection of the oral cavity as part of a program of oral hygiene. Antiseptics are also used for disinfection of inanimate (Uretsky, 2004).

Hand washing with an antiseptic agent has long been considered effective in reducing the incidence of health care-associated infection. Compounds currently used for both routine and pre-surgical preparation hand antisepsis in health care settings include plain (non-antimicrobial) soap, chlorhexidine, chloroxylenol, hexachlorophene, quaternary ammonium compounds, and triclosan. Optimal hand hygiene should balance protecting the skin and resident flora, and reducing or eliminating transient flora (Judith & Garson, 2006).

Multiple nosocomial outbreaks have resulted from inadequate antisepsis or disinfection. Inadequate skin antisepsis may result from a lack of intrinsic antimicrobial activity of the

antiseptic, a resistant pathogen, over dilution of the antiseptic, or the use of a contaminated antiseptic. The inadequate disinfection of medical devices or environmental surfaces may result from a lack of intrinsic antimicrobial activity of the disinfectant, an incorrect choice of a disinfectant, a resistant pathogen, over dilution of the disinfectant, an inadequate duration of disinfection, a lack of contact between the disinfectant and the microbes, or the use of a contaminated disinfectant **(**David et al, 2007).

### 2.5.4. Used needle or sharp medical instrument injury

The injury of health care providers with used needle or sharp medical instrument considered a major occupational hazard which may lead to cross infection with dangerous fatal diseases such as HBV and AIDS (Wicker et al, 2007).

The study is conducted to investigate the frequency and the cause of needle stick injuries in a German university hospital, the study has focused on injuries caused by contaminated sharps, the researcher has found that, 35.6% physicians, 58.4% nurses, 4.3% cleaners, and 1.7% lab. Technicians have exposed to at least one needle stick injury in the last year, while physicians have the highest risk to experience needle stick injuries with 55.1%, followed by nurses with 22%. The researcher discusses the needle injuries that can be avoided by the introduction of safety devices; and has found that 29.2% of needle injuries might be avoided, while 36.7% could not be avoided, and he recommends to prevent needle injuries by organizational measures (Wicker et al, 2007).

In another cross sectional study that aims to assess safe injection practices among health care workers in Garbiya Governorate, Egypt, the results have shown lacked infection control policy in all of the facilities, and lack of many supplies needed for safe injection. 62.2% of the respondent has reported that they experienced at least one needle stick injury during their working life. The most common reported causes of HCP's hand injuries are recapping of needles followed by during waste collection and then while needle flexing. The study also reveals that only 11.3% of respondent have received a full course of Hepatitis B vaccination, and concludes that there is a lack of training of all health care workers on different practices related to safe injection practices (Shama et al, 2007).

## 2.6 Infection prevention and control protocol

Infection prevention and control is an essential part of health care that has an impact on the infant mortality and morbidity, it provokes many health institutions to adopt various IPC protocol and guidelines to ensure high quality and developed health care system.

A nosocomial infection prevention manual, compiling recommended instructions and practices for patient care, is an important tool. The manual should be developed and updated by the infection control team, with review and approval by the committee it must be made readily available for patient care staff, and updated in a timely fashion (Pittet, 2002).

The guidelines are generic in nature and can be used in any health care facility. Countries need to adapt them to suit their needs, context and resources. Health care providers should periodically refer to it, to update information on infectious diseases and their control (WHO, 2003).

These guidelines describe the precautions that healthcare workers should consider in three areas: standard principles for preventing HAI, which include hospital environmental hygiene, hand hygiene, the use of personal protective equipment, and the safe use and disposal of sharps; preventing infections associated with the use of short-term indwelling catheters; and preventing infections associated with central venous catheters. In addition to informing the development of detailed local operational protocols, these guidelines can be used as a benchmark for determining appropriate infection prevention decisions and, as part of reflective practice, to assess clinical effectiveness. They also provide a baseline for clinical audit, evaluation and education, and facilitate ongoing quality improvements (Pratt et al, 2007).

## 2.7 Infection prevention in pediatric hospitals

The CDC has developed and regularly updates specific guidelines aiming to prevent the transmission of pathogens within the hospital setting. An important component of these guidelines involves hand hygiene. How broadly these recommendations were followed in

pediatric hospitals is not known. Moreover, despite the quantity of data supporting the use of infection control measures to prevent hospital- associated infections, there have been few multicenter studies examining the variability of infection rates and infection control policies among institutions and investigating which infection control measures might be more important, especially in pediatric settings (Danielle, 2005).

Infants are more liable to get infections and have immature immune system which require us to use other infection prevention practices in addition to the standard precautions followed in all health care settings including droplet and contact precautions, wearing gloves, wearing clean uniform and using isolation as needed (WHO, 2007).

American Academy of pediatrics (2001) has recommended standard guidelines for infection control in pediatric hospitals and pediatric intensive care unit focusing on: physical setup explaining the arrangement and organization of the unit space, ventilation of the units, scrub area, isolation room criteria, and administrative arrangements beside the use of the standards of IPC.

### 2.8 Assessment of the compliance to infection prevention and control

Many studies assess the compliance of HCP to IPC. This assessment is valuable in planning and decision making to increase the compliance of all categories of health care workers reaching observed decline in infections and morbidities resulting from cross infection.

The assessment might include, personal characteristics, knowledge and training about the importance of infection prevention; administrative support and punishment used for non-compliant persons, and the accessibility of materials used in disinfection (Pittet, 2002).

(Awad, 2009) In her study of health care workers compliance to IPC protocol in intensive care units in Gaza governorates clarifies that the practice of infection prevention and control was 56% among health care workers though their attitude was high.

Many variables affected in compliance to IPC practices such as personal and professional characteristics, the study of Askarian et al, (2006), on the compliance of personal hygiene and safety and its effect on Nosocomial infection in Shiraz, reflected that there are varieties in

compliance with personal hygiene among health care workers, where physicians and nurses were less compliant than cleaners, 10% of doctors, 32.2% of nurses, and 56.7% of cleaners adhere to personal hygiene practices.

### 2.9 Barriers of compliance to IPC protocol

Many research studies has explored barriers that prevent or decrease the health care worker to comply with IPC protocols, most of these studies have shared some causes, and added other different variables according to demographic and personal differences.

According to WHO (2007) a description of perceived barriers to adherence with hand hygiene practices shows the following causes: skin irritation caused by hand hygiene agents, inaccessible hand hygiene supplies, interference between practices and health care worker-patient relationship, patient needs as a priority over hand hygiene, wearing of gloves forgetfulness, lack of knowledge of guidelines, insufficient time for hand hygiene related to high work load and understaffing, and the lack of scientific information about impact of improved hygiene in lowering the incidence of hospital acquired infections.

Another study has defined direction of assessment area to be assessed, conducted that the assessment should include many related variables as management support and offering needed equipments, availability of protective measures was better in teaching hospitals, and vaccination rate among staff with physician score were the highest. These results pointed to the measures needed to improve health care workers in compliance with infection prevention including increasing knowledge of health care workers about the importance of infection prevention measures not only in decreasing morbidity and mortality but also in decreasing financial costs as well (Askarian et al, 2006).

Many research studies have assessed the compliance to hand hygiene as the main and most effective infection prevention practice as a tool of assessment to the entire IPC practices.

One researcher has differentiated the barriers into two groups, i.e., the group level, and the individual level. At the group level, the barriers practicing hand hygiene was attributed to lack of education, high work load especially when the ward is occupied to its full capacity,

understaffing, working in the critical care units, lack of encouragement and lack of a role model among senior staff. On the other hand, the individual level, the barriers perceived is the lack of knowledge and experience, lack of knowledge of guidelines set by the institution or being a refractory non-complier (Suchitra & Devi, 2007).

compliance with IPC practices and protocols is needed all the time, but the need increased in case of emergencies and outbreaks, a study that explores reasons for non-adherence to communicable disease crisis guidelines which is essential part of recent health care facility practices especially when endemic of new emerging infectious diseases, and re-emerging of other infectious diseases have been taken place. The researcher identifies and measures barriers and conditions for optimal adherence as perceived by 4 categories of health care professionals. Crisis guidelines are found to have 4 generic barriers to adherence: lack of imperative or precise wording; lack of easily identifiable instructions specific to each profession; lack of concrete performance targets; and lack of timely and adequate guidance on personal protective equipment and other safety measures (Timen et al., 2010).

### 2.9.1 Methods to improve compliance with infection prevention and control precautions

Great international efforts have been paid to improve the HCP's compliance with IPC precautions, much of these efforts have not reflected any positive results, which is the result of treating the problem before assessing it properly. The compliance with protocols has many aspects and affected by many variables such as availability of guidelines; the fitness of physical environment; the role of the existing health care system; the institution management support and supervision; and strategies implemented to overcome barriers.

The development of surveillance process is an essential step to identify local problems and priorities and to evaluate the effectiveness of infection control activities. Surveillance is an effective process to decrease the frequency of hospital acquired infections (WHO, 2002).

A research study has defined the key to implementation and quality improvement in infection prevention to be lied in combining the political will to create an environment that supports and challenges the trusts and individual practitioners cut HAIs with the creation of an internal

environment that focuses on learning, leadership and involvement to ensure that staff provide safe, clean care ( Loveday et al, 2007).

Another study has explored methods to improve compliance to hand hygiene practices- as the main IPC precaution- by describing the efforts needed, it should be multimodal and multidisciplinary. In-service education, information leaflets, workshops and lectures, automated dispensers, and performance feed back on hand-hygiene adherence rates need to be associated with further improvements. In developing countries, like India, more emphasis should be given on such practices like hand hygiene in which infection control can be done to over power the infections and to improvise the medical standards and health conditions in a very economical way (Mani et al, 2010).

Crises situations needs crises management, to improve adherence to crisis guidelines, the generic barriers should be addressed when developing guidelines, irrespective of the infectious agent. Profession-specific barriers require profession-specific strategies to change attitudes, to ensure organizational facilities, and to provide an adequate setting for crisis management (Timen et al, 2010).

Many managers suggested adapting the rule of reward and punishment in improving HCPs' compliance to general or specific IPC practice. As example of punishment used to enforce hand washing, in Abington Memorial Hospital in Abington a healthcare workers have been punished by firing for failure to comply with proper hand hygiene procedures which is a major component of IPC standards (Sweeney, 2010).

Some infection prevention agencies have supported health institutions to implement a campaign or intervention project to improve their HCPs practices and compliance with standard precautions to decrease HAIs. Such as the following study which has investigated hand hygiene, handling of needles and use of personal protective equipment in an Indonesian teaching hospital, and performed a multi-faceted intervention study to improve compliance. An intervention has been performed in an internal medicine ward and a pediatric ward, consisting of development of a protocol for standard precautions, installation of wash stands, educational activities and performance feedback. Before, during and after the intervention, observers have monitored compliance with hand hygiene, safe handling of needles and use of gloves, gowns and masks. A gynecology ward has served as the control. Unobtrusive

observations have been performed to check for an influence of the observers on the overt observations. In total, 7160 activities have been observed. Compliance with hand hygiene has increased from 46% to 77% in the internal medicine ward and from 22% to 62% in the pediatric ward. Before the intervention, no safe recapping of needles has been recorded in either ward. After the intervention, 20% of needles have been recapped safely. Inappropriate gown use has decreased in the internal medicine ward. There have been any significant changes in use of gloves and masks. There may have been an effect of the overt observations in the pediatric ward, but there was no effect in the internal medicine ward. There were no significant changes in the control ward, except for a decrease in the use of gloves. In conclusion, compliance with hand hygiene procedures have improved significantly due to an intervention project focused on education and improved facilities. Compliance with safe handling of needles improved slightly due to introduction of the one-handed method for safe recapping of used needles (Duerink et al, 2006).

This observational study measures healthcare workers' (HCWs'), patients' and visitors' hand hygiene compliance over a 24 h period in two hospital wards using the 'five moments of hand hygiene' observation tool. Hand hygiene is considered to be the most effective measure in reducing healthcare-associated infections but studies have reported suboptimal levels of compliance. Most studies have used random observational time-periods for data collection and this has been criticized. We monitored a total of 823 hand hygiene opportunities (HCWs, $N = 659$; patients and visitors, $N = 164$). Among HCWs, compliance was 47% for doctors, 75% for nurses, 78% for allied health professionals, and 59% for ancillary and other staff ($P < 0.001$). There was no difference in compliance between patients and visitors (56% vs 57%, $P = 0.87$). Hand hygiene compliance varied depending on which of the five moments of hygiene HCWs had undertaken ($P < 0.001$), with compliance before an aseptic task being 100% (3/3); after body fluid exposure 93% (86/93); after patient contact 80% (114/142); before patient contact 68% (196/290); and after contact with surroundings 50% (65/129). Lower levels of compliance were found for HCWs working during the early shift ($P < 0.001$). For patients and visitors there was no evidence of an association between moments of hygiene and compliance. Levels of compliance were higher compared with previous reported estimates. Medical staff had the lowest level of compliance and this continues to be a concern which warrants specific future interventions (Randle et al, 2010).

## 2.10 Education and training programs

Educational sessions, training programs, and management support and supervision have been found to be critical factors that can improve HCP's compliance with IPC practices significantly. A study conducted in Egypt at Assiut governorate, the researcher has aimed to assess educational training program for nurses working in maternal and child health centers regarding infection control. It has been conducted in all maternal and child health centers in Assuit city. Work system in maternal and child health center is divided into two shifts; morning and afternoon. The total number of the study sample have been 72 nurse, two tools have been designed to collect data; questionnaire has been used as a tool for data collection in both pre and post test of the training program in order to measure knowledge level of the trainees. The second tool has been observation checklist which has been developed to assess nurses' performance. These tools have been used before and after the training program to evaluate the extent to which the training program affected the nurse's performance. Observation has been done during routine work; the results of the study have reflected that: The percentage nurses with sufficient knowledge regarding the concept of epidemiology increased from 40.2% to 88.9% after exposure to the program, The nurse's knowledge about universal precautions improved from 12.5% to 80.6%, the nurses adherence to hand washing has increased from 87.5 to 100%, technique of hand washing has been improved from 33.4 to 76.4%, wearing gloves practices increased from 93 to 98.6%. These results have encouraged the researcher to recommend periodic refreshing training course to keep the improvement (Hassan et al, 2004).

Another study conducted to assess the compliance with modified contact precautions policy regarding routine gowning and gloving in intensive care unit and general wards; the study tools have included meetings with supervisors, department's nursing team, infection control professionals, and the hospital epidemiologist, the researcher has asked nurses to familiarize visitors with the modified contact precaution policy which stated that gown and gloves are required before entry into the room, and posted beside the door. The results have revealed a significant increase in compliance of all personnel. HCP's compliance reached 73%, while visitor's compliance reached 65% (Manian & Ponzillo, 2007).

These results encourage the researcher to find the suitable strategy to improve the HCPs compliance with IPC protocol in pediatric hospitals.

### 2.11 Knowledge and practices of IPC

The levels of awareness to universal precaution among health care workers have various degrees in different countries; many research studies have discussed this issue and most of them reveal differences between knowledge and practice of HCPs in different health institutions. One study has explored differences between knowledge, attitude and practice of basic precaution by medical personnel in a teaching hospital. The data collected through structured self administered questionnaire, and the results have revealed that 92% of respondents have knowledge about universal precautions where as 32% have contacted skin with infected blood or body fluid without gloves, which is contrary to standard precautions. 96% of respondent agreed that universal basic precautions should be practiced for all patients, and 94% agreed that it is important to wear gloves when doing invasive procedure, while the results of actual practice; 88% of respondents have indicated that they wore gloves when performing invasive procedure (Hesse et al, 2006).

Another study of knowledge and practice of universal precautions has been carried out among final year medical and nursing students of university teaching hospital in Nigeria, to assess the level of awareness of basic principles of universal precautions, the results have revealed that; only 36.9% of medical students have been scored very well, against 42.2% of nursing students. The source of information has been defined as; 19% from classroom, 27% from books and journals; and 12% from seminars and workshops. The researcher has found that 64.3% of the respondents are familiar with universal precautions; the frequency of needle sticks are about 41.8%; level of knowledge of what's constitute universal precautions was equally low, and only 38.8% of the respondents have a very good knowledge. Wearing of ward coat and gloves during clinical work has been 73% among medical students against 7.7% among nurse's students. Adding the practices of regular hand washing after touching patients is higher among nurses 53.8% than medical 37.9%. Also hand washing after removing gloves nurses applied at 57.7% against medical 26.2%. So this study reflected reverse results

comparing to other studies as it identify very low knowledge with universal precautions while practice was observed to be higher (Bamigboye et al, 2006).

Other cross sectional survey study of medical staff in two hospitals in Mazandaran province, Islamic republic of Iran, the researchers have found that 65.8% of hospital "A" staff have heard about universal precautions compared with 90% of hospital "B" staff, among the staff respondent 64.3% have bachelor degree or more, and have the highest knowledge and practices toward universal precautions, and they have found a significant relationship between age and knowledge and practices toward universal precautions, many of health workers have been misconception of the universal precautions, low general understanding of universal precautions among health staff and medical students (Motamed et al, 2006).

## 2.12 Summery of literature review

In this chapter the researcher discussed issues related to infection prevention and control; as he started with description of the conceptual frame work which was drawn as a map for the research process and it identified all factors found to have a related with IPC protocol which were: The availability of the protocol; the health care provider's knowledge about IPC; the health care provider's practices about IPC; the availability of the needed supplies which include the provision of materials, equipments, and antiseptics needed ; the adoption of training by its types and removing of barriers that prevent the healthcare provider's adherence to IPC protocols.

Then explore the history of infection prevention and control practices and definitions, and found most of the definitions close to the definitions of WHO and CDC, or derived from it. The researcher adopted the definition of infection prevention and control practices that guarantee the complete protection of patient, health care provider, and the community to decrease incidence of nosocomial infection which is congruent with the Palestinian IPC protocol.

Then a description of infection transmission cycle which is a circle of links in a specific order that have a basic role in infection cycle in the life, so, it is vital to study this cycle to find out

the weakest point and work to cut it, but still there are some new infectious diseases that have no clear infectious chain yet, and its control achieved through complying with IPC protocol practices as standard precautions which consider every body is infectious and also vulnerable to infection.

After that this chapter discussed the cost of nosocomial infection in many countries over the world and explored high cost in mortalities and morbidities and so in financial cost, but most of the studies took place in western countries because there are no research studies about the significant cost of nosocomial infection in Arab countries especially in Palestine, which clarifies the importance of hospital surveillance programs that include all aspects of infection prevention practices and the results of improving HCP's compliance with the IPC practices. Although all efforts done all over the world did not prevent nosocomial infection completely, and published reports estimated that at least third of nosocomial infections could be prevented by complying with the current recognized standard precautions but we have to measure the problem of nosocomial infection in Gaza's hospitals to prevent as possible as we can of these infections.

Then the researcher discussed the meaning and contents of standard precautions, and the difference between it and the transmission precautions and when to use each of them. The study of many published research studies clarifies that: The standard precautions are basically the same and some modifications are usually done every other year, and then approved by international agencies as WHO and CDC, also each health institution adopted specific procedures that suit its environment and personnel but the over all aim of all practices is to achieve the same goal which is infection prevention and control.

The standard precautions involve work practices that are essential to provide a high level of protection to patients, health care workers and visitors. These include: hand washing and antisepsis (hand hygiene); use of personal protective equipment when handling blood, body substances, excretions and secretions, appropriate handling of patient care equipment and soiled linen; prevention of needle stick/sharp injuries; environmental cleaning and appropriate handling of waste.

When reviewing the hand washing as the major IPC practice the previous research studies identify many types of hand washing such as routine hand washing, alcohol based hand rub, and surgical scrub hand washing; and also identified many basics for hand washing such as using adequate amount of soap, rubbing the hands together to create some friction, and rinsing under running water, beside care of nails and jewelry.

After reviewing many research studies the compliance with hand washing still low and ranges between 30% and 80% in all the research studies which was defined to be related to many factors including; a lack of knowledge among personnel about the importance of hand hygiene in reducing the spread of infection and how hands become contaminated, lack of understanding of correct hand hygiene technique, understaffing and overcrowding, poor access to hand washing facilities, irritant contact dermatitis associated with frequent exposure to soap and water, and lack of institutional commitment to good hand hygiene, and the researcher experience in different health care facilities stresses on the need to over come most of these factors to achieve higher compliance rate with hand washing.

Then the researcher defined the personal protective equipment and the rates of HCP'S compliance with it and explored that; effective personal protective equipment must not allow potentially infectious materials to pass through or reach your skin, eyes, mouth, or clothes under normal conditions of use. The compliance with these PPE was different in different studies and in different countries, but the researcher during this study dose not notice the presence of most of these protective equipments in the place of study, the only protective device noticed is gloves, with the absence of all other types such as face masks, protective eye glasses, gowns, etc except in little number of department such as intensive care units and hemodialysis department which contain gowns and face masks, and so the compliance with the use of these protective equipment is expected to be low.

The studies about wearing gloves explored that there are three types of gloves which are: Surgical (sterile) gloves, **e**xamination gloves which is available in latex and non-latex, and utility or heavy-duty household gloves; each type of them has its benefits and indication for use. The effectiveness of gloves in preventing contamination of HCPs' hands has been confirmed in several studies; however, other studies confirm that gloves do not provide

complete protection against hand contamination. Therefore hands should be washed or disinfected with alcohol based hand rub after removal of gloves.

Although wearing gloves is the more used practice from the personal protective equipments but the compliance to wear gloves in various studies still lower than the expected, except when the HCP feel danger to his life when dealing with highly infectious disease or patient secretions and excretions. The researcher experience clarified misuse and bad use of gloves, as little number of HCPs can wear sterile gloves correctly and keep them sterile during surgical or invasive procedure, in the other hand many procedures contain direct contact with the patient's blood and secretion are done with out any use of gloves such as sample collecting and inserting intravenous cannula.

Multiple nosocomial outbreaks have resulted from inadequate antisepsis or disinfection. Inadequate skin antisepsis may result from a lack of intrinsic antimicrobial activity of the antiseptic, a resistant pathogen, over dilution of the antiseptic, an incorrect choice of a disinfectant, an inadequate duration of disinfection, a lack of contact between the disinfectant and the microbes, or the use of a contaminated disinfectant. In the setting of this research study there was no routine examination or follow up for the quality or quantity of antiseptic or disinfectant solutions used, that beside the dependency of HCPs on the cleaners to use these solutions in disinfecting the department and some patient equipments.

Then the injury of HCP with sharp used needle or medical instrument was discussed to find different rates in different places which range from 34% to 62%, while the injury of health care providers with used needle or sharp medical instrument considered a major occupational hazard which may lead to cross infection with dangerous fatal diseases such as HBV and AIDS. The most common reported causes of HCP's hand injuries are recapping of needles followed by during waste collection and then while needle flexing.

Although the injuries from used needles and medical instruments is a major occupational hazard but it is not measured nor reported in our hospitals.

To over come all of these deficits and achieve infection prevention each health facility adapted its own IPC protocol that suit their needs, context and resources

This protocol should be developed and updated by the infection control team, with review and approval by the committee it must be made readily available for patient care staff, and updated in a timely fashion. Health care providers should periodically refer to it, to update information on infectious diseases and their control.

Despite the importance of preventing nosocomial infections in pediatric hospitals as vulnerable age group as recommended by WHO and CDC, there have been few multicenter studies examining the variability of infection rates and infection control policies among it and investigating which infection control measures might be more important.

Many research studies has explored barriers that prevent or decrease the HCP's compliance with IPC protocols, most of these studies have shared some causes, and added other different variables according to demographic and personal differences such as: lack of written guide lines, lack of management support, offering needed equipments, vaccination rate, increasing knowledge and education sessions provided for HCPs about the importance of IPC, and work overload, but the percent of importance of each cause is different from place to place.

In this study the researcher gave the HCPs the chance to vote about the weight of each of these variables as a major barrier which directed our suggestions to improve the HCP's compliance with IPC practices.

Many research studies suggested different solution to improve the HCP's compliance with IPC practices which include recurrent observation, follow up, and audit, education and training, management support and follow up, provision of written guidelines, and the use of reward and punishment, but much of these efforts have not reflected any positive results, which is the result of treating the problem before assessing it properly as each health care setting has its unique needs, context and resources, so there is no magic solution but we should study each place circumstances and provide the optimal solutions.

After reviewing these results the researcher concluded that the knowledge is not connected to practice all the time but there are other factors may affect the personal behavior which should be considered when planning change at any setting.

# 3. Methodology

The chapter focuses mainly on issues related to methodology used to answer the research questions. It includes the study design, study populations, period and place of the study, selection criteria, and methods of conducting the study. Besides, the construction of the questionnaire, as well as in depth interview, piloting, and then it presents ethical considerations, data collection, and methods of data analysis. In addition, it illustrates the validity of the study, and finally the limitation of the study.

## 3.1 Study design

The study design is descriptive, analytical, and cross sectional. It is a person triangulation one that includes both quantitative and qualitative data collection approaches. This design is chosen since it is considered the best design to describe the status of compliance of health care provider's with the Palestinian IPC protocol, in addition it provides snapshot of the outcome and the characteristics associated with it. The triangulation also enriches the study and strengthens the scientific rigor of the findings.

## 3.2 Study Population

The researcher have used census population as the questionnaire and checklists were distributed and observed for all official doctors, nurses, and physiotherapists working at governmental pediatric hospitals and meets the eligibility criteria. They were: 334 health care providers (220 nurses, 106 doctors, and 8 physiotherapists) who are formally working at the three governmental pediatric hospitals in the time of study implementation.

The HCPs who were actually working in the three hospitals in the time of study implementation were 363; 240 of them were nurses, 112 doctors, and 11 physiotherapists, but 18 health care provider working in the three hospitals were under temporary contracts funded by UNRWA beside eleven were not in their jobs in the time of study implementation that include at El-Nassr pediatric hospital, there were two doctors abroad, other two nurses were in maternity leave, at El-Durra Pediatric Hospital, there were two nurses and one doctor in their

maternity leave; other two doctors were abroad for study, and at RSPH, there were two nurses in their maternity leave.

The study population of the qualitative method consists of ten (10) health care providers from the administrative jobs of the hospital except one ICU nurse who are purposively selected including hospital director general, hospital medical director, nursing director, ICU manager, and IPC committee manager or nurse from different pediatric hospitals.

### 3.3 Response rate:

The total number of distributed questionnaire was 334, while the number of the study respondent was 307 with response rate of 92% distributed as the following: At El-Nassr pediatric hospital the respondent were 38/43 doctors, 86/99 nurses, and 2/2 physiotherapists; while at El-Durra Pediatric Hospital they were 29/32 doctors, 55/55 nurses and, 3/3 physiotherapists; and at RSPH there were 28/31 doctors, 63/66 nurses, and 3/3 physiotherapists.

The sample of the in-depth interviews has completely answered all the interview questions.

### 3.4 Eligibility criteria

#### 3.4.1. Inclusion criteria:

All official doctors, nurses and physiotherapists who are working in governmental pediatric hospitals as governmental employees in the time of study implementation and have experience period more than six months.

#### 3.4.2. Exclusion criteria:

Any doctor, nurse, or physiotherapists who are

- Hired in the last six months.

- In long vacation or maternity leave.
- Working under temporary contract
- Working as a volunteer.

### 3.5 Setting of the study

The study was conducted in the three pediatric hospitals in Gaza governorates that are directed and owned by the Palestinian MOH as follow: El-Nassr Pediatric Hospital, El-Durra Pediatric Hospital, and Abd El Azeez El-Ranteesy Specialized Pediatric Hospital.

### 3.6 Ethical considerations

Approval has been obtained from the general directorate of human resource department at MOH/ Gaza strip (Annex 5), after Al-Quds university approval and request which was sent to them (Annex 4), and then the approval of Helsinki Committee has been obtained (Annex 6).

Each participant is given an explanatory letter about the study that was attached to the questionnaire which included the purpose of the study, guarantee the confidentiality of the information, and included a statement indicating that the participant have the right to refuse participation or withdraw at any time (Annex 7).

### 3.7 Study instrument

Four instruments have been used in this study:

For quantitative date collection the researcher uses three methods which are self administered questionnaire, observation checklist for the health care provider, and observation checklist of the physical environment.

The fourth instrument is an in-depth interviews which were used for qualitative data collection.

***Questionnaire design***: the researcher uses a structure questionnaire (Annex 8) which is clear, with no complex terms, no jargons, no leading questions, nor double parallel questions. The questionnaire consists of five sections and takes approximately fifteen minutes to complete. The first part covers the information related to personal and professional information. The second part contains questions that assess the health care provider's knowledge about the IPC protocol, and includes variables that can be used in the assessment of the hospital action to improve IPC practices. The third part explores barriers that decrease HCP's compliance with IPC protocol. The fourth part assesses the HCP's perception and attitude toward IPC and its recommended practices. And the last part explores if the HCP's practices are congruent with the IPC protocol recommendations.

***The observation checklist for the health care provider*** has been constructed and observed by the researcher (Annex 10), it assesses the main five practices recommended in the protocol which are: wearing uniform, hand washing, using gloves, using antiseptics and disposables, and proper sharp disposal practices.

***The observation checklist of the physical environment*** also has been constructed to assess the physical environmental fitness for the implementation of the IPC protocol (Annex 9). It assesses availability of equipments and supplies in each department of the three pediatric hospitals.

All the three data collection instruments have been developed by the researcher in the light of IPC protocol, and have been reviewed by experts.

***The in-depth interviews*** has been designed to probe further finding, and to explain the deficiencies appear in the analysis of the questionnaire (Annex 11), it includes nine questions discussing the following: importance of existence of the Palestinian IPC protocol, and importance of work according to its recommendation; explanation for HCP's unawareness about the protocol place and content; the role of infection control committee with identification of the accountability of follow up; searching about the surveillance of HAI; evaluation of training and exploration of methods of promoting IPC concepts; finding

solutions to the scarcity of equipments needed to practice IPC; explanation about non compliance of HCPs with hand washing; and the high percent of injured HCP with used needles and medical instruments; and finally set of recommendation to improve HCPs compliance with IPC practices.

### 3.8 Pilot study

A pilot study of 30 participants for the quantitative method has been conducted first with the existence of the researcher in place to answer any question. At the end of this process two small changes have been conducted which are: Arabic translation of the questionnaire with the assistance of expert in translation and the approval of the supervisor; and a short explanation added before the question No. 30 as a separation between two groups of questions then the final questionnaire has been achieved, and distributed to the study population.

Because these two changes were not significant and an explanation was provided to the pilot sample, the researcher had included the pilot questionnaires in the total data.

Two in-depth interviews have been conducted, using two methods for documentation writing and tape recorder, to improve the researcher experience and to assess the questions fitness. Each interview lasts for twenty five minutes and there has been no need to change any question.

### 3.9 Data collection

The data is collected through the questionnaire and the observation checklists during August, September, and October by the researcher himself. These instruments are designed to match the research objectives and to give accurate and relevant information to the research questions.

The researcher distributes the questionnaires to HCPs and stays in the hospital to receive them in the same shift, and repeats that action three to four days in different shifts each week for ten successive weeks, during his stay in the departments, he fills in the observation checklists.

The researcher has held ten interviews, nine of them with three key persons from each of the three pediatric hospitals, while the tenth with a regular ICU nurse who have eight years experience. All the interviews have been held at the hospitals in October 2010 during the time of analysis of the questionnaire. The answers have been written by the researcher besides a recorder cassette tapping all the interviews.

### 3.10 Statistical analysis

The data of the questionnaire and checklists have been processed and analyzed using statistical package for social science (SPSS version 18) and also using Microsoft excel for figures.

Reviewing the entire instrument, coding the questions, appropriate entry model, coding variables, data cleaning, then doing frequencies and cross tabulation, chi square, and ANOVA were used for specific study variables and determine P-value of (<0.05%) with 95% confidence interval were done.

The researcher used study population characteristics (gender, age group, marital status, place and type of work, their highest degree awarded current position at work place and their years of experience) as independent variables and compares them with the differences in compliance with the IPC practices and protocol (as dependent variable).

Other results were obtained using regular frequencies and cross tabulations.

The qualitative data was analyzed using Open Coding thematic Analysis (OCTA). This method is done after the end of each interview, the general ideas at each interview have been categorized, and then the researcher has summarized the interviews.

### 3.11 Validity and reliability of the quantitative instruments

The internal validity was ensured in the quantitative part by field checking, piloting, and standardization of the instruments and taking the ethical matters in consideration.

Face validity was achieved by organizing the questionnaire in categories with logical sequence. Content validity was checked by ten expertise by using the content validity index (CVI), where all questions that reach less than 80 % consensus were removed.

Reliability was ensured by using three instruments to measure the same factors through questionnaire, checklists, and interviews.

### 3.12 Trustworthiness of the qualitative instrument

Two pilot interviews were conducted and the same questions have been used. Selection of personnel was performed according to peer check, the supervisor, and an expert researcher. Interview schedule was followed. Additionally, member check, audit trial, observing and recording, prolonged engagement and peer debriefing was conducted.

### 3.13 Period of the study

The study has been conducted from February 2010 to November 2010, as shown in the work plan (Annex 10), The study has been started in February 2010, by preparing the research proposal and designing the questionnaire. Approvals from Al-Quds University, Helsinki Committee and from MOH are received, and then Pilot study and data collection are completed from August 2010 to October 2010. Data entry, analysis and writing the final report continued till the mid of November 2010.

### 3.14 Limitation of the study

The main limitations are as follow:

- Recurrent shortage of electricity.
- Difficult access to updated books and journals.
- Lack of resources, especially time and budget.
- Hawthorne effect in the questionnaire.
- The stability of work schedules of some HCPs at night shifts.

# 4. Findings and discussion

This chapter represents the main findings of the study, including characteristics of the study population, description of the health care provider's compliance with IPC protocol, verifying their knowledge and practices in preventing and controlling infections, then the researcher explains the barriers that prevent the compliance of health care providers with the IPC protocol. In addition to observational data about health care provider's compliance with some variables related to infection prevention and control practices, and observing physical environmental fitness to implement IPC in pediatric hospitals.

There are a comparison between different study sample characteristics and their level of compliance with various IPC practices. Moreover, the researcher discusses and explains the findings comparing them with other local, national and international studies.

Finally the researcher explores the ideas, recommendations, and results of the qualitative part of the study which clearly reflects the real causes of compliance and noncompliance from the point of view of nine key persons; three from each of the pediatric hospitals.

## 4.1 Characteristics of study population

The Characteristics of study population have been summarized in table (4.1). The study populations were 307 healthcare providers (subjects) respond to the questionnaire from 334 with 92% response rate, all has come from three pediatric hospitals including all doctors, nurses and physiotherapists who were working in these hospitals during study implementation, and who met the inclusion criteria, which were mentioned in the previous chapter.

The researcher clarified their gender, age group, marital status, place and type of work, their highest degree awarded current position at work place and their years of experience.

The researcher uses these characteristics to find out differences in compliance with the IPC protocol and these characteristics.

**Table 4.1 summery table of Characteristics of the study population**

| Variable | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 213 | 69.4 |
| | Female | 94 | 30.6 |
| **Age group** | 21-27 years | 103 | 33.6 |
| | 28-38 years | 103 | 33.6 |
| | 39-60 years | 101 | 32.9 |
| **Marital status** | Married | 247 | 80.5 |
| | Single | 53 | 17.3 |
| | Divorced | 6 | 2.0 |
| | Widowed | 1 | .3 |
| **Place of work** | El Nassr Pediatric hosp. | 126 | 41.0 |
| | El Dorra Pediatric hosp. | 87 | 28.3 |
| | Dr Abd El Azeez El-Ranteesy Specialized Pediatric hosp. | 94 | 30.6 |
| **Type of work** | Specialized doctor | 48 | 15.6 |
| | General physician | 47 | 15.3 |
| | BSN nurse | 124 | 40.4 |
| | Prn nurse | 80 | 26.1 |
| | Physiotherapist | 8 | 2.6 |
| **Highest degree awarded** | Board | 21 | 6.8 |
| | Master | 29 | 9.4 |
| | Bachelor | 174 | 56.7 |
| | Diploma | 83 | 27.0 |
| **Current position** | Director | 8 | 2.6% |
| | Department manager | 42 | 13.7% |
| | Supervisor | 22 | 7.2% |
| | Others | 235 | 76.5% |
| **Years of experience** | 1-5 years | 137 | 44.6 |
| | 6-15 years | 107 | 34.9 |
| | 16-36 years | 63 | 20.5 |

### 4.1.1. Distribution of study population by gender:

Males represent 69.4% of study population and that is related to the normal situation in Gaza strip where female participation rate in labor force is very low compared to male participation rate; 13.5% in Gaza strip (PCBS, 2009). However, medical field provide wider opportunity for female employment, so the female rate reaches 30.6% of this study population.

**Table 4.2 Distribution of study population by gender**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 213 | 69.4 |
| Female | 94 | 30.6 |
| Total | 307 | 100 |

### 4.1.2. Distribution of study population according to age group

The age of the sample population ranged from 21 years to 60 years, the young ages of some subject is because some nurses and physiotherapist have completed diploma at age of twenty, and have one year of experience to fit the inclusion criteria, while the oldest possible age is 60 years (age of retirement).

**Table 4.3 distribution of study population according to age groups**

| Age group | Frequency | Percentage |
|---|---|---|
| 21-27 years | 103 | 33.6 |
| 28-38 years | 103 | 33.6 |
| 39-60 years | 101 | 32.9 |
| Total | 307 | 100 |

This distribution has divided the study population into three approximately equal in percent groups, the first age group of subjects is the HCPs with young age who are supposed to have fresh updated knowledge, with fresh information that they accept during graduation years, but they are supposed not to receive training about the IPC protocol yet.

The second age group contains HCPs who are in their youth age and supposed to pass all the expected training according to hospital policy, they also have the abilities to guide the changes needed to improve performance. The third age group consists of well trained, and experienced personnel, most of them could be in managerial positions and have the abilities of audit and evaluation. All of the three groups, expected knowledge and experience are used in evaluating the study population Compliance with the IPC practices.

### 4.1.3. Distribution of study population according to marital status

The majority of study populations are married (80.5%), other 17.3% are single, beside 2% are divorced, and only one widowed female in the sample (0.3%). The differences are mostly related to the state of employment; and this may need a research study to explore the relation between employment and marital status. In this study, there were no any statistical differences between marital status and IPC practices, and the t value ranged from (0.1 to 0.7).

**Table 4.4 Distribution of study population according to marital status and hospital**

| Marital status | | Hospital | | | Total |
|---|---|---|---|---|---|
| | | El-Nasser | El-Dorra | RSPH | |
| Married | No. | 100 | 72 | 75 | 247 |
| | % | 32.6% | 23.5% | 24.4% | 80.5% |
| Single | No. | 24 | 12 | 17 | 53 |
| | % | 7.8% | 3.9% | 5.5% | 17.3% |
| Divorced | No. | 1 | 3 | 2 | 6 |
| | % | .3% | 1.0% | .7% | 2.0% |
| Widowed | No. | 1 | 0 | 0 | 1 |
| | % | .3% | .0% | .0% | .3% |
| Total | No. | 126 | 87 | 94 | 307 |
| | % | % | 28.3% | 30.6% | 100.0% |

### 4.1.4. Distribution of study population according to work place

Health care providers from El Nassr Pediatric Hospital constitute about 41% of the study sample, while El-Dorra pediatric hospital constitutes 28.3% of the sample, and Dr Abd El Azeez El-Ranteesy Specialized pediatric hospital represents 30.6% of the sample (table 4.4), and these differences are related to the number of beds and the presence of specialized care departments as mentioned in the introduction chapter.

**Table 4.5 Distribution of study population according to place and type of work**

| Hospital | | Type of work | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Specialized doctor | General physician | BSN Nurse | Diploma nurse | physiotherapist | |
| El-Nasser | No. | 19 | 19 | 53 | 33 | 2 | 126 |
| | % | 39.6% | 40.4% | 42.7% | 41.3% | 25.0% | 41.0% |
| El-Dorra | No. | 13 | 16 | 30 | 25 | 3 | 87 |
| | % | 27.1% | 34.0% | 24.2% | 31.3% | 37.5% | 28.3% |
| RSPH | No. | 16 | 12 | 41 | 22 | 3 | 94 |
| | % | 33.3% | 25.5% | 33.1% | 27.5% | 37.5% | 30.6% |
| Total | No. | 48. | 47 | 124 | 80 | 8 | 307 |
| | % | % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

### 4.1.5. Distribution of study population according to type of work:

Nurses constitute the majority of the study sample (66.5%), and they are divided into BSN nurse (40.4%) and diploma nurse ( 26.1%) to find out if there is any difference in practice related to the differences in educational level or not.

Doctors represent about 30.9% of the study sample and this group is also divided into two categories related to qualification as specialized doctor (15.6%) and general physician (15.3%), and physiotherapists constitute the remaining 2.6% as seen in (table 4.4).

All of these results are related to many factors such as the actual need of each profession in relation to beds number, the presence of sophisticated specialties and training programs implemented in the health facility.

The results of this study explores statistical significant differences between type of work and compliance of HCPs with some IPC practices such as wearing uniform and safe sharp practices. Beside the nurses are more compliant with hand washing than doctors but the differences does not reach statistical differences value although it is similar to the study of

(Pittet, 2001) who observes that being a physician or a nursing assistant rather than a nurse; being a nursing assistant rather than a nurse reducing the compliance to hand washing.

### 4.1.6. Distribution of study population according to the highest degree awarded:

The study population educational level appears as follows: 6.8% doctors have doctorate or Palestinian board, 9.4% doctors and nurses have master degree in various specialties, 56.7% doctors, nurses and physiotherapists have bachelor degree, and 27% nurses and physiotherapists have diploma degree (Table 4.5).

**Table 4.6: Distribution of study population according to the degree awarded**

| Highest degree awarded | Frequency | Percentage |
|---|---|---|
| Board | 21 | 6.8 |
| Master | 29 | 9.4 |
| Bachelor | 174 | 56.7 |
| Diploma | 83 | 27.0 |

This distribution could have a meaning when comparing to the level of the healthcare provider with their practices in IPC.

### 4.1.7. Distribution of study population according to the current position

**Table 4.7: Distribution of study population according to the current position**

| Current position | Frequency | Percentage |
|---|---|---|
| Director | 8 | 2.6% |
| Department manager | 42 | 13.7% |
| Supervisor | 22 | 7.2% |
| Others | 235 | 76.5% |

The study sample includes nine managers but eight of them respond to the questionnaire so in this study, the directors constitute 2.6%, department managers represent 13.7% including

doctors, nurses, and physiotherapists; nursing supervisors percent is about 7.2%, and the other employees from all the three categories who have no managerial position constitute the main category with 76.5% (Table 4.6).

These information are used to explain that about 24% of the study population is in managerial position who can share any idea, or implement education or training program in the benefit of improving compliance of health care providers with IPC practices

### 4.1.8. Distribution of study population according to experience:

Years of experience ranged from 1 to 36 years, considering the use of rounding to the nearest integer, with the mean age of 34.5 years. They are arranged into three groups similar to previous studies, that consider the employee with experience of five years or less is a new employee. The employees with experience from six to fifteen years are the trained personnel, while other health care providers with experience more than fifteen years are personnel with very good experience, those can be trainers or a role model for others.

**Table 4.8: Distribution of study population according to years of experience**

| Years of experience | Frequency | Percentage |
|---|---|---|
| 1-5 years | 137 | 44.6 |
| 6-15 years | 107 | 34.9 |
| 16-36 years | 63 | 20.5 |

As (table 4.7) illustrates 44.6% of the study population have less than 5 years of experience, 34.9% between 6 – 15 years, and 20. 5% have more than 15 years of experience.

In other previous study (Motamed et al.,2006) 66% of respondents have less than 15 years of experience, this result is similar to the result of (Awad, 2009); about 89% of the respondents have less than 15 years of experience.

In this research study also 89.5% had less than 15 years of experience, that mean the majority of HCPs have good opportunity for improvement, training and development.

## 4.2. Infection prevention and control

### 4.2.1. Health care provider's knowledge about IPC precautions and protocol

The researcher assesses the health care provider's knowledge concerning the IPC standard precaution and protocol through question nine to twelve and finds that: 59.3% of the study population thinks that they know the universal standard precautions of infection prevention and control, but only 34.2% know the existence of a Palestinian IPC protocol. 2.3% of the study population has a copy of the Palestinian protocol in their departments, but only 1.3% recognizes where to find it (table 4.8 ). These results are close to the results of previous study of (Awad, 2009) which was conducted in intensive care units in GS, about 73% of HCPs have knowledge of the standard precautions, and 27% recognize the existence of a Palestinian IPC protocol, whereas 47% of them only know about its contents. Another study done in 32 European Countries by (Struelens, et al, 2006) states that most hospitals have written protocols for Infection control procedures concerning: (a) basic Infection Control (117; 70%); (b) room cleaning (120; 71%); (c) screening for multi-resistant organisms (90; 53%); and (d) isolation of patients with alert organisms (106; 63%).

**Table 4.9 Assessment of knowledge of IPC precautions and protocol**

| Variable | Frequency | Percent |
|---|---|---|
| Know the universal standard precautions of IPC | 182 | 59.3 |
| Know that there is Palestinian IPC protocol | 105 | 34.2 |
| Have a copy of the Palestinian IPC protocol | 7 | 2.3 |
| Recognize where to find a copy of the Palestinian IPC protocol | 4 | 1.3 |

This research results reflect a significant problem since the researcher is going to assess compliance of healthcare provider with a protocol. Only 34.2% of them know about its existence, and only 1.3% knew where to find it and recognized its components.

### 4.2.2. Hospital surveillance program for nosocomial infection

The researcher finds that 62.9% admit that the hospital conducts continuous surveillance program for nosocomial infection, considering the cooperation in reporting the cases of bacterial meningitis to the epidemiological department in the ministry of health as surveillance program while the hospital surveillance program might include the incidence and prevalence of any nosocomial infection, with clear description of the causative microorganism. In a study on the Efficacy of Nosocomial Infection Control Project from the 1970s showed nosocomial rates could be reduced by 32% if infection surveillance were coupled with appropriate infection control programs (Hughes, 1988).

The results of this study reflected the state of knowledge existing among HCPs as they do not recognize the meaning of hospital surveillance program, which reflects the urgent need for educational program concerning basic concepts of infection prevention and control.

### 4.2.3. Hospital education and training programs

It is noticed that about 42.7% think that hospital provides recent information about IPC to healthcare providers, and around 21.5% share an education or training session of IPC, but only 16.9% of the study population receive sufficient information about IPC in that session (Table 4.9). This result is lower than the results obtained by Struelens et al, (2006) In his study of 169 acute-care hospitals from 32 European countries which have assessed the organization, components and human resources of Infection Control programs and revealed that: Educational sessions for healthcare workers concerning infection control practices are (77%) of centers.

**Table 4.10 Hospital education and training programs**

| Variable | Frequency | Percent |
|---|---|---|
| The hospital provide information and updates to healthcare providers on IPC | 131 | 42.7 |
| Healthcare provider attend education session or training on IPC | 66 | 21.5 |
| HCP receive sufficient information in that session | 52 | 16.9 |

In the in-depth interviews conducted with the key persons at managerial positions in the three pediatric hospitals, about 80% of the interviewed persons deny the existence of any training on IPC practices or protocol. This fact reflects the real need for training and education regarding IPC periodically to enhance the HCPs' knowledge, skills and practice of standard precautions and IPC practices as recommended by the Palestinian protocol. Also the trainers need preparation courses as very little percent (16.9%) of the held training course that provide sufficient information.

### 4.2.4. Hospital IPC promotion instruments

Hospital instruments to promote IPC are recognized to be 37.8% through in-service education, 16.6% using posters in work places, 11.7% point to written guidelines, and 8.8% related to reward and punishment, however the other 25.1% think that there are no efforts done in the hospital to promote infection prevention and control. The in-depth interviews respondents clarified the need for the adoption of reward and punishment in improving the HCP's compliance, which is absente in the current time.

### 4.2.5. Vaccination

Although 84.7% receive vaccination for hepatitis B, only 63.2% receive all the proposed three doses needed to protect health care provider from cross infection of this dangerous disease, which is transmitted through blood and body fluids, especially to a person with non-intact skin. This result is approximately the same as previous study of (Awad, 2009) in Gaza which explore 85.6% of respondent have been received hepatitis vaccination. These results are much better than study results conducted in neighbor countries, where the percent of vaccinated HCPs with full course against hepatitis in Gharbia Governorate, Egypt was only 11.3% (Isamil, et al.,2007), and in Jordanian dental clinics 36% of HCPs received hepatitis vaccine (Al-Omari, & Al-Dwairi, 2005).

On the other hand, incidence of hepatitis B according to the annual report is 1.06/ 100,000 population (MOH, 2006), so policies should be established regarding immunization of

employees, volunteers, students, and resident physicians against vaccine-preventable infections. Immunization records should be maintained for all employees, Immunization with hepatitis B vaccine at no cost to the employee is mandated and must be offered to all persons whose job category, specified in the blood borne pathogen exposure-control plan for the facility, indicates likely exposure to blood borne pathogens (American Academy of Pediatrics, 2007).

### 4.2.6. Injury from used sharps

The researcher found 66.1% of the study population have been exposed to an injury from used needle or sharp medical instrument, but this result still better than the results of the study done in Assiut University by (Hassan et al., 2004) which found 97.2% of HCPs exposed to used needle stick, while the result of another study that was conducted in German university Hospital were better than those results since the needle stick injuries were 31.4% in all healthcare workers (Wicker, 2007).

These results reflected an important occupational health hazard lead to infections with blood born pathogens like Hepatitis B that needs urgent intervention for prevention, such as using vaccination and protective barriers.

### 4.2.7. Compliance with IPC precaution in healthcare provider perception

Two thirds of the study population (66.4%) thinks that they follow the IPC precautions, while 14% confess that they do not follow IPC precautions, and about 20% don't know if they follow these precautions or not. While when the researcher assesses the health care provider's knowledge concerning the IPC standard precaution through question nine 59.3% of the study population thinks that they know the universal standard precautions of infection prevention and control, taking into consideration that both questions are in the same questionnaire.
In previous studies knowledge deficit usually reflected low compliance to practice, such as the study of Fawole (2004), which pointed to that lack of knowledge and awareness is apparently the major obstacle to changing practice.

### 4.3 Health care provider's perception toward IPC practices

All the study population reflect high understanding and perception of the importance of most of the IPC practices, which was clear in the questions 23 to 29 as it is clear in (table 4.10). The respondent agree or strongly agree with the following: 99% that IPC is important in pediatric units, 100% identify the important of hand washing in infection prevention, 96.1% perceive that physical barriers decreases cross infection. 98.3% identify the importance of proper handling of contaminated instruments in improving IPC practices, 98.7% stresses on the importance of routine cleaning and disinfecting patient unit, and 99% identify the importance of safe work practices and proper waste disposal management in decreasing infection hazards.

**Table 4.11: Health care providers' perception toward IPC practices**

| Variable | Agree | Undecided | Disagree | Mean |
|---|---|---|---|---|
| IPC is important in pediatric units | 99% | 0.3% | 0.7% | 4.83 |
| Hand washing is important to prevent infection | 100% | - | - | 4.84 |
| Physical barriers decrease cross infection | 96.1% | 3.6% | 0.3% | 4.56 |
| Proper handling of contaminated instruments improves IPC | 98.3% | 1.0% | 0.6% | 4.64 |
| Routine cleaning and disinfecting of patient equipment and unit lead to IPC. | 98.7% | 1.3% | - | 4.68 |
| Safe work practices are major component of standard precaution of IPC | 99% | 1% | - | 4.57 |
| Safe and proper waste disposal prevent infection hazards | 99.3% | .7% | - | 4.65 |

### 4.4 Health care provider's practices in IPC

Health care provider's practices were different from their perception and knowledge. The HCPs demonstrate very high perception and understanding of the importance of IPC practices, while their responses concerning their commitment to practice as recommended in the IPC protocol is very weak as it observed in the following analysis of the questionnaire.

### 4.4.1. Wearing uniform:

Most of Healthcare providers (90.9%) are committed to wear uniform during working time. These results are better than previous study done in neonatal intensive care units by (Awad, 2009) which reflect compliance with wearing uniform with 73%. The good compliance to uniform is related to clear rules and to the management follow up and recommendation.

The uniform help in identification of personnel beside its important role in preventing cross infection from patient to HCP and from HCP to client.

### 4.4.2. Hand washing:

Hand washing is the single most effective measure of preventing infections, and it is a major component of the standard precautions (Siegel, 2007). Most of us know when to perform hand hygiene in our personal lives, health care providers who come in contact with patients or the patients' body fluids are expected to perform hand hygiene many more times throughout the encounter. These indications for hand hygiene are described in professional guidelines and policies. Within a single encounter with a patient, there can be several times when hand hygiene should be performed (The Consensus Measurement in Hand Hygiene Project Team 2009).

This study results revealed different responses in measuring compliance of HCPs with hand washing practices as shown in (table 4.11). Where 77.5% of HCP wash their hands often or always for fifteen seconds using soap and running water; 53.8% of HCP remove jewelry, watch and ring when washing hands, or even they are not wearing them during working hours; 48.8% of HCPs wash hands on arrival to work; 97% wash hands after contact with blood or body fluids; 72% Wash hands before and after touching the child; and 79.8% washing their hands before leaving the unit. The median percent of compliance is 79.7%.

Pittet D,( 2001) in a special issue assessed HCPs compliance with hand washing and find the average compliance with hand hygiene recommendations varies between hospital wards, among professional categories of health-care workers, and according to working conditions, as well as according to the definitions used in different studies. Compliance is usually estimated

as <50%. Compliance to hand washing is still a major challenge for infection control experts, and they suggest a lot of strategies to improve HCPs' compliance (Larson, 1999).

**Table 4.12 Health care provider's practices in hand washing**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Wash hands for fifteen seconds using soap and water | 77.5 | 13.7 | 8.8 | 3.97 |
| Remove jewelry, watch and ring when washing hands | 53.8 | 26.4 | 19.5 | 3.53 |
| Used to wash hands on arrival to work | 48.8 | 29.6 | 21.5 | 3.40 |
| Wash hands after contact with blood or body fluids | 97.1 | 0.7 | 0.3 | 4.86 |
| Wash hands before and after touching the child | 72 | 21.2 | 6.8 | 3.99 |
| Washing hands before leaving the unit | 79.8 | 14.7 | 5.5 | 4.16 |

### 4.4.3. Wearing gloves

There are three types of gloves: sterile gloves that are used in septic sterile procedures, latex gloves which are used to protect the HCP from cross infection when he anticipate to contact blood or any other body fluid, or when he want to contact used patient care equipments, and heavy duty gloves that usually used when contact disposables. The researcher found that 85% of HCPs always or often wear gloves when contact with blood or other body fluids, while 90% wear gloves when handling contaminated instruments.

This results are in consistency with (Hesse et al, 2006) who found 88% of HCPs wear gloves routinely before invasive procedure, and 94% wear gloves before education program, but much better than the results of (Shama et al., 2007) who found only 17.5% wear gloves, and 77% of them change them between different patient care. Therefore, more education, training, and regular monitoring are suggested to improve the practice of wearing gloves among HCPs.

**Table 4.13: Health care provider's practices in wearing gloves**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Wear gloves when contact with blood, body fluids, secretion and excretion | 85 | 12.4 | 2.6 | 4.41 |
| Wear gloves when handling contaminated instrument | 90.2 | 7.8 | 2.0 | 4.5 |

### 4.4.4 Using antiseptics and disinfectants

The IPC protocol recommended using disinfectant solution in cleaning when contamination is present such as for cleaning blood or other body fluids, also any place used for procedures, or visibly soiled including patient unit and patient room. In this study 83.2% of HCP demonstrate that they use disinfectants in cleaning patient unit, while in 76.4% of times they conduct that patient unit is disinfected periodically even in the presence of the patient for long time (Table 4.13). These results are better than the results of previous study done in 32 European countries, which explore poor compliance with procedures for decontaminating the environment in patients' rooms (39%) (Struelens et al, 2006).

**Table 4.14: Health care provider's practices in using antiseptics**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Using disinfectants in cleaning patient unit | 78.5 | 16.6 | 4.9 | 4.16 |
| Patient unit is disinfected periodically | 67.1 | 20.2 | 12.7 | 3.82 |

### 4.4.5. Using disposables and linens

Bed linen should be changed when wet, or visibly soiled or when contaminated with blood or body fluids, which is consistent with current standard infection control precautions. The use of biocidal textiles have recently been suggested as a way of preventing cross transmission of infection through linen itself or handling of linen (Borkow and Gabbay, 2008).

The study population clarifies that 86.3% of the times linens are changed periodically or when dirty, disposable suction tubes are discarded after each single patient use, while the inhalation boxes and tubes are changed less frequently only in 52.8% of cases. These result are close to the results of (Tariq et al., 2006) in his study of the effect of audit in compliance where he found proper handling of clean and soiled linen improved after specific interventions to reach from 60-70% after audit. The improvement of these results could be achieved by recurrent audit and offering more sufficient amounts of disposables.

**Table 4.15: Health care provider's practices in using disposables and linen**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Linens are changed periodically or when dirty | 86.3 | 9.8 | 4.0 | 4.36 |
| Suction tubes discarded after single use | 87.3 | 7.5 | 5.2 | 4.40 |
| Inhalation box and tubes are changed between different patient uses. | 52.8 | 20.8 | 26.4 | 3.45 |

### 4.4.6. Isolating infectious patients

In Gaza pediatric hospital's department there are many rooms which enable the separation of different diseases in different rooms. Except in some departments such as reception and specialty departments, for example neurology department which contain only two room, the main complain is neurological deficit while the patient may complain of any other disease such as pneumonia, or gastroenteritis that could not be separated in different rooms, at the light of the above explanation the HCP practices in separating and isolating patient with different diseases is excellent 79.4%, and also the isolation of infectious patient (90.8%).

**Table 4.16: Health care provider's practices in isolating patients**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Separating different diseases in different room | 79.4 | 15.0 | 5.6 | 4.2 |
| Infectious diseases are isolated | 90.8 | 6.2 | 3.0 | 4.6 |

In previous study by (Bruce, 1989) where risk factors predisposing patients to infection were compared between two groups of patients in the intensive care unit. Nosocomial colonization occurred later among isolated patients (median, 12 vs. 7 days; P<0.01) and was associated with subsequent infection in 2 patients, as compared with 12 patients given standard care (P = 0.01). These results prove the need to isolate infectious patients to prevent cross infection that beside the compliance with isolation practices supposed to be followed in caring with isolated patient.

### 4.4.7. Keeping sterility

The study results explore that 80% of the study population use sterile equipment in sterile way for invasive procedures, 14.7% often do so, while 3.9% some times are committed to keep sterility, and the other 1.3% don't use or keep sterile technique. These results are better than previous study done in neonatal intensive care units by (Awad, 2009) that found 47.8% of respondents keep sterile field during procedures until finish. Taking into consideration that sterile technique has a minimal use in medical pediatric departments, and invasive procedures used only in specialty departments such as intensive care units.

### 4.4.8. Using safe sharp disposable practices

Although injury from used sharp instruments or needles is a significant hazard- that rises the risk of infection with dangerous diseases such as Hepatitis B and AIDS- but the study population demonstrated poor compliance with safe practices in dealing with sharp disposals. Only 25.3% of HCPs follow the recommendation of the standard precaution in avoiding recapping, breaking or bending used needles before disposal, and only 12.7% discard the used syringe without removing its needle from it, while 87% always dispose used needles and syringes in safety box. These results are close to the results obtained by (Awad, 2009) as she found low compliance to sharp disposal practices, 23.9% of her respondent do not recap needle as recommended, 52.2% don't remove needle from used syringe, 73 % don't bend or break used needle before disposal, 88% dispose all sharps in puncture resistant containers.

Both study results explain the very high percentage of HCP injury from used needles or medical sharp instrument that was observed in the analysis of data.

**Table 4.17: Compliance of health care providers with safe work practices**

| Variable | Always | Sometimes | Rarely or no | Mean |
|---|---|---|---|---|
| Do not recap, break or bend used needle before disposal | 25.4 | 12.1 | 62.6 | 3.62 |
| Do not remove used needle from syringe before disposal | 12.7 | 14.7 | 72.6 | 3.97 |
| Dispose used needles and syringes in safety box | 87 | 8.1 | 4.9 | 4.4 |

### 4.4.9. Protect hospitalized child from infectious visitors

Only 28% of the respondents used to prevent visitors with signs of infectious diseases from reaching their children, 24% often do so, other 30% rarely or some times prevent those visitors while 10% don't care at all or don't notice the health status of the visitors.

In a study concerning the impact of hospital visiting hour's policies in pediatric patients and their visitors performed in USA and some European countries, The researcher recommended that restrictions might be followed depending on cultural differences, hospital size, geographical location of the hospital, the hospital's access to and implementation of current technology and the hospital staff's ability to adopt change in line with new knowledge and routines (Smith et al., 2009).

In MOH institutions, the visitors restrictions are followed in previous outbreaks such as in meningitis 1997, and in Swine flu 2009.

## 4.5 Barriers of noncompliance with IPC protocol

After exploring many literatures, and international infection prevention guidelines, the researcher has found nine barriers that may prevent HCP from compliance with IPC protocol, and added them in the questionnaire; each participant was permitted to choose more than one reason for non compliance. 61.5% of the study population has defined absence of education or training program as the main barrier, 52.4% define the lack of knowledge and updates as the a main cause, 46.9% refer that to scarcity of required supplies, 39.7% refer that to whether the

high work load and insufficient time, or to the administration responsibility in follow up and feed back, 30% define absence of written guidelines as a main cause of noncompliance, 28.3% think that poor job satisfaction could be the barrier, 10.4% are afraid from the complication of using these precautions, while only 3.9% perceive that these precautions are unnecessary in pediatric hospitals and departments.

The results of previous study done in neonatal intensive care units by (Awad, 2009) found similar barriers of non compliance, as she found the main cause as: absence training programs and updates, the second cause was lack of knowledge and education, then work load and insufficient supplies required, and finally no accountability and feed back of performance from administration.

(Bittet D, 2001) in his study has found the main barriers of hand hygiene arranged as the following: skin irritation, inaccessible supplies, interference with worker-patient relationship, forgetfulness, ignorance of guidelines, insufficient time, high work load and understaffing, and lack of scientific information.

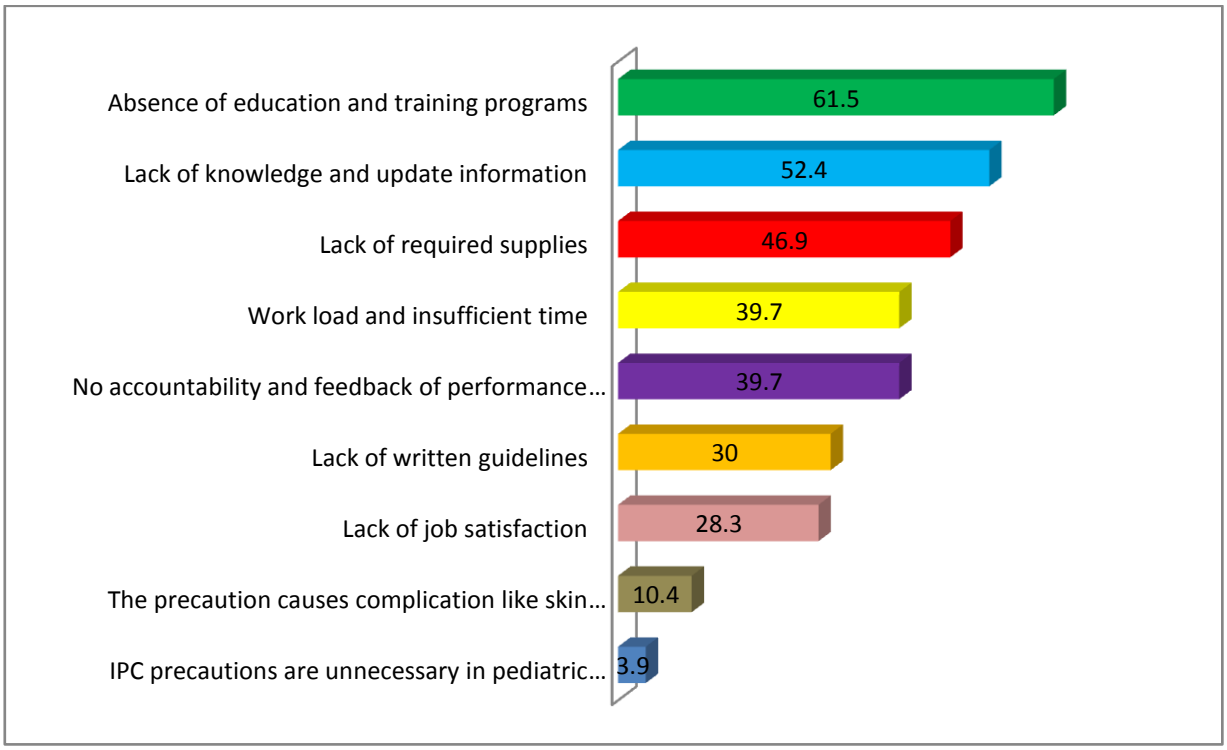



**Figure 4.1 Percent of causes of noncompliance with IPC**

### 4.6 Analysis of the observation checklist of healthcare provider's practices

The checklist of HCP prepared by the researcher in the light of the Palestinian IPC protocol and previous studies, and it contains five main categories, which are: wearing uniform, hand washing, wearing gloves, antiseptics and disinfectant, and sharp disposal.

The checklists were filled three times for each of HCP in different shifts to obtain 1002 filled checklists, which reflect the actual practices of all HCPs in relation to IPC.

The actual practices that were observed by the researcher differ from the practices that checked by the questionnaire analysis as seen in the next analysis.

#### 4.6.1. Wearing uniform

The observation reflects that 86.6% of the study population are committed to wear uniform in the time of work, and the researcher observe that this number is near or just lower than the result of the questionnaire 90.9%.

#### 4.6.2. Hand washing

Hand washing is the single most important infection prevention procedure, the IPC protocol clarify when to wash hands to include: immediately on arrival, before and after examining a client, before putting on sterile gloves, before performing an aseptic technique, after touching any thing that might be contaminated, after touching blood or body fluids, and after removing gloves. The compliance with theses practices is shown in (table 4.11).

The observed results of hand washing practices reflect poor compliance with this important practice of infection prevention particularly when it is done prior to any procedure, as you observe in table 4.11, hand washing on arrival is a rare practice since only 4.7% of the study sample is committed to do it, and similarly the hand washing before wearing gloves (5.9%), and the hand washing before touching the patient (7.5%) are with very low compliance, while the highest compliance rates was observed in hand washing practices that reflect cleaning

hands after being visibly dirty as seen in hand washing after touching blood or body fluids (97.4%), Hand washing after removing gloves (92.5%), and Drying hands with clean paper towel (91.2%). These results demonstrate unprofessional practices where all ordinary people perform hand hygiene in similar obvious dirty in their personal live.

The other variable results appears as the following: Hand washing after working with patients 76.9%, but in 56% of hand washing it last for 15-30 seconds with soap and running water, and only 31% removing jewelry, hand watch, and ring when washing hands, which prevent proper cleaning of hands from microorganisms.

Less than half of the study population (48.9%) washing their hands before leaving the unit, while near the third of them (34.2%) wash hands before performing a septic invasive procedures, which is dangerous practice that increase risk of infection.

**Table 4.18 compliance to hand washing in the observation checklist**

| Variable | No. | % |
|---|---|---|
| Hand washing immediately on arrival to the unit. | 47 | 4.7 |
| Hand washing before touching the patients. | 76 | 7.5 |
| Hand washing after working with patients. | 775 | 76.9 |
| Hand washing before leaving the unit. | 493 | 48.9 |
| Hand washing before performing a septic invasive procedures. | 345 | 34.2 |
| Hand washing after touching blood or body fluids. | 982 | 97.4 |
| Hand washing before wearing gloves. | 59 | 5.9 |
| Hand washing after removing gloves. | 932 | 92.5 |
| Removing jewelry, hand watch, and ring when washing hands. | 319 | 31.6 |
| Washing hands for 15-30 seconds with soap and running water | 564 | 56.0 |
| Drying hands with clean paper towel. | 919 | 91.2 |
| Turn of water after hand washing using paper towel. | 42 | 4.2 |

### 4.6.3. Wearing gloves

Wearing gloves prevents transmission of microorganisms from service provider to client, and reduces contamination of service provider's hands by infectious microorganisms from client which certainly decreases HAI. The observation checklist has clarified that, HCP are committed to wear gloves while contact blood or body fluids by 84.7%, which seems to be high percent but it is a basic procedure of self protection that might be more practiced, and also 83.2% wear gloves when handling suspected contaminated instrument, two third of HCP wear sterile gloves appropriately, while 81% wear sterile gloves when doing invasive procedure, but only 0.3% handle wastes using heavy duty gloves.

**Table 4.19 Compliance to wearing gloves in the observation checklist**

| Variable | No. | % |
|---|---|---|
| Wear gloves when contact with blood or other body fluids. | 854 | 84.7 |
| Use clean gloves when handling contaminated instrument. | 839 | 83.2 |
| Wearing sterile gloves in appropriate way. | 687 | 68.2 |
| Wearing sterile gloves when doing invasive procedure. | 817 | 81.1 |
| Persons handling wastes wear heavy duty gloves. | 3 | 0.3 |

### 4.6.4. Antiseptic and disinfectant

The analysis of the checklist clarify that there is minimal use of antiseptics and disinfectants, as shown in table 4.13. Where 3.8% of the sample use antiseptic solution in hand washing prior aseptic invasive procedure, despite in more than 80% of time there is no problem in offering antiseptic solutions. 57.3% uses antiseptics in disinfecting patient unit. Only 54.8% keep sterile field during procedures, but 92.6% of the HCP insist to clean and disinfect medical instruments between different patient uses. Only 8% uses sterile gown, mask and sterile gloves by all contacts with sterile field, which is a very low percent.

It is true that 93.6% uses alcohol swab before administering intramuscular injection or inserting a catheter in the client's veins, but only 33.9% of them leave antiseptic one minute to dry before starting the procedure as recommended by the protocol.

**Table 4.20 Compliance to use antiseptic and disinfectant in the observation checklist**

| Variable | No. | % |
|---|---|---|
| Use antiseptic for hand washing prior a septic invasive procedure | 38 | 3.8 |
| Each patient unit disinfected after patient discharged. | 578 | 57.3 |
| Sterile field is established and maintained during procedures. | 552 | 54.8 |
| Medical equipments or instruments is not used between patients immediately (with out disinfection). | 933 | 92.6 |
| Sterile gown, mask and sterile gloves are used by all contacts with sterile field. | 82 | 8.1 |
| Clean skin with 60-90% alcohol is used for injections and peripheral intravenous catheter insertion. | 943 | 93.6 |
| Leaving antiseptic one minute to dry when used. | 342 | 33.9 |

### 4.6.5. Sharp disposal

There is very weak compliance with the recommendation of the IPC protocol in dealing with sharps and waste disposals, as it appears in (table 4.20).

Three forth of the study population remove needles from used syringes before disposal, 76.4% comply with not to bend or break used needles prior disposal, only 41% don't recap used needle before disposal, and also only 19.3% are use to dispose sharp disposable container when 3/4 full, and 69.9% dispose all sharps in puncture resistance containers.

There is a big a problem in labeling and separating wastes as there is no policy in all the three hospitals to separate or label waste products.

**Table 4.21 Use of sharps and waste disposal in the observation checklist**

| Variable | No. | % |
|---|---|---|
| Do not remove used needles from syringes before disposal. | 277 | 27.5 |
| Do not bend or break used needles prior disposal. | 770 | 76.4 |
| Do not recapping used needles. | 414 | 41.1 |
| Dispose sharp disposable container when 3/4 full. | 195 | 19.3 |
| Dispose all sharps in puncture resistance containers. | 705 | 69.9 |
| Labeling and separating waste disposals. | 3 | 0.3 |

## 4.7 Analysis of the observation checklist of the physical environment

This study was conducted in three pediatric hospitals, including twenty-three departments; the researcher checked all of these departments three times to check its physical fitness to perform IPC protocol inside it, the results vary as shown in table 4.21.

There were no any copy of the IPC protocol in any department, which is a major obstacle to the application of the protocol in these departments; also RSPH contains no any copy of the protocol, while the other two hospitals have a copy or more in the library.

There are no heavy- duty gloves at any department or hospital, which should be used in dealing with medical waste disposal and contaminated instruments, and this is a significant cause of infection transmission.

There is excellent compliance in offering alcohol swab in each department, and in the level of cleanliness of doctor rooms in the three hospitals.

There is good compliance in maintaining clean nursing rooms, suction tubes and bottles; offering antiseptics and disinfectant solutions; offering all supplies for hand washing; and offering sufficient disposables and linens to prevent reuse. Patient unit and department in general cleanliness are accepted but more efforts are required for more improvement.

The waste containers are not covered which increase the hazard of cross infection.

It is expected to distribute safety boxes in each room according to the protocol, but the observation reveals that it is present in each room only in 26% of departments that include intensive care units, nursery department, and hemodialysis department.

**Table 4.22 Physical environmental fitness to perform IPC**

| Variable | Yes | No | NA |
|---|---|---|---|
| | % | % | % |
| There is a copy of the IPC protocol in the department. | 0 | 100 | 0 |
| Alcohol swabs are available in the department. | 97.1 | 2.9 | 0 |
| Patient units are clean (no blood, dust, or other dirty). | 71 | 15.9 | 13 |
| Doctor's room is clean (no blood, dust, or other dirty). | 94.2 | 5.8 | 0 |
| Nursing room is clean (no blood, dust, or other dirty). | 81.2 | 18.8 | 0 |
| The unit in general is clean (kitchen, bathroom, toilette …etc | 78.3 | 21.7 | 0 |
| Antiseptics and disinfectant solutions are available. | 85.5 | 14.5 | 0 |
| All supplies for hand washing are available. | 87 | 13 | 0 |
| There are sufficient disposables and linens to prevent reuse. | 82.6 | 17.4 | 0 |
| There is sharp disposal container in each room. | 26.1 | 73.9 | 0 |
| There are covered waste containers for contaminated wastes. | 5.8 | 94.2 | 0 |
| All types of gloves are available in the unit. | 0 | 100 | 0 |
| Suction tubes and suction bottles are clean. | 82.6 | 13 | 4.3 |
| Each bed in the unit is covered by clean linen. | 59.4 | 36.2 | 4.3 |
| There are separated rooms for different diseases | 36.2 | 33.3 | 30.4 |
| There is isolation room in each department. | 60.9 | 21.7 | 17.4 |

## 4.8 The differences between HCPs practices of IPC and their personal and professional characteristics

The researcher has used simple frequencies and cross tabulation, t-test and one way ANOVA to compare means and to examine the relationship between practices of HCPs in pediatric hospitals and some of their personal and professional characteristics. Such as gender, place of work, type of work, and years of experience to clarify if there is association between these variables and compliance with IPC protocol practices.

### 4.8.1. Differences between gender and IPC practices

There are differences between gender and wearing uniform practices where females are wearing uniform often or always in 100% of the study population while males are committed to wear uniform often or always in 86.9% of times, and the differences reaches statistical differences as chi square = 17.68, degree of freedom = 4, and p value = 0.001(Annex 14 **)**.

The differences between gender and other IPC practices do not reach statistical difference as seen in table 4.16, which reflect that poor performance between all HCPs without any effect of personal and professional characteristics. In another study that compares different hospital practices in infection prevention particularly hand washing as the main infection prevention practice, male healthcare workers (irrespective of discipline) were less likely to comply with hand-hygiene guidelines than women (Creedon et al, 2008). Another study also supported the results of Creedon as it found Males across all occupations were less likely to comply with infection control across all questions and were significantly less likely to clean their hands (OR = 0.30, p <.001). (Yassi et al., 2007)

**Table 4.23 Differences between gender and IPC practices**

| Dep. var. IPC practices | Indep. var. gender | N | Mean | Std. Deviation | Std. Error | f | P-Value | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower Bound | Upper Bound |
| Mean hand washing | Male | 213 | 3.95 | .64583 | .04425 | 1.252 | 0.21 | 3.8690 | 4.0434 |
| | Female | 94 | 4.05 | .57694 | .05951 | | | 3.9350 | 4.1714 |
| Mean wearing gloves | Male | 213 | 4.47 | .67505 | .04625 | 0.706 | 0.48 | 4.3830 | 4.5654 |
| | Female | 94 | 4.41 | .68642 | .07080 | | | 4.2743 | 4.5555 |
| Mean using antiseptics | Male | 213 | 3.95 | .89950 | .06163 | 1.045 | 0.297 | 3.8316 | 4.0745 |
| | Female | 94 | 4.06 | .74860 | .07721 | | | 3.9105 | 4.2172 |
| Mean proper use of disposables | Male | 213 | 4.014 | .82372 | .05644 | 1.82 | 0.062 | 3.9028 | 4.1253 |
| | Female | 94 | 4.195 | .67275 | .06939 | | | 4.0572 | 4.3328 |
| Mean safe sharp practices | Male | 213 | 3.97 | .89630 | .06141 | 0.573 | 0.567 | 3.8539 | 4.0960 |
| | Female | 94 | 4.039 | .91953 | .09484 | | | 3.8507 | 4.2273 |

### 4.8.2. Differences between place of work and IPC practices

Place of work of the HCPs of this study is the pediatric hospitals. This study results identified differences between place of work and IPC practices in three of the main six variables reflecting IPC practices demonstrated statistically significant differences. Using Scheffe test the study sample of El-durra hospital was more compliant with hand washing, and less compliant with wearing gloves practices than the HCPs from the other two hospitals (annex 15). This result was related to many factors such as: the availability of hand washing supplies and materials; Hawthorne effect, as the researcher is a nursing supervisor assigned as infection prevention nurse at El-durra pediatric hospital; beside the possibility of frank chance or real better compliance of HCPs. RSPH' HCPs uses disposables more properly than the other two pediatric hospitals, and these differences reached statistical significant value (t = 0.04). This result was related to the availability of disposables with sufficient amounts, especially, after observing big amounts of disposables in each unit during data collection. Other IPC practices reflect no statistical significant differences, which means that HCPs in all of the three hospitals practice similarly in infection prevention and control practices.

**Table 4.24 Differences between place of work and IPC practices**

| Dep. var. IPC practices | Indep. var. place of work | N | Mean | Std. Deviation | Std. Error | f | P-Value | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower Bound | Upper Bound |
| Wearing uniform | El Nassr | 126 | 4.4 | .905 | .081 | 2.59 | 0.076 | 4.25 | 4.56 |
| | El Dorra | 87 | 4.4 | .637 | .068 | | | 4.27 | 4.54 |
| | RSPH | 94 | 4.63 | .762 | .079 | | | 4.47 | 4.78 |
| Mean hand washing | El Nassr | 126 | 3.93 | .69891 | .0622 | 4.29 | 0.015 | 3.8106 | 4.0571 |
| | El Dorra | 87 | 4.149 | .49613 | .0531 | | | 4.0437 | 4.2552 |
| | RSPH | 94 | 3.904 | .60882 | .0628 | | | 3.7796 | 4.0290 |
| Mean wearing gloves | El Nassr | 126 | 4.33 | .76637 | .0682 | 3.61 | 0.028 | 4.2022 | 4.4724 |
| | El Dorra | 87 | 4.50 | .64249 | .0688 | | | 4.3631 | 4.6369 |
| | RSPH | 94 | 4.57 | .55337 | .0570 | | | 4.4611 | 4.6878 |

| Dep. var. IPC practices | Indep. var. place of work | N | Mean | Std. Deviation | Std. Error | f | P-Value | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower Bound | Upper Bound |
| Mean using antiseptics | El Nassr | 126 | 3.88 | .89984 | .0801 | 1.81 | .165 | 3.7223 | 4.0396 |
| | El Dorra | 87 | 4.02 | .78469 | .0841 | | | 3.8557 | 4.1902 |
| | RSPH | 94 | 4.09 | .85282 | .0879 | | | 3.9211 | 4.2704 |
| Mean proper use of disposables | El Nassr | 126 | 3.91 | .80929 | .0721 | 5.65 | 0.04 | 3.7674 | 4.0527 |
| | El Dorra | 87 | 4.09 | .86817 | .0930 | | | 3.9069 | 4.2770 |
| | RSPH | 94 | 4.26 | .61029 | .0629 | | | 4.1374 | 4.3874 |
| Mean safe sharp practices | El Nassr | 126 | 4.07 | .84134 | .0749 | 2.72 | .067 | 3.9284 | 4.2251 |
| | El Dorra | 87 | 3.80 | .87979 | .0943 | | | 3.6171 | 3.9921 |
| | RSPH | 94 | 4.06 | .98248 | .1013 | | | 3.8591 | 4.2615 |

### 4.8.3. Differences between type of work and IPC practices

The study sample was divided in relation to type of job into five groups, which are Specialized doctor, General physician, BSN nurse (bachelor or master degree nurse), Prn nurse (practical nurse), and Physiotherapist to reflect the job and years of education in the same variable.

The results of the study clarify that there is statistical significant differences between type of work and only two of the six IPC practices, while the other practices are almost the same in the three hospitals. The differences appear in wearing uniform and in using safe work practices. Using Scheffe test regarding commitment in wearing uniform the Prn nurses were more committed to wear uniform then all other groups, and specialized doctors were the less compliant group and this result is congruent with many international studies (annex 16).

The study of Askarian et al, (2006), on the compliance of personal hygiene and safety and its effect on Nosocomial infection in Shiraz, reflected that there are varieties in compliance with personal hygiene among health care workers, where physicians and nurses were less compliant than cleaners, 10% of doctors, 32.2% of nurses, and 56.7% of cleaners adhere to personal hygiene practices.

The explanation of the differences between nurses and other health care providers in using sharps and needles might be related to the nature of nurse's job description. although they have to use needles and sharps frequently, but most of them recap the needle after use which cause high incidence of needle stick injuries, and the physiotherapists answer the questionnaire by some times in this point which lead to the appearance of the differences.

**Table 4.25 Differences between type of work and IPC practices**

| IPC practices | Type of work | N | Mean | Std. Deviation | Std. Error | f | P-Value | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower Bound | Upper Bound |
| Wearing uniform | Specialized doctor | 48 | 4.04 | 1.09 | .157 | 6.30 | 0.00 | 3.72 | 4.36 |
| | General physician | 47 | 4.28 | .949 | .138 | | | 4.00 | 4.56 |
| | BSN nurse | 124 | 4.60 | .649 | .058 | | | 4.48 | 4.71 |
| | Prn nurse | 80 | 4.64 | .601 | .067 | | | 4.50 | 4.77 |
| | Physiotherapist | 8 | 4.63 | .518 | .183 | | | 4.19 | 5.06 |
| Mean hand washing | Specialized doctor | 48 | 3.96 | .682 | .0984 | .960 | .430 | 3.7707 | 4.1668 |
| | General physician | 47 | 3.87 | .552 | .0805 | | | 3.7138 | 4.0380 |
| | BSN nurse | 124 | 3.97 | .618 | .0555 | | | 3.8619 | 4.0816 |
| | Prn nurse | 80 | 4.08 | .655 | .0732 | | | 3.9437 | 4.2355 |
| | Physiotherapist | 8 | 3.91 | .487 | .1725 | | | 3.5087 | 4.3246 |
| Mean wearing gloves | Specialized doctor | 48 | 4.53 | .639 | .0922 | .231 | .921 | 4.3456 | 4.7169 |
| | General physician | 47 | 4.47 | .633 | .0924 | | | 4.2926 | 4.6648 |
| | BSN nurse | 124 | 4.43 | .698 | .0627 | | | 4.3113 | 4.5596 |
| | Prn nurse | 80 | 4.43 | .713 | .0797 | | | 4.2788 | 4.5962 |
| | Physiotherapist | 8 | 4.37 | .582 | .2059 | | | 3.8880 | 4.8620 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mean using antiseptics | Specialized doctor | 48 | 3.94 | .918 | .1325 | .788 | .534 | 3.6813 | 4.2145 |
| | General physician | 47 | 3.89 | .852 | .1244 | | | 3.6432 | 4.1441 |
| | BSN nurse | 124 | 4.08 | .833 | .0748 | | | 3.9405 | 4.2369 |
| | Prn nurse | 80 | 3.92 | .879 | .0982 | | | 3.7294 | 4.1206 |
| | Physiotherapist | 8 | 3.81 | .593 | .2099 | | | 3.3160 | 4.3090 |
| Mean proper use of disposables | Specialized doctor | 48 | 4.13 | .733 | .1058 | 1.51 | .197 | 3.9259 | 4.3519 |
| | General physician | 47 | 3.95 | .898 | .1310 | | | 3.6867 | 4.2141 |
| | BSN nurse | 124 | 4.15 | .750 | .0673 | | | 4.0226 | 4.2893 |
| | Prn nurse | 80 | 4.00 | .800 | .0895 | | | 3.8301 | 4.1865 |
| | Physiotherapist | 8 | 3.62 | .547 | .1935 | | | 3.1674 | 4.0826 |
| Mean safe sharp practices | Specialized doctor | 48 | 4.25 | .754 | .1089 | 3.880 | .004 | 4.0308 | 4.4692 |
| | General physician | 47 | 4.30 | .718 | .1047 | | | 4.0940 | 4.5159 |
| | BSN nurse | 124 | 3.84 | .962 | .0864 | | | 3.6704 | 4.0124 |
| | Prn nurse | 80 | 3.93 | .933 | .1044 | | | 3.7297 | 4.1453 |
| | Physiotherapist | 8 | 3.58 | .729 | .2578 | | | 2.9737 | 4.1930 |

### 4.8.4. Differences between years of experience and IPC practices

The years of experience was ranged from 1 year to 36 years, and the researcher divided it into three groups to facilitate analysis depending on previous studies and he found no differences between years of experience and the HCP practices in IPC except in wearing uniform, (table 4.18), by using Scheffe test he found the more experienced personnel were less compliant to wear uniform (annex 17), and this result is explained by the previous relation which reflect that the specialized doctors who are with longer years of experience were less compliant with wearing uniform.

**Table 4.26 Differences between years of experience and IPC practices**

| Dep. var. IPC practices | Indep. var. Years of experience | N | Mean | Std. Deviation | Std. Error | f | P-Value | 95% Confidence Interval for Mean | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Lower Bound | Upper Bound |
| Wearing uniform | 1-5 years | 137 | 4.56 | .706 | .060 | 6.366 | 0.002 | 4.44 | 4.68 |
| | 6-15 years | 107 | 4.54 | .756 | .073 | | | 4.40 | 4.69 |
| | 16-36 years | 63 | 4.16 | .971 | .122 | | | 3.91 | 4.40 |
| Mean hand washing | 1-5 years | 137 | 4.0036 | .6267 | .0535 | 1.029 | .359 | 3.8978 | 4.1095 |
| | 6-15 years | 107 | 4.0218 | .5917 | .0572 | | | 3.9084 | 4.1352 |
| | 16-36 years | 63 | 3.8862 | .6798 | .0856 | | | 3.7150 | 4.0575 |
| Mean wearing gloves | 1-5 years | 137 | 4.4343 | .7092 | .0605 | 2.286 | .103 | 4.3145 | 4.5541 |
| | 6-15 years | 107 | 4.5561 | .6193 | .0598 | | | 4.4374 | 4.6748 |
| | 16-36 years | 63 | 4.3333 | .6897 | .0869 | | | 4.1596 | 4.5071 |
| Mean using antiseptics | 1-5 years | 137 | 3.9416 | .8381 | .0716 | .451 | .637 | 3.8000 | 4.0832 |
| | 6-15 years | 107 | 4.0467 | .9228 | .0892 | | | 3.8699 | 4.2236 |
| | 16-36 years | 63 | 3.9841 | .7827 | .0986 | | | 3.7870 | 4.1813 |
| Mean proper use of disposables | 1-5 years | 137 | 4.0341 | .8077 | .0690 | 1.035 | .356 | 3.8976 | 4.1705 |
| | 6-15 years | 107 | 4.1558 | .8396 | .0811 | | | 3.9948 | 4.3167 |
| | 16-36 years | 63 | 4.0000 | .6134 | .0772 | | | 3.8455 | 4.1545 |
| Mean safe sharp practices | 1-5 years | 137 | 3.9124 | .9229 | .0788 | 1.391 | .250 | 3.7565 | 4.0683 |
| | 6-15 years | 107 | 4.0156 | .9542 | .0922 | | | 3.8327 | 4.1985 |
| | 16-36 years | 63 | 4.1376 | .7468 | .0941 | | | 3.9495 | 4.3257 |

## 4.9 Comparison between IPC practices by questionnaire and observed checklist

The results of analysis demonstrate significant differences between the HCP's practices that observed by the researcher through the observation checklist of health care providers'

practices, and the practices that was obtained through the analysis of the questionnaire Particularly, in some specific points in which the researcher can significantly compare.

The real practices observed through the observation checklist reflect lower compliance to IPC protocol practices than that obtained through the analysis of the questionnaire as seen in table (4.19). The greatest differences were observed in: hand washing immediately on arrival showed (4.7% -68%), and Hand washing before touching the patients (7.5% - 79.8%); Removing jewelry, hand watch, and ring when washing hands (31.6 – 70.6%); Hand washing before leaving the unit (48.9 – 83.2% ); Do not bend or break used needles prior disposal (76.4- 27.6%).

Other results reflected closer differences such as: Washing hands for 15-30 seconds with soap and water (56 - 79.4%), Each patient unit disinfected after patient discharged (57.3 - 76.4%), and Do not recapping used needles (41.1 – 27.6% ).

Some practices were consistent by both methods. Such as the practices of Hand washing after working with patients (76.9 – 79.8%), Hand washing after touching blood or body fluids (97.4 – 97.2%), Wear gloves when contact with blood or other body fluids (84.7 - 88.2%) and Use clean gloves when handling contaminated instrument( 83 – 90%).

Although the Arabic language is used in the questionnaire, but little misunderstanding is still expected to occur related to the respondents perception and explanations.

Other suggested explanation to these differences are; the tendency of people to appear as ideal; carelessness of some HCPs in dealing with the whole subject; and hawthorn effect, as the researcher is a well known colleague for many of the study population; and finally some answers have reflected misunderstanding or even knowledge deficit that guided us to find the basic causes of knowledge deficit concerning IPC protocol and practices, which enforced the need for education and training to enhance the infection prevention and control knowledge and practice.

**Table 4.27 Percent of selected IPC practices by questionnaire and observation checklist**

| Variable | Percent of practices observed by checklist | Percent of practices observed by Questionnaire |
|---|---|---|
| Hand washing immediately on arrival to the unit. | 4.7 | 68.0 |
| Hand washing before touching the patients. | 7.5 | 79.8 |
| Hand washing after working with patients. | 76.9 | 79.8 |
| Hand washing before leaving the unit. | 48.9 | 83.2 |
| Hand washing after touching blood or body fluids. | 97.4 | 97.2 |
| Removing jewelry, hand watch, and ring when washing hands. | 31.6 | 70.6 |
| Washing hands for 15-30 seconds with soap and water | 56.0 | 79.4 |
| Wear gloves when contact with blood or other body fluids. | 84.7 | 88.2 |
| Use clean gloves when handling contaminated instrument. | 83.2 | 90 |
| Each patient unit disinfected after patient discharged. | 57.3 | 76.4 |
| Do not remove used needles from syringes before disposal. | 27.5 | 20.6 |
| Do not bend or break used needles prior disposal. | 76.4 | 27.6 |
| Do not recapping used needles. | 41.1 | 27.6 |
| Dispose all sharps in puncture resistance containers. | 69.9 | 88.0 |

### 4.9.1. Percent of differences between knowledge, practice and observation in specific variables

Another strategy to clarify the differences have been used by the researcher to compare knowledge and practices observed through analysis of both assessment methods.

The differences observed by comparing percent of knowledge and perception with the percent of the total main of selected practices towards compliance with recommended IPC practices obtained through both data collection methods. In the following figures the term" knowledge"

reflected the respondent perception and knowledge about the importance of the selected IPC practice.

While the term “practice” explore the mean weighted percent of IPC practices as obtained through the analysis of self-administered questionnaire that is practices in always or often manner, and the researcher means by using the term “observed”, the percent of respondent who was observed committed to the same IPC practice through the observation checklist.

#### 4.9.1.1. Importance of IPC in pediatric units

Approximately all of the study population has recognized the importance of the existence of Palestinian IPC protocol, but only third of them knew that there is a Palestinian IPC protocol, while the observation checklist of the physical environment clarifies that no one of the respondent has a copy of the protocol in his department.

The researcher have found two copies of the protocol at the library of El-Durra hospital, and one copy at the director general’s office of El Nassr hospital while RSPH contain no any copy of the protocol.

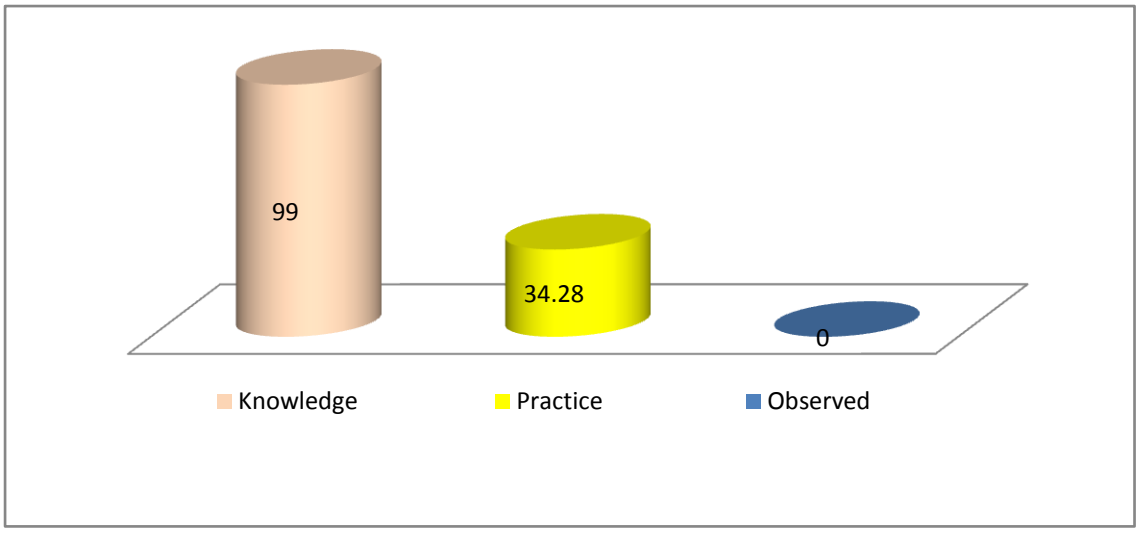



**Figure 4.2 Importance of IPC in pediatric units**

#### 4.9.1.2. Importance of hand washing practices

All respondents have demonstrated a very high knowledge about the importance of hand washing as IPC practice, while 79.7% of them reported their compliance to hand washing practices, but only 45.9% observed complying with the protocol recommendation concerning hand-washing practices.

These differences could be explained by the knowledge deficit of HCPs with the Palestinian IPC protocol and its content, as none of them has any access to any copy of the protocol. So most of the difference came from this point as the HCPs thought that they practice hand washing properly while their real practices were different from the protocol recommendations, which clarify the importance of education and training sessions

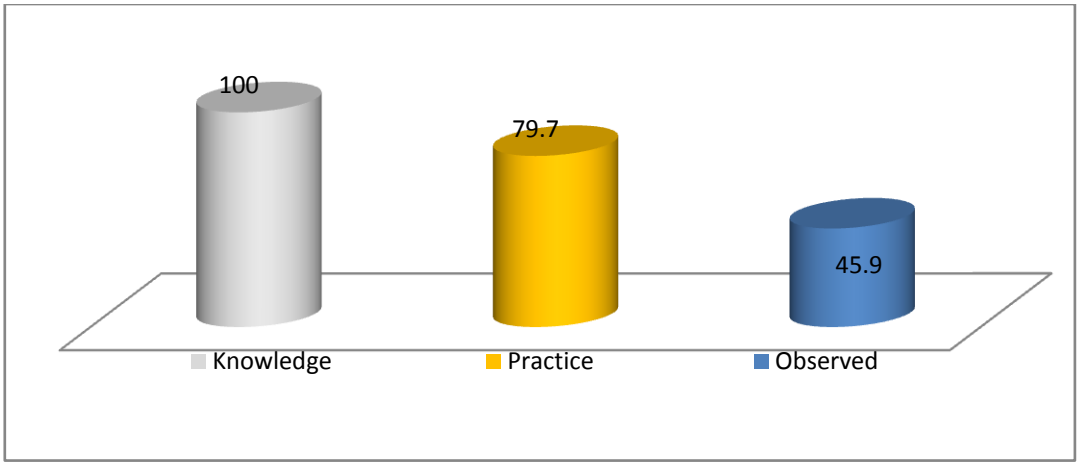



**Figure 4.3 Importance of hand washing**

#### 4.9.1.3. Wearing gloves as physical barriers

Wearing gloves as IPC practice also similar to other HCP's practices is lower than their perception and knowledge about its important, but the observed practice is the lowest.

The study population have identified the importance of wearing gloves as physical barrier by (96.1%), and (89.1%) of them wear gloves, but 40.7% only uses gloves properly and as recommended by the protocol, which ascertain the previous results of knowledge deficit, and enforce the need for further education and training.

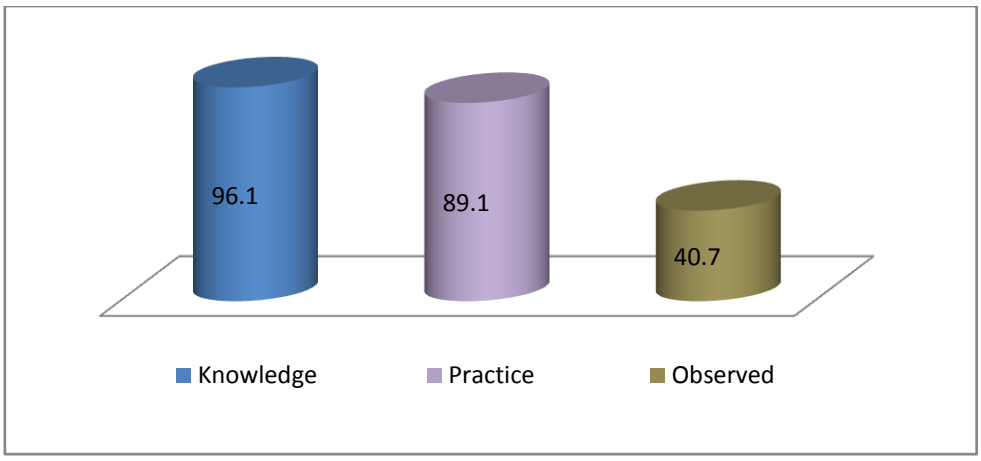



**Figure 4.4 Wearing gloves as physical barriers**

#### 4.9.1.4. Safe sharp practices

The safe sharp practices reflect the HCP's practices in dealing with used needles and syringes, by bending, recapping, and disposal in safe containers. The importance of such a practice is very clear in preventing cross infection with the most dangerous infectious diseases such as hepatitis and AIDS without referring to any protocol, so the observed and real practices seemed very close or even practiced appear to be more than the observed.

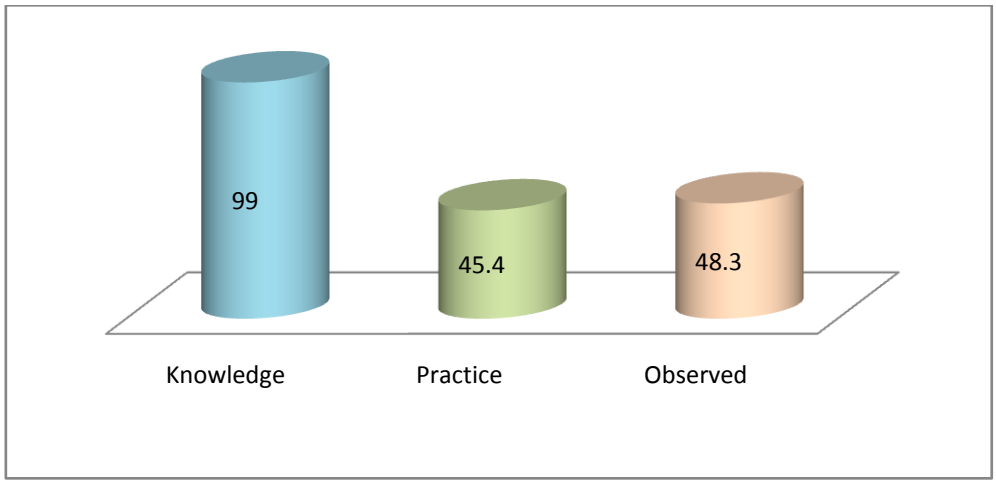



**Figure 4.5 Safe sharp practices**

### 4.10 In depth interviews findings

The in depth interviews with the key persons in the three pediatric hospitals were highlighted some points regarding the IPC protocol, the HCPs compliance with its practices, and their recommendations to improve compliance with the protocol.

**Importance of IPC protocol**

All of the interviewed persons have confirmed the importance of the existence of the IPC protocol. And to work according to its recommendations, which reflect very high perception and attitude toward the protocol. They mentioned many benefits for the protocol summed up as follows: use it as a reference that unify performance; increase HCP's knowledge and compliance with IPC practices; half of the study population propose to use it as base line for assessment and evaluation of HCPs practice; and a manager of the infection control committee at one hospital suggests to use it as base line in updating the Palestinian protocol itself.

The interviewed persons gave different interpretations for the reasons of HCPs lack of knowledge about content and place of existence of the Palestinian IPC protocol as 40% of them refer that to the inefficiency of the infection control committee in publications of the protocol and its content, 40% find absence of education and training of IPC practices as a cause, 30% refer that to absence of the protocol from each department, 30% accuse management lack of interest in following the IPC protocol or impose its implementation, other 30% suppose that the HCPs themselves are not interested in search and study, and 20% blame the PMOH and ask to integrate the protocol items in the hospital policy.

**Role of infection control committee**

The results of the analysis of the interviews reflect that the infection control committee responsibilities are not clear, as 20% of the interviewed don't recognize the existence of the committee, another 20% define the infection control committee responsibilities in collecting swabs for culture from all the hospital departments and treating any source of infection discovered and writing a monthly report, the other 60% emphasize that the infection control committee hold lectures, distribute posters and brochures.

In a separate question regarding training, 80% of the interviewed persons denied the existence of any training on IPC practices or protocol, and 20% of the study population pointed to the increased activity of the committee in outbreaks and in case of positive culture results.

Although there is little efforts done in education and training regarding IPC protocol a director general of one of the hospitals evaluate the work of the committee by the satisfactory results and absence of HAI in his hospital despite that there is no indicator used to measure HAI.

**Surveillance of hospital acquired infection**

Not only all of the interviewed persons denied the presence of surveillance program in the hospital even some of them did not recognize the meaning of surveillance of HAI as well. The only practice that are done is the notification of the epidemiological department with any infectious diseases especially the bacterial meningitis, other efforts are paid to keep safe and clean environment by treating positive culture results and preventing cross infections.

Each hospital should define the term HAI in its strategic plan and explore methods to assess incidence of HAI annually.

**Availability of tools and equipments used in infection prevention**

The analysis of the questionnaire showed scarcity of resources and tools needed to practice IPC properly, as the protocol it self is absent from the hospital departments, also the hygiene gel used in alcohol hand rub, and heavy duty gloves needed to deal with contaminated equipments, that beside the instability of the amounts of disinfectants and tools needed for hand washing.

The key persons interviewed were asked how to overcome the scarcity of resources and shortage of tools. All of them recognize the defect but each of them propose different solutions to over come this problem. Half of them ask the PMOH to increase its efforts to offer more tools and equipments needed for IPC practices, while a director manager of one hospital suggests looking for donors or externals to fulfill requirements. 40% suggest rationalizing consumption and using the available quantity appropriately to reach improvement. 30% stressed the need to bind cleaning companies with the contract items in offering enough high quality disinfectants. (Hospital cleaning was assigned to private companies many years ago).

Finally it is worth to mention one hospital nursing director opinion when he said that "scarcity of tools is not a barrier to whom wants to work, but more attention can solve the problem".

**Poor compliance and more risk**

Analysis of the observation checklist clarify poor compliance of HCPs with IPC practices, specially hand washing as a main practice in preventing HAI, all of the interviewed personnel agree that there is poor compliance with proper hand washing and they propose the following causes as reasons of non compliance: 40% absence of reward and punishment in the health care facility roles, 40% lack of interest by officials beside lack of follow up and evaluation of IPC practices, 40% refer the problem to the diminished resources and in availability of the needed equipments and supplies in the place of work, 30% thinks that specific personal behavior of HCPs may be the cause, while 20% refer the noncompliance to lack of knowledge of the importance of following IPC protocol.

Other proposed causes were work overload, absence of the protocol from each department, and misunderstanding about the use of gloves eliminate the need for recurrent hand washing.

The poor compliance to IPC practices results in a very high percent of needle stick injuries among health care providers, about two third of the HCPs have a history of injury from used needle or used medical instrument. The interviewed persons refer this high percent to:

50% think that it is the HCPs' negligence and recklessness that cause this high percent of needle sticks, 40% suppose the lack of knowledge and short experience are the cause, 40% refer that to work overload and type of clients, 30% clarify that it is the result of recapping of the needle which is prevented by the protocol recommendations, and other opinions arises such as absence of the protocol from each department and HCPs' vision problems.

**How to improve HCPs' compliance with IPC practices?**

The interviewed personnel recommendations to improve HCPs compliance with IPC protocol included four to six recommendations for each, but all could be concluded into five important points, which are:

1- Provide a copy of the Palestinian IPC protocol to each department, then implement well prepared training course abut it to all HCPs.
2- Offer the needed tools and equipments in high quality and sufficient amounts.
3- Construct an infection control committee in each hospital containing highly qualified personnel in infection control methods and give them the responsibility and accountability, then let them evaluate and control infection.
4- Share all the HCPs in education and training courses about infection control and then watch their performance.
5- Follow the strategy of reward and punishment in dealing with all personnel regarding IPC practices and compliance.

**Summery of in-depth interview results**

The results of the qualitative part of data collection method (the in-depth interviews) have confirmed the results of the quantitative parts in most of the study variables.

The respondent have recognized the importance of the Palestinian IPC protocol, and admitted its absence from the work places despite their knowledge of its various benefits.

Other important result was to clarify the turbulence in the responsibility of the infection control committee, and its diminished performance, which is almost limited to follow swabs and cultures, obtained from different hospital departments.

Not only all of the interviewed persons denied the presence of surveillance program in their hospital even some of them did not recognize the meaning of surveillance of HAI as well.

Most of the respondents have identified scarcity of tools and equipments used in infection prevention practices, and submitted suggestions to over come these deficiencies.

Although all of the interviewed personnel agree that there is poor compliance with proper hand washing and other infection prevention practices, and they have explained many reasons for the noncompliance, but they refer the high incidence of HCPs' injuries with used needles to it.

Finally the key persons who were interview present a set of recommendations to improve the health care provider's compliance with IPC practices and protocols.

# 5. Conclusion and Recommendation

## 5.1 Conclusion

An attempt to evaluate the health care provider's compliance with the infection prevention and control protocol that was adopted by Ministry of Health, the current descriptive analytic study was conducted at governmental pediatric hospitals- Gaza governorates. Parallel with the CDC & WHO recommendations to prevent hospital acquired infection that affected children during hospitalization, which lead to increase in childhood morbidity and mortality in Palestine. The MOH has adopted the IPC protocol in 1994, and being activated through all the MOH institutions, including training of trainees work shops, and training of service providers in all technical areas, however, the protocol have not well followed up nor supervised, therefore the aim of this study is to evaluate the compliance of health care providers with the infection prevention and control protocols, to recognize how the implementation could be promoted, to achieve the goal of the protocol which is to protect the health of workers, clients, the community and the environment. So if the HCP's compliance to the recommended protocol practices improved that well improves the health care provider's skills and lead to decrease infant's morbidity and mortality rates.

This is the first study in Gaza Governorates that assesses the HCP's compliance to IPC protocol in pediatric hospitals, the study population were 334 health care providers who are working at governmental pediatric hospitals in Gaza governorates, including all official doctors (106), nurses (220), and physiotherapists (8) who are working in the three pediatric hospitals at the time of study implementation. The response rate was 91%; and the study results have illustrated that 69.4% of respondents were males; the age of the sample population ranged from 21 years to 60 years; the majority of study populations were married (80.5%), 30.9% were physicians; and 66.5% were nurses, about 80% 0f them have less than fifteen years of experience; and 41% were from El Nassr Pediatric hosp, 30.6% were from RSPH, and the remaining 28.3% from El-Durra pediatric hospital.

The study demonstrates a major problem affecting the IPC protocol implementation because only 24.3% identified knowledge about IPC precautions and protocol.

HCPs do not even recognize the meaning of hospital surveillance program; 21.5% share an education or training session about IPC, but only 16.9% of the study population received sufficient information about IPC in that session which reflect the urgent need for education program concerning basics of infection prevention protocols.

Although 84.7% receive vaccination for hepatitis B, only 63.2% receive all the proposed three doses; 66.1% of the study population has been exposed to an injury from used needle or sharp medical instrument; these results reflected an important occupational health hazard lead to infections with blood born pathogens like Hepatitis B that needs urgent intervention for prevention, such as using vaccination and protective barriers.

93.6% of the study population knew and perceive the importance of the IPC practices, while the compliance to practices was unsatisfactory.

The compliance of HCPs with IPC practices were evaluated using two methods, the results have proved lower compliance rates through observation checklist of HCPs than the rates obtained through questionnaire as the following: compliance with wearing uniform practices (90.9% , and observed 86.6%); hand washing (79.7%, and observed 45.9%); wearing gloves (89.1, and observed 40.7%); use Antiseptic and disinfectant (79.8% , and observed 49.16%); safe work practices (45.3% , and observed 48.2%); additional results obtained was the absence of covered waste containers and absence of heavy duty gloves, and adopting labeling and separating of waste disposables. These results clarify the need of recurrent multidirectional interventions to improve HCP's compliance to IPC practices.

There were little relationship between practices of HCPs in pediatric hospitals and some of their personal and professional characteristics. Such as gender, place of work, type of work, and years of experience except for wearing uniform is more practiced by female, diploma nurse or physiotherapist, and new employee, more compliance to hand washing practices and less to wearing uniform practices were observed between HCPs from El-Dorra hospital, and the other two hospitals, and RSPH's health care providers were more compliance to safe work practices.

The most important reasons for noncompliance with IPC protocol were: (61.5%) absence of education or training program, (52.4%) lack of knowledge and updates, (46.9)

scarcity of required supplies, (39.7%) whether the high work load and insufficient time, or the administration responsibility in follow up and feed back.

The results of the in-depth interviews emphasized the same results of the questionnaire. The people who participate at the in depth interviews revealed that the IPC protocol is important and very useful despite there its absence from all departments, the infection control committee performance is very weak, and so the training and education sessions, they also confirmed the absence of hospital surveillance program, and scarcity of tools and equipments used in infection prevention practices, and submitted suggestions to over come these deficiencies. And finally most of interviewed personnel have suggested recommendations to improve the health care provider's compliance with IPC practices and protocols which included: Providing a copy of the Palestinian IPC protocol to each department, implement well prepared training course abut it to all HCPs, Offer the needed tools and equipments in high quality and sufficient amounts, construct an infection control committee in each hospital containing highly qualified personnel in infection control methods and give them the responsibility and accountability, then let them evaluate and control infections, share all the HCPs in education and training courses about infection control and then evaluate their performance, and to follow the strategy of reward and punishment in dealing with all personnel regarding IPC practices and compliance.

## 5.2 Recommendations

The study enabled the researcher to put useful recommendations to help in improving health care providers' compliance with infection prevention practices and protocols.

Cooperation between the organization (MOH) and health care providers is the corner stone of improvement, The recommendations suggested by the researcher are:-

- Provide a copy of the protocol containing written policies and procedures concerning infection prevention and control practices, and available at all times to office staff, and reviewed at least every two years.

- Educational programs for staff concerning infection prevention and control should be implemented, reinforced, and evaluated on a regular basis.

- Staff should receive influenza immunization annually and be immunized against or show documentation of immunity to other vaccine-preventable infections, including hepatitis B.

- Standard precautions should be used in every interaction with a patient, including hand hygiene by using hand washing with soap (plain or antimicrobial) and water before and after patient contact or contact with the patient's immediate environment.

- Patients with potentially contagious diseases and immune-compromised children should be promptly triaged. Contact between contagious children and uninfected children should be minimized. Policies to deal with children who present with highly contagious infections, should be devised and implemented.

- Needles and sharps should be handled with great care. Needle-disposal units that are impermeable and puncture-proof should be available next to the areas used for injection or vein puncture. The containers should not be overfilled and should be kept out of reach of young children. Procedures should be established for removal and incineration or sterilization of contents. Needle devices with safety features should be evaluated periodically with input from staff members who use needles, and use of devices that are likely to improve safety should be implemented.

- A written blood borne pathogens exposure-control plan that includes written policies for management of contaminated–sharp-object injuries should be developed, readily available to all staff, and reviewed annually.

- Regular hospital infection control audits or hospital surveillance program results should be reported on a regular basis, leading to significant improvement of infection control practice.

- Offering basic requirements and materials that are needed to comply with the IPC protocols such as disinfectant solutions, hand washing equipments, heavy duty gloves, and covered waste containers.

- Support efforts and research studies done concerning the field of infection prevention.

**Research recommendations**

Further research studies should be conducted about compliance with IPC protocols in all governmental hospitals, including cleaners.

Establish standard guidelines that can be used later in evaluating all health care facilities compliance with standard precautions and protocols, to enable comparisons between different places.

Conducting research studies concerning specific infection prevention practice such as hand washing, or using safe work practices.

A research study is needed to evaluate needle sticks and blood borne pathogens exposure in all health care facilities in Gaza governorates.

To conduct a comparison study concerning compliance with the Palestinian IPC protocol at all governmental hospitals in Gaza governorates.

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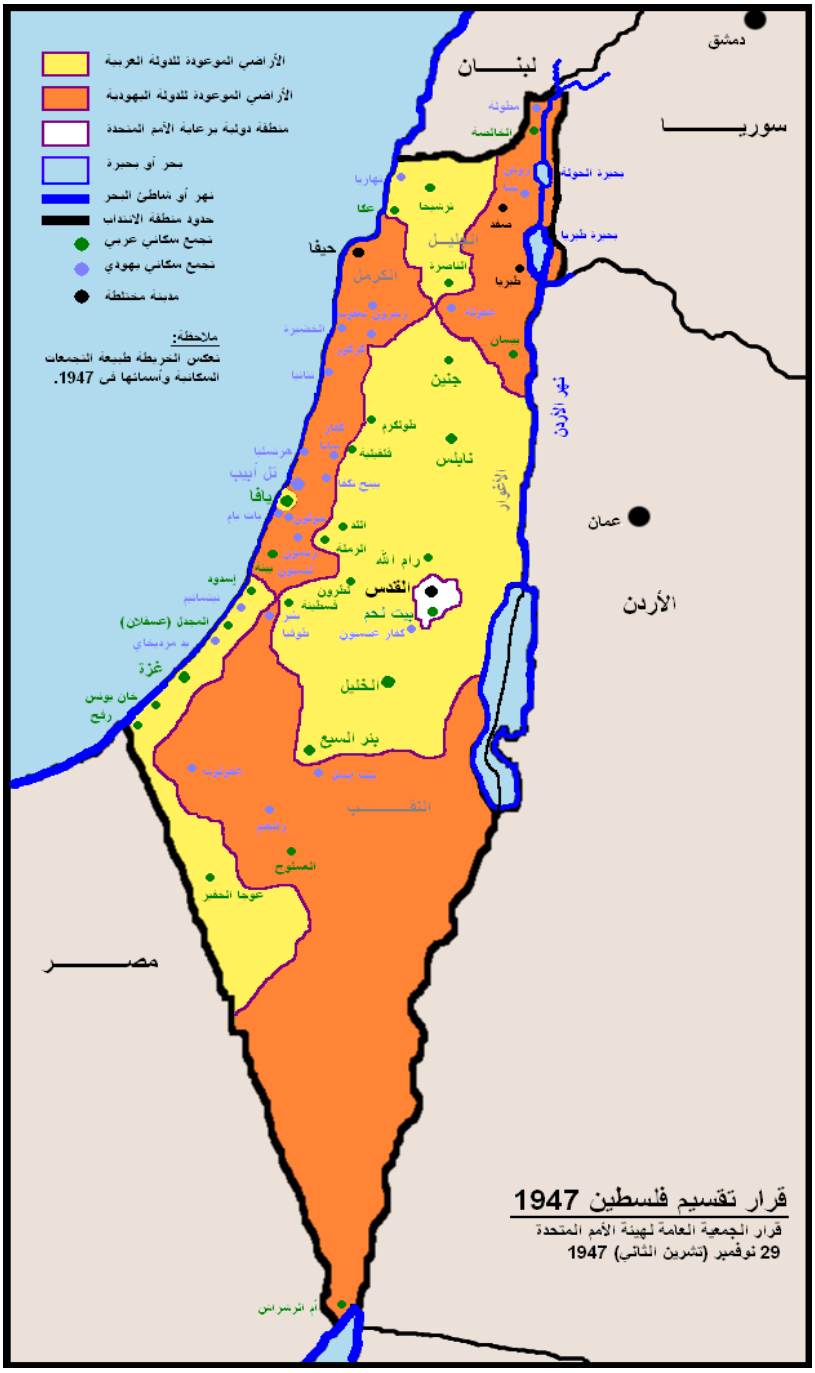
**Annexes**

**Annex 1**

## Map of Palestine

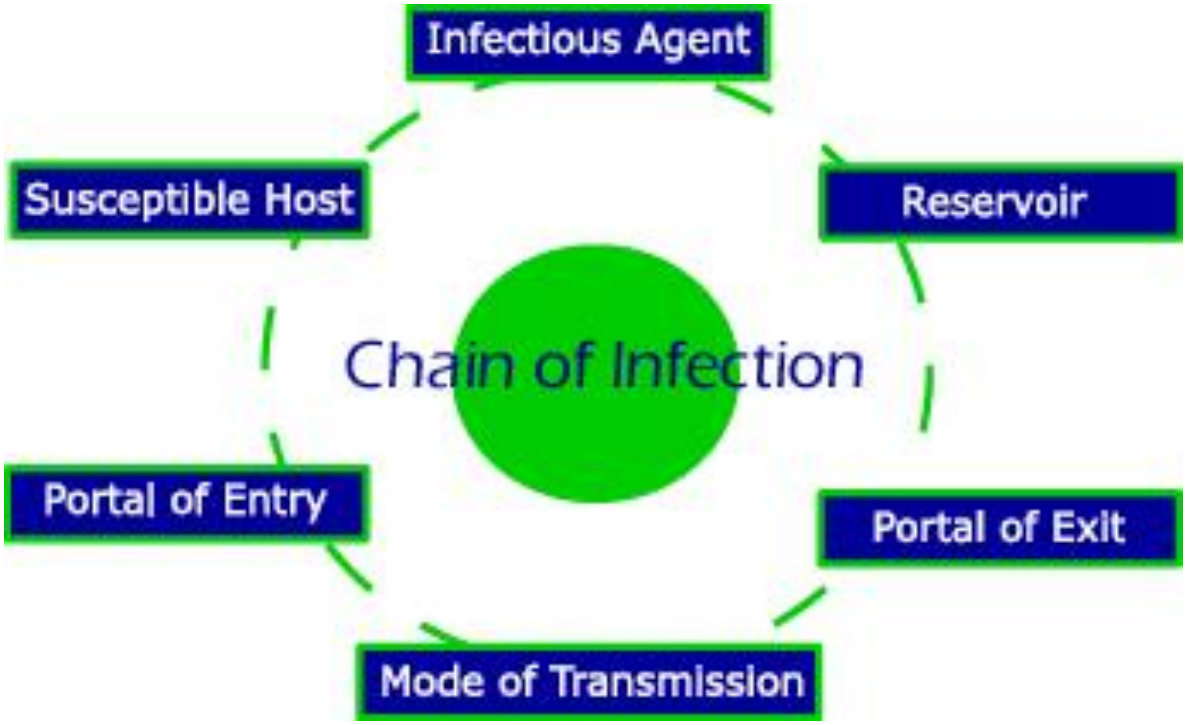


**Annex 2**

# Map of Gaza strip

**Annex 3**

**Infection transmission cycle**



**Annex 4. Al-Quds University request for MOH approval**


Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة


1

2010/7/11

الأخ/د. ناصر أبو شعبان المحترم
مدير عام تنمية القوى البشرية–وزارة الصحة
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب شريف محمد الدلو

يقوم الطالب المذكور أعلاه بإجراء بحث بعنوان:

***"Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospitals- Gaza Governorates"***

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار إدارة صحية و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة من مستشفيات الأطفال التابعة لوزارة الصحة (مستشفى الشهيد محمد الدرة و مستشفى النصر للأطفال و مستشفى الشهيد عبدالعزيز الرنتيسي).
علماً بأن المعلومات ستكون متوفرة لدى الباحث و الجامعة فقط..

و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة

نسخة:
– الملف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## Annex 5. Approval of MOH

Palestinian National Authority
Ministry Of Health
Hospitals General Administration

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة للمستشفيات

الرقم:عام التاريخ:٢٠١٠١٧١١٧

الأخوة / مدراء المستشفيات المحترمون

م. النصر للأطفال
م.الدرة للأطفال
م.الرنتيسي التخصصي للأطفال

السلام عليكم ورحمة الله وبركاته

الموضوع/ إجراء بحث

بالإشارة لكتاب السيد مدير عام تنمية القوى البشرية بخصوص الموضوع أعلاه يرجى تسهيل مهمة **الحكيم/ شريف الدلو** وملتحق ببرنامج ماجستير الصحة العامة- إدارة صحية- جامعة القدس لإجراء بحث بعنوان.

"Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospital –Gaza Governorates"

حيث سيقوم الباحث بتعبئة استبانه من الأطباء والممرضين وأخصائي العلاج الطبيعي الذين يتعاملون مباشرة مع الأطفال في المستشفيات التالية(م.النصر للأطفال، م.الدرة للأطفال ، م.الرنتيسي التخصصي للأطفال) وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي، دون تحمل الوزارة أي أعباءه مع موافقة خطية من المشاركين في البحث.

ولا مانع لدينا من إجراء الاستبيان.

آملين حسن تعاونكم،،،

٢٠١٧/١٧
د.محمد الكاشف
مدير عام المستشفيات

الإدارة العامة للمستشفيات
صادر
رقم: ٦٠١
التاريخ: ٢٠١٧/١/٢٠

-صورة للسيد مدير عام تنمية القوى البشرية المحترم
-صورة للسادة مدراء المستشفيات المعنية المحترمون

فندق الأمل – وزارة الصحة تليفاكس : ٢٨٢٠٧٣٤

The Palestinian National Authority
Ministry of Health
Directorate General of Human Resources Development

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

الرقم: ١٥/١٠٨٥..

التاريخ: 2010/07/12

الأخ الدكتور / محمد الكاشف المحترم،،،
مدير عام المستشفيات
تحية طيبة وبعد،،،

**الموضوع/ إجراء بحث**

بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الحكيم/ شريف الدلو والذي يعمل في م. الدرة للأطفال وملتحق ببرنامج ماجستير الصحة العامة – مسار إدارة صحية – جامعة القدس لإجراء بحث بعنوان:-

" Compliance with the Infection Prevention and Control Protocol at the Governmental Pediatric Hospitals- Gaza Governorates"

حيث سيقوم الباحث بتعبئة استبانه من الأطباء والممرضين وأخصائي العلاج الطبيعي الذين يتعاملون مباشرة مع الأطفال في المستشفيات التالية( م. النصر للأطفال، م. الدرة للأطفال، م. الرنتيسي التخصصي للأطفال)، بالإضافة إلي استخدام نموذج خاص يبين مدي استخدام آليات وطرق منع العدوي بالأقسام، وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي،دون تحمل الوزارة أي أعباء، مع أخذ موافقة خطية من المشاركين في البحث.

**وتفضلوا بقبول خالص الاحترام والتقدير،،،،،،،**

د. ناصر رأفت أبو شعبان
مدير عام تنمية القوى البشرية

وزارة الصحة
تنمية الموارد البشرية
الرقم: ١٥/١٠٨٥..
التاريخ: ١٥/٧/١٢

صورة لـــ/
.- الملف

وزارة الصحة
قسم ... ٥٩٥
7/12

Gaza Tel / 08-2827298 Fax / 08-2868109 Email / gdhrd@moh.gov.ps

## Annex 6. Approval of Helsinki Committee

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**Palestinian National Authority**
**Ministry of Health**
**Helsinki Committee**

**السلطة الوطنية الفلسطينية**
**وزارة الصحة**
**لجنة هلسنكي**

التاريخ7/6/2010

Name:

**الاسم: شريف محمد الدلو**

I would like to inform you that the committee has discussed your application about:
**Compliance with the infection prevention and control protocol at the governmental pediatric hospitals-Gaza Governorates.**

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

In its meeting on June 2010
and decided the Following:-
To approve the above mention research study.

و ذلك في جلستها المنعقدة لشهر 6 2010
و قد قررت ما يلي:-
الموافقة على البحث المذكور عاليه.

Signature
توقيع

Member
عضو

Member
عضو

Chairperson

Conditions:-
- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

**Annex 7. Questionnaire (Arabic)**

**زميلي/ زميلتي العزيز/ة:**

يسعدني جدا مشاركتك الفاعلة في بحث بعنوان الالتزام ببروتوكول منع ومكافحة العدوى في مستشفيات الأطفال الحكومية في محافظات غزة.

وتهدف هذه الدراسة لتقييم مدى التزام مقدمي الخدمات الصحية بمستشفيات الأطفال التابعة لوزارة الصحة في محافظات غزة ببروتوكولات منع ومكافحة العدوى مما قد يساعد في تقليل العدوى المنقولة داخل هذه المستشفيات ويقلل وفيات الأطفال.

وهذه الدراسة ممولة ذاتيا من الباحث وهي جزء من متطلبات نيل درجة الماجستير في الصحة العامة بجامعة القدس أبوديس – فلسطين.

الوقت اللازم لتعبئة الاستبانة لا يتعدى خمس عشرة دقيقة، ولا يوجد أي احتمال للخطر أو عدم الراحة نتيجة لمشاركتكم، وجميع المعلومات سوف تستخدم لأغراض البحث العلمي فقط وستبقى سرية، ولا داعي لكتابة الاسم على الاستبانة.

يرجى الاجابة على جميع الأسئلة الواردة في الاستبانة وفق ماتراه مناسبا، حيث لا يوجد آراء صحيحة وأخرى خاطئة، سوف اكون موجودا في القسم خلال عملية جمع البيانات وجاهزا لأي استفسار.

لك كامل الحق بالاجابة علي الاستبانة أو رفض المشاركة، كما لك الحق بالانسحاب في أي وقت.

أشكركم علي حسن تعاونكم ومشاركتكم التي ستكون فاعلة.

**الباحث/** شريف الدلو

**استبانة**

**القسم - - - - - - - - - - - - - - -** **رقم مسلسل - - - - - - - - - - -**

| | | | |
|---|---|---|---|
| **معلومات شخصية ومهنية** | | | |
| .1 | الجنس | 1 -ذكر | 2 -أنثى |
| .2 | العمر: - - - - - - - - سنة | | |
| .3 | الحالة الاجتماعية | 1 -متزوج/ة | 2 -أعزب |
| | | 3 -مطلق/ة | 4 -أرمل/ة |
| .4 | المستشفى | 1 -النصر | 2 -الدرة |
| | | 3 -عبد العزيز الرنتيسي | |
| .5 | المهنة | 1. طبيب اخصائي | 2. طبيب عام |
| | | 3. بكالوريوس تمريض | 4. دبلوم تمريض |
| | | 5. علاج طبيعي | 6. أخرى - - - - - - - - |
| .6 | أخر شهادة علمية حصلت عليها | 1. ماجستير | 2.بكالوريوس |
| | | 3. دبلوم | 4. أخرى - - - - - |
| .7 | الوظيفة الحالية | 1.مدير | 2. رئيس قسم |
| | | 3. مسئول فترة | 4. عادي |
| | | 5. أخرى - - - - - - | |
| .8 | سنوات الخبرة - - - - - - - - سنة | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **تقييم منع ومكافحة العدوى** | | | | | | |
| .9 | هل تعرف عن الاحتياطات المعيارية العالمية لمنع ومكافحة العدوى؟ | | | | 1.نعم | 2. لا |
| .10 | هل تعرف بوجود بروتوكول فلسطيني لمنع ومكافحة العدوى؟ | | | | 1.نعم | 2. لا |
| .11 | هل لديك نسخة من بروتوكول منع ومكافحة العدوى الفلسطيني في قسمك؟ | | | | 1.نعم | 2. لا |
| .12 | إذا كانت هناك نسخة من البروتوكول الفلسطيني لمنع ومكافحة العدوى فأين هي موجودة؟ | | 1.غرفة العلاج | 2. الخزانة | | |
| | | | 3.الدرج | 4. أخرى - - - | | |
| .13 | هل يتم عمل مراقبة واستقصاء وبائي للعدوى المنقولة داخل المستشفى؟ | | | | 1.نعم | 2. لا |
| .14 | هل تقدم المستشفى معلومات وتعليمات حديثة لمقدمي الخدمات الصحية حول منع ومكافحة العدوى؟ | | | | 1.نعم | 2. لا |
| .15 | هل شاركت بحضور تدريب وتعليم عن منع ومكافحة العدوى؟ | | | | 1.نعم | 2. لا |
| .16 | هل حصلت على معلومات كافية عن منع العدوى من ذلك التدريب؟ | | | | 1.نعم | 2. لا |
| .17 | تقوم المستشفى بتعزيز منع ومكافحة العدوى بواسطة | | 1.تعليم داخلي | 2.تذكير في مكان العمل (بوسترات) | | |
| | | | 3.تشجيع الأداء الجيد | 4.معاقبة الأداء السيء | | |
| | | | 5.تعليمات مكتوبة | 6. أخرى - - - - - - - - | | |
| .18 | هل سبق وتلقيت تطعيم التهاب الكبد الوبائي؟ | | | | 1.نعم | 2. لا |
| .19 | إذا كنت قد تلقيت تطعيم فكم جرعة؟ | | 1.جرعة | 2.جرعتين | 3. 3جرعات | |
| .20 | هل سبق وتعرضت لوخز إبر أو أدوات حادة مستخدمة؟ | | | | 1.نعم | 2. لا |
| .21 | هل تعتقد بأنك تطبق احتياطات منع ومكافحة العدوى؟ | | 1.نعم | 2. لا | 3.لاأعرف | |

| | | |
|---|---|---|
| .22 | حسب رأيك ما يعيق الالتزام ببروتوكولات منع ومكافحة العدوى؟<br>يمكنك اختيار اكثر من سبب | 1.قلة المعرفة او عدم وجود معلومات حول منع ومكافحة العدوى |
| | | 2.عدم وجود تعليم أو تدريب حول منع ومكافحة العدوى |
| | | 3.قلة توفر الوقت أو زيادة ضغط العمل. |
| | | 4.قلة وجود المتطلبات والأدوات اللازمة لتنفيذ منع العدوى. |
| | | 5. عدم وجود تعليمات مكتوبة. |
| | | 6. الاجراءات الوقائية تسبب مضاعفات مثل جفاف الجلد وتهيجه |
| | | 7.لا تقوم الإدارة بالمحاسبة أو مراجعة الأداء. |
| | | 8.اجراءات منع ومكافحة العدوى غير ضرورية في أقسام الأطفال |
| | | 9. عدم وجود الرضا الوظيفي. |
| | | 10. أخرى - - - - - - - - - - - - |

**من فضلك تسجيل مدى اتفاقك واختلافك مع العبارات التالية بوضع إشارة (×) في الخانة المناسبة**

| الرقم | العبارة | أعارض بشدة | أعارض | محايد | أوافق | أوافق بشدة |
|---|---|---|---|---|---|---|
| .23 | منع ومكافحة العدوى مهم لأقسام الأطفال | | | | | |
| .24 | غسيل الأيدي باستمرار مهم لمنع العدوى | | | | | |
| .25 | استخدام الحواجز الوقائية (مثل القفازات والنظارات وغطاء الفم والانف والملابس الواقية) عند ملامسة اي من سوائل الجسم يقلل نقل العدوى | | | | | |

| الرقم | العبارة | أعارض بشدة | أعارض | محايد | أوافق | أوافق بشدة |
|---|---|---|---|---|---|---|
| .26 | التعامل الصحيح مع الأدوات الملوثة بطريقة مناسبة يمنع أو يقلل نقل العدوى | | | | | |
| .27 | تنظيف وتعقيم أدوات المريض ووحدة المريض بشكل دوري يحد من العدوى | | | | | |
| .28 | الممارسات الصحية الآمنة هي جزء اساسي من احتياطات منع العدوى | | | | | |
| .29 | التخلص الصحيح والآمن من المخلفات الطبية يقلل أو يمنع خطر العدوى | | | | | |

**من فضلك تسجيل مدى التزامك بتنفيذ العبارات التالية بوضع إشارة (×) في الخانة المناسبة**

| الرقم | العبارة | لا ألتزم | نادرا | أحيانا | غالبا | دائما |
|---|---|---|---|---|---|---|
| .30 | أنت ملتزم بارتداء الزي الخاص اثناء العمل | | | | | |
| .31 | اغسل يدي لمدة خمس عشرة ثانية باستخدام الصابون والماء | | | | | |
| .32 | التزم بخلع الساعة أو المجوهرات عند غسل الأيدي | | | | | |
| .33 | أعتاد غسل يدي عند وصولي إلي القسم | | | | | |
| .34 | اغسل يدي إذا لمست دم او أي من سوائل أو إفرازات المريض بالماء والصابون | | | | | |
| .35 | أغسل يدي قبل وبعد ملامسة الطفل المريض | | | | | |
| .36 | أغسل يدي قبل مغادرة القسم | | | | | |
| .37 | أرتدي قفازات عند ملامسة دم او أي من سوائل أو إفرازات المريض أو أغشية جسمه. | | | | | |

| الرقم | العبارة | لا ألتزم | نادرا | أحيانا | غالبا | دائما |
|---|---|---|---|---|---|---|
| 38. | أرتدي قفازات عند ملامسة اي ادوات ملوثة | | | | | |
| 39. | تستخدم المطهرات في تنظيف وحدة المريض | | | | | |
| 40. | تطهير وحدة المريض يتم بشكل دوري حتى إذا بقي المريض منوما لفترة طويلة. | | | | | |
| 41. | يتم تغيير شراشف سرير المريض بشكل دوري أو كلما اتسخت. | | | | | |
| 42. | أنابيب التشفيط والادوات أحادية الاستخدام يتم التخلص منها بعد كل استخدام. | | | | | |
| 43. | يتم استخدام علب تباخير وأنابيب أكسجين مستقلة لكل مريض | | | | | |
| 44. | يتم فصل الأطفال المرضى كل حسب مرضه | | | | | |
| 45. | يتم عزل المرضي بامراض معدية في غرف عزل | | | | | |
| 46. | استعمل ادوات معقمة وبطريقة معقمة للإجراءات الطبية التداخلية(قسطرة, وريد مركزي,LP ..الخ) | | | | | |
| 47. | أقوم باعادة تغطية أو ثني او كسر الإبرة قبل القائها | | | | | |
| 48. | اقوم بفصل الإبرة المستخدمة عن السرنج قبل القائها | | | | | |
| 49. | يتم القاء الإبرة والسرنج المستخدم في الصندوق الآمن | | | | | |
| 50. | يتم منع دخول الزوار الظاهر عليهم اعراض معدية | | | | | |

شكرا لمساهمتك

**Annex 8. QUESTIONNAIRES (English)**

**CONSENT FORM**

**Al-Quds University**

**School of public health**

Dear participant

You are selected to participate in a research about the compliance with infection prevention and control protocol in governmental pediatric hospitals - Gaza governorates.

This self funded study is a part of the requirements of the master degree of public health at Al-Quds University - Palestine

The aim of this study is to evaluate the infection prevention and control in pediatric hospitals which might help in reducing the infections and cross infection in pediatric hospitals in Gaza governorates.

The time needed to fill the questionnaire will not exceed 13 minutes. All the information will be used for the purpose of scientific research, and will be kept confidential.

Please answer the questions as your opinion appropriate, there is no right or wrong answers, and I will be in the unit and ready for any explanation.

You have the right to participate or to refuse, and the right to withdraw at any time.

Thank you for your kind participation.

The researcher

Shareif El-Dalow

**QUESTIONNAIRES**

**Please answer the following questions** department ---------- **Ser. N. ----------**

| **Personal and professional information** | | | | |
|---|---|---|---|---|
| **1-** | Gender | 1- male | | 2- female |
| **2-** | Age in years ---------- year | | | |
| **3-** | Marital status | 1- married | | 2- single |
| | | 3-divorced | | 4-widowed |
| **4-** | Hospital | | 1. El Nassr | 2. El Dorra |
| | | | 1- RSPH | |
| **5-** | **Profession** | 1- specialist doctor | | 2- general Physician |
| | | 3- BSN Nurse | | 4- PRN Nurse |
| | | 2- physiotherapist | | 6- others |
| **6-** | **Last degree awarded** | 1-master | | 2 bachelor |
| | | 3- diploma | | 4- others |
| **7-** | **Current position** | 1-Director | | 2- Department manager |
| | | 3-supervisor | | 4- regular |
| | | 5- Doctorates | | 6- others |
| **8-** | Years of experience - - - - - - - - | | | |

| **Assessment of infection prevention and control** | | | | |
|---|---|---|---|---|
| **9** | Do you know about the universal standard precautions of infection prevention and control? | | | **1. Yes**<br>**2. No** |
| **10** | Do you know if there is Palestinian infection prevention and control protocol? | | | **1- Yes**<br>**2- No** |
| **11** | Do you have a copy of infection prevention and control protocol? | | | **1-yes**<br>**2- no** |
| **12** | If there is a copy, where it is | 1- Medication room | 2- Cupboard | |
| | | 3- Drawer | 4- others | |
| **13** | Does the hospital provide evaluation and surveillance for hospital acquired infection? | | | **1- yes**<br>**2- no** |
| 14 | Did the hospital provide continuous updated information and instruction about infection prevention and control? | | | **1- yes**<br>**2- no** |
| 15 | Have you received any infection prevention training course? | | | **1- yes**<br>**2- no** |
| 16 | Do you feel that you have sufficient information at that training | | | **1- yes**<br>**2- no** |
| 17 | The hospital improve infection prevention and control by | 1- In-service education | 2-Posters in work place | |
| | | 3-Encourage good performance | 4-Punishment of bad | |
| | | 5-Written information | 6-Others | |
| 18 | Have you ever been vaccinated for hepatitis B? | | | **1- yes**<br>**2- no** |
| 19 | If you have, How many doses? | 1-one | 2-two | 3-three |

| | | | | |
|---|---|---|---|---|
| 20 | Have you exposed to any injury from used needle or sharp medical instrument? | | | **1- Yes**<br>**2- no** |
| 21 | Do you follow the infection prevention and control precautions? | **1- yes** | **2- no** | **3-don't know** |
| 22 | What are the barriers that prevent compliance to infection prevention and control protocol<br>You can choose more than one answer | 1- Lack of knowledge and education | | |
| | | 2- no training program and updated information | | |
| | | 3- insufficient time and high workload | | |
| | | 4- Lack of required supplies. | | |
| | | 5- lack of guidelines from colleagues and superior | | |
| | | 6- these precautions causes skin dryness and irritation | | |
| | | 7- no accountability and feed back of performance from administration | | |
| | | 8- These precautions are unnecessary in pediatric department. | | |
| | | 9- Lack of job satisfaction. | | |

Please record the level of your agreement or disagreement with each of the following statement by placing a check mark ( X ) in the appropriate box of the following:

**(1) <u>strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly agree</u>**

| **No.** | **Item** | strongly disagree | disagree | undecided | agree | strongly agree |
|---|---|---|---|---|---|---|
| 23 | The infection prevention and control is important for pediatric units. | | | | | |
| 24 | Hand washing is important to prevent infection. | | | | | |

| No. | Item | strongly disagree | disagree | undecided | agree | strongly agree |
|---|---|---|---|---|---|---|
| 25 | Using protective barriers( gloves, eye glasses, mask, protective gown) when contact with blood, body fluids, decreases cross infection | | | | | |
| 26 | Proper handling of contaminated equipment prevent cross infection. | | | | | |
| 27 | Cleaning and disinfecting patient unit and equipment decreases cross infection | | | | | |
| 28 | Safe work practices are one of the standard precautions | | | | | |
| 29 | Safe and proper waste disposal decreases or prevent infection. | | | | | |

Please define the level of your commitment to practice the following by putting the mark (x)

| S.n | Variable | No | Rarely | Some times | Often | Always |
|---|---|---|---|---|---|---|
| 30 | You are committed to wear uniform | | | | | |
| 31 | I wash my hands for 15-30 seconds | | | | | |
| 32 | I remove jewelry of hands, watch, and ring when washing hands | | | | | |
| 33 | I wash my hands when arriving at work | | | | | |

| S.n | Variable | No | Rarely | Some times | Often | Always |
|---|---|---|---|---|---|---|
| 34 | . I wash hands after any contact with blood, body fluids, secretions, and excretions. | | | | | |
| 35 | All health care providers washing hands before & after touching any child. | | | | | |
| 36 | I wash hands before leaving the unit | | | | | |
| 37 | You wear gloves when contact with blood, body fluids, secretions, mucous membranes and excretions | | | | | |
| 38 | You wear clean gloves when handling contaminated instruments | | | | | |
| 39 | I use disinfectant in cleaning patient's unit | | | | | |
| 40 | Disinfection of the patient unit is performed periodically even if the patient is in long stay | | | | | |
| 41 | Bed linen are changed periodically or when become dirty | | | | | |
| 42 | Disposables and suction tubes discarded after single use | | | | | |
| 43 | Separated Inhalation cups and oxygen tubes are used for each patient. | | | | | |
| 44 | Patients are separated in relation to disease | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 45 | Infectious diseased patient are isolated in separate rooms | | | | | |
| 46 | You use sterilized equipment and sterile procedure for invasive procedures. | | | | | |
| 47 | I recap the used needles, or break or bend before disposal. | | | | | |
| 48 | I remove used needles from syringes before disposal. | | | | | |
| 49 | Used needles and syringes are discarded into safety box. | | | | | |
| 50 | Prevent any visitor with symptoms of influenza, fever, or any other infection | | | | | |

**Annex 9. Assessment checklist of physical environment**

Serial number ---------- Department: ---------- Hospital ----------

| No. | Item | Applied | Not applied |
|---|---|---|---|
| 1. | There is a copy of the ICP protocol in the department. | | |
| 2. | Alcohol swabs are available in the department. | | |
| 3. | Patient units are clean (no blood, dust, or other dirty). | | |
| 4. | Doctor's room is clean (no blood, dust, or other dirty). | | |
| 5. | Nursing room (Medication trolley, reception bed, medical instruments, .. etc) is clean (no blood, dust, or other dirty). | | |
| 6. | The unit in general is clean (kitchen, bathroom, toilette …etc | | |
| 7. | Antiseptics and disinfectant solutions are available in the unit. | | |
| 8. | All supplies for hand washing are available (water source, a sink, soap bar, or liquid soap, and tissue paper). | | |
| 9. | There are sufficient disposables and linen to prevent re use. | | |
| 10. | There are sharp disposal containers in each room | | |
| 11. | There are covered waste containers for contaminated wastes. | | |
| 12. | All three types of gloves are available in the unit. | | |
| 13. | Suction tubes and suction bottles are clean. | | |
| 14. | Each bed in the unit is covered by clean linen. | | |
| 15. | There are separated room for different disease | | |
| 16. | There is Isolation room in each department. | | |

**Annex 10 Observation checklist for health care providers**

Serial number ---------- Department: ---------- Hospital ----------

| No | Item | Yes | No | NA |
|---|---|---|---|---|
| 1. | **(Uniform)** Health care provider wears uniform during duty. | | | |
| 2. | **Hand washing**<br><br>Hand washing immediately on arrival to the unit. | | | |
| 3. | Hand washing before touching the patients. | | | |
| 4. | Hand washing after working with patients. | | | |
| 5. | Hand washing before leaving the unit. | | | |
| 6. | Hand washing before performing a septic invasive procedures. | | | |
| 7. | Hand washing after touching blood or body fluids. | | | |
| 8. | Hand washing before wearing gloves. | | | |
| 9. | Hand washing after removing gloves. | | | |
| 10. | Removing jewelry, hand watch, and ring when washing hands. | | | |
| 11. | Washing hands for 15-30 seconds with soap and running water | | | |
| 12. | Drying hands with clean paper towel. | | | |
| 13. | Turn of water after hand washing using paper towel. | | | |
| 14. | **Wearing gloves**<br><br>Wear gloves when contact with blood or other body fluids. | | | |
| 15. | Use clean gloves when handling contaminated instrument. | | | |

| | | | | |
|---|---|---|---|---|
| 16. | Wearing sterile gloves in appropriate way. | | | |
| 17. | Wearing sterile gloves when doing invasive procedure. | | | |
| 18. | **Antiseptic and disinfectant**<br><br>Use antiseptic for hand washing prior a septic invasive procedure (e.g. central line, LP, and urine catheterization) | | | |
| 19. | Each patient unit disinfected after patient discharged. | | | |
| 20. | Sterile field is established and maintained during procedures. | | | |
| 21. | Medical equipments or instruments used between patients immediately (with out disinfection). | | | |
| 22. | Sterile gown, mask and sterile gloves are used by all contacts with sterile field. | | | |
| 23. | Clean skin with 60-90% alcohol is used for injections and peripheral intravenous catheter insertion. | | | |
| 24. | Leaving antiseptic one minute to dry when used. | | | |
| 25. | **Sharp disposal**<br><br>Do not remove used needles from syringes before disposal. | | | |
| 26. | Do not bend or break used needles prior disposal. | | | |
| 27. | Do not recapping used needles. | | | |
| 28. | Dispose sharp disposable container when 3/4 full | | | |
| 29. | Dispose all sharps in puncture resistance containers. | | | |
| 30. | Labeling and separating waste disposals. | | | |
| 31. | Persons handling wastes wear heavy gloves. | | | |

**Annex 11. The Indepth interview questions**

1. ما هي أهمية وجود والعمل وفق بروتوكول فلسطيني لمنع ومكافحة العدوى؟

- - - - - - - - - - - -
- - - - - - - - - - -

2. بماذا تفسر عدم معرفة غالبية مقدمي الخدمات الصحية عن محتواه ومكان وجوده؟

- - - - - - - - - - - - -
- - - - - - -

3. ما دور لجنة منع ومكافحة العدوى في مشفاكم؟ ومن يراقب أدائها؟

- - - - - - - - - - - - -
- - - -

4. إلي أي درجة يتم استقصاء العدوى المنقولة داخل المستشفيات في مشفاكم؟

- - - - - - - - - - - -
- - - - - - - - -

5. كيف تقيم الأنشطة التدريبية وكيف يتم تعزيز مفاهيم منع ومكافح العدوى؟

- - - - - - - - - - - -
- - - - - - - - - - -

6. كيف يمكن تجاوز مشكلة عدم كفاية الأدوات الخاصة بمنع ومكافحة العدوى؟

- - - - - - - - - - - - -
- - - - - - - - - - - -

7. كيف تفسر قلة التزام مقدمي الخدمات الصحية بغسل الأيدي كلما وجب فعل ذلك؟

- - - - - - - - - - - - -
-- - - - - - - - - - - -

8. بما تفسر إصابة اكثر من 66% من مقدمي الخدمات الصحية في مشفاكم بوخزات النيادل والأدوات الحادة المستخدمة؟ وكيف يتم التعامل مع من يصاب وقت الاصابة؟

- - - - - - - - - - - -
- - - -

9. ما هي مقترحاتكم لزيادة التزام مقدمي الخدمات الصحية ببروتوكول منع ومكافحة العدوى؟

- - - - - - - - - - - - -
- - - - - - - - - - - -

**Annex 12 List of the indepth interview names**

| | |
|---|---|
| Dr. Hasan Khalel El-Zagzog | El-Durra pediatric hospital |
| Dr. Ahmed Ibraheim shatat | El-Durra pediatric hospital |
| Mr. Ibraheim Husain Eid | El-Durra pediatric hospital |
| Mrs. Huda Kamel Abed | El-Durra pediatric hospital |
| Dr. Saeid Salah | RSPH |
| Dr. Abdulla Omer Hasaballa | RSPH |
| Mr. AbdelMotaleb Eid ElKahlout | RSPH |
| Dr. Mustafa ElKahlout | El-Nassr pediatric hospital |
| Dr. Hisham Ahmed Murtaga | El-Nassr pediatric hospital |
| Mr. Saleh Kaeid Aeish | El-Nassr pediatric hospital |

**Annex 13. Work plan:**

| Task | Feb.2010 | Mar.2010 | April2010 | May 2010 | June 2010 | July 2010 | August 2010 | Sept.2010 | October 2010 | November 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Development of proposal | | | | | | | | | | |
| Ethical clearance from Helsinki community | | | | | | | | | | |
| Obtain approval from MOH | | | | | | | | | | |
| - Literature review | | | | | | | | | | |
| - Instrument | | | | | | | | | | |
| - Data collection | | | | | | | | | | |
| - Data storing and analysis | | | | | | | | | | |
| - Interpretation of results | | | | | | | | | | |
| - Declaration of result | | | | | | | | | | |

## Annex 14 Differences between gender and wearing uniform practice

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 17.680[a] | 4 | .001 |
| Likelihood Ratio | 25.669 | 4 | .000 |
| Linear-by-Linear Association | 15.811 | 1 | .000 |
| N of Valid Cases | 307 | | |

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .92.

**Table. Differences between gender and wearing uniform practice**

| Gender | | (Question 30)Compliance to wear uniform | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | **No** | **Rarely** | **Some times** | **Often** | **Always** | |
| Male | Count | 5 | 3 | 20 | 69 | 116 | 213 |
| | % within gender | 2.3% | 1.4% | 9.4% | 32.4% | 54.5% | 100.0% |
| | % within q.30 | 100.0% | 100.0% | 100.0% | 74.2% | 62.4% | 69.4% |
| Female | Count | 0 | 0 | 0 | 24 | 70 | 94 |
| | % within gender | .0% | .0% | .0% | 25.5% | 74.5% | 100.0% |
| | % within q.30 | .0% | .0% | .0% | 25.8% | 37.6% | 30.6% |
| Total | Count | 5 | 3 | 20 | 93 | 186 | 307 |
| | % within gender | 1.6% | 1.0% | 6.5% | 30.3% | 60.6% | 100.0% |
| | % within q.30 | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

## Annex 15. Differences between place of work and IPC practices

**Multiple Comparisons**

Mean hand washing

Scheffe

| (I) Hospital | (J) Hospital | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| El-Nasser | El-Dorra | -.21556-* | .08637 | .046 | -.4280- | -.0031- |
| | RSPH | .02961 | .08444 | .940 | -.1781- | .2373 |
| El-Dorra | El-Nasser | .21556* | .08637 | .046 | .0031 | .4280 |
| | RSPH | .24517* | .09218 | .030 | .0184 | .4719 |
| RSPH | El-Nasser | -.02961- | .08444 | .940 | -.2373- | .1781 |
| | El-Dorra | -.24517-* | .09218 | .030 | -.4719- | -.0184- |

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

**Multiple Comparisons**

Mean wearing gloves

Scheffe

| (I) Hospital | (J) Hospital | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| El-Nasser | El-Dorra | -.16270- | .09371 | .223 | -.3932- | .0678 |
| | RSPH | -.23717-* | .09162 | .036 | -.4625- | -.0118- |
| El-Dorra | El-Nasser | .16270 | .09371 | .223 | -.0678- | .3932 |
| | RSPH | -.07447- | .10001 | .758 | -.3205- | .1716 |
| RSPH | El-Nasser | .23717* | .09162 | .036 | .0118 | .4625 |
| | El-Dorra | .07447 | .10001 | .758 | -.1716- | .3205 |

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

Mean proper use of disposables

Scheffe

| (I) Hospital | (J) Hospital | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| El-Nasser | El-Dorra | -.18190- | .10766 | .242 | -.4467- | .0829 |
| | RSPH | -.35236-* | .10526 | .004 | -.6113- | -.0934- |
| El-Dorra | El-Nasser | .18190 | .10766 | .242 | -.0829- | .4467 |
| | RSPH | -.17046- | .11490 | .334 | -.4531- | .1122 |
| RSPH | El-Nasser | .35236* | .10526 | .004 | .0934 | .6113 |
| | El-Dorra | .17046 | .11490 | .334 | -.1122- | .4531 |

- *. The mean difference is significant at the 0.05 level.

**Annex 16. Differences between place of work and IPC practices**

**Differences between wearing uniform and type of work**
**Scheffe**

| (I) **type of work** | (J) **type of work** | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| طبيب اخصائي | طبيب عام | -.235- | .158 | .698 | -.73- | .26 |
| | يكالوريوس تمريض | -.555-* | .131 | .002 | -.96- | -.15- |
| | دبلوم تمريض | -.596-* | .141 | .002 | -1.03- | -.16- |
| | علاج طبيعي | -.583- | .294 | .418 | -1.50- | .33 |
| طبيب عام | طبيب اخصائي | .235 | .158 | .698 | -.26- | .73 |
| | يكالوريوس تمريض | -.320- | .132 | .211 | -.73- | .09 |
| | دبلوم تمريض | -.361- | .142 | .169 | -.80- | .08 |
| | علاج طبيعي | -.348- | .295 | .845 | -1.26- | .57 |
| يكالوريوس تمريض | طبيب اخصائي | .555* | .131 | .002 | .15 | .96 |
| | طبيب عام | .320 | .132 | .211 | -.09- | .73 |
| | دبلوم تمريض | -.041- | .111 | .998 | -.38- | .30 |
| | علاج طبيعي | -.028- | .281 | 1.000 | -.90- | .84 |
| دبلوم تمريض | طبيب اخصائي | .596* | .141 | .002 | .16 | 1.03 |
| | طبيب عام | .361 | .142 | .169 | -.08- | .80 |
| | يكالوريوس تمريض | .041 | .111 | .998 | -.30- | .38 |
| | علاج طبيعي | .013 | .286 | 1.000 | -.87- | .90 |
| علاج طبيعي | طبيب اخصائي | .583 | .294 | .418 | -.33- | 1.50 |
| | طبيب عام | .348 | .295 | .845 | -.57- | 1.26 |
| | يكالوريوس تمريض | .028 | .281 | 1.000 | -.84- | .90 |
| | دبلوم تمريض | -.013- | .286 | 1.000 | -.90- | .87 |

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

**Annex 17. Differences between years of experience and IPC practices**

**Differences between years of experience and wearing uniform**

Scheffe

| (I) years of experiance | | (J) years of experiance | | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower Bound | Upper Bound |
| dimension2 | 1-5 | dimension3 | 6-15 | .020 | .101 | .981 | -.23- | .27 |
| | | | 16 -36 | .403* | .119 | .004 | .11 | .70 |
| | 6-15 | dimension3 | 1-5 | -.020- | .101 | .981 | -.27- | .23 |
| | | | 16 -36 | .383* | .124 | .009 | .08 | .69 |
| | 16 -36 | dimension3 | 1-5 | -.403-* | .119 | .004 | -.70- | -.11- |
| | | | 6-15 | -.383-* | .124 | .009 | -.69- | -.08- |

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

**Abstract Arabic**

## الملخص العربي لدراسة

## التزام مقدمي الخدمات الصحية في مستشفيات الأطفال الحكومية في محافظات غزة ببروتوكول منع ومكافحة العدوى.

**إعداد: شريف محمد الدلو**

**إشراف: دكتور/ أشرف يعقوب الجدي**

### ملخص الدراسة

تعتبر العدوى المنقولة داخل المستشفيات عبئا على المريض وعلى الصحة العامة للمجتمع. وتعاني منطقة شرق المتوسط من أعلى نسب إنتشار للعدوى داخل المستشفيات في العالم. ويصل معدل العدوى المنقولة داخل مستشفيات محافظات قطاع غزة إلى 10% من مجمل حالات الدخول. وقد تبنت وزارة الصحة الفلسطينية بروتوكول منع ومكافحة العدوى عام 2004م بهدف حماية صحة العاملين الصحيين والمرضى والمجتمع والبيئة، ولكن تطبيق هذا البروتوكول لم يقيم بشكل كاف، لذلك تهدف هذه الدراسة لتقييم مدي التزام مقدمي الخدمات الصحية بالعمل وفق بروتوكول منع ومكافحة العدوى الفلسطيني لتحسين معدل التزامهم وتقليل العدوى المنقولة داخل المستشفيات وتقليل نسب أمراض ووفيات الأطفال.

وتعتبر الدراسة متعددة ووصفية تحليلية صممت لتكون نوعية وكمية نفذت خلال العام 2010م، حيث طبقت الطريقة الكمية عبر استبانة تم توزيعها على كل الأطباء والممرضين وأخصائيي العلاج الطبيعي الموظفين رسميا في مستشفيات الأطفال بقطاع غزة ( 334). وقد استجاب عدد (307) منهم بنسبة 92%. وتم أيضا استخدام قوائم تقييم أداء لمقدمي الخدمات الصحية عبئت بواسطة الباحث ثلاث مرات عن كل موظف، وكذلك تم تقييم جاهزية أقسام المرضى وتجهيزهم عبر قوائم تقييم بيئة العمل.

واستخدمت الطريقة النوعية عبر إجراء مقابلات فردية معمقة مع عشرة أفراد من أصحاب النفوذ والتأثيرمن العاملين في مستشفيات الأطفال مكان الدراسة.

وقد أظهرت الدراسة أن 69,4% من العينة المستهدفة كانوا ذكورا، وأن حوالي 80% منهم كانوا متزوجين، وقد شكل الأطباء نسبة حوالي 31% من العينة فيما شكل الممرضون حوالي 66,5%، كما بينت الدراسة أن حوالي 80% من المستطلعة أرائهم هم موظفون سنوات خبرتهم اقل من 15 سنة.

وقد أظهرت الدراسة أنه لايوجد نسخة من بروتوكول منع ومكافحة العدوى مع أي من عينة البحث، وأن أكثر من ثلاث ارباع المستطلعة أرائهم لا يعرفون بوجود بروتوكول فلسطيني، وأنه لايتم عمل مسح دوري للأمراض المنقولة داخل المستشفيات، كما أن 16,9% فقط حضر أوشارك بحضور محاضرة أو تدريب مع معلومات كافية بما يخص موضوع منع ومكافحة العدوى، وقد بينت الدراسة أن 63% فقط قد تلقوا ثلاثة جرعات تطعيم ضد مرض التهاب الكبد الوبائي، بينما وجدت ثلثي العاملين الصحيين قد سبق لهم وأن اصيبوا بوخزات من أدوات أو إبر مستخدمة.

وعلى الرغم من فهم واستيعاب معظم المستطلعة أرائهم لأهمية اتباع ممارسات منع ومكافحة العدوى إلا أن ألتزامهم العملي باتباع تلك التوصيات كان متوسطا، ولكن مراقبة التزامهم عمليا بواسطة الباحث أظهرت نسب التزام أقل مما أعتقدوا كما تظهرمقارنة النسب التالية: التزامهم بارتداء زي خاص بالعمل بلغ 90%- 86,6%، والتزامهم بغسيل الأيدي 79,7%- 45,9%، وبارتداء القفازات 89% -40,7%، وباستخدام المطهرات 79,8% - 49%، بينما كان التزامهم باتباع ممارسات عمل آمنة متقاربا 45,3%- 48%. وأظهر تقييم بيئة العمل وجود بعض النقص في التجهيزات والأدوات اللازمة لممارسة بروتوكول منع ومكافحة العدوى مثل عدم وجود نسخة من البروتوكول في كل قسم، وعدم وجود قفازات ثقيلة ، وعدم وجود حاويات مغطاة ، كما أن المخلفات الطبية لا تفصل عن باقي المخلفات، ولكن باقي التجهيزات المطلوبة للتنظيف والتعقيم وغسيل الأيدي كانت في معظم الأحيان متوفرة.

ولم تظهر النتائج وجود علاقة بين صفات أفراد العينة الشخصية والمهنية ومدى إلتزامهم بتطبيق البروتوكول سوى في بعض النقاط القليلة، ولكنها أظهرت ان أسباب قلة التزام مقدمي الخدمات الصحية بتطبيق البورتوكول يعود إلى عدة أسباب أهمها: عدم وجود برامج تعليم أو تدريب، وقلة معرفة العاملين الصحيين، ونقص الأدوات والمواد اللازمة للعمل وفق البروتوكول. وقد أكدت نتائج الدراسة النوعية نتائج الدراسة الكمية وشددت على ضرورة إيجاد آلية لتحسين تطبيق توصيات بروتوكول منع ومكافحة العدوي.

**توصيات الدراسة**

يأمل الباحث أن تسهم هذه الدراسة بتسليط الضوء على بروتوكول منع ومكافحة العدوى بحيث تساهم التوصيات بزيادة التزام مقدمي الخدمات الصحية بتطبيق ماجاء فيه مما يقلل من نسبة الأمراض والوفيات لدى الأطفال. ويمكن ذلك عن طريق:

توفير نسخ من بروتوكول منع ومكافحة العدوى في كل قسم، مع عمل تعليم وتدريب عليه، كما يجب زيادة مراقبة وتقييم تنفيذه وتفعيل لجان مكافحة العدوى المؤهلين للقيام بذلك، وبعد توفير الأمكانيات والأدوات الناقصة يمكن اتباع مبدأ الثواب والعقاب في متابعة تنفيذ البورتوكول.