An-Najah National University

Faculty of Graduate Studies

Knowledge and Practice of Standard Precaution and Sharp Injures among Nurses in the Northern West Bank Hospitals; Palestine

By

Bushra Jamal Almurr

Supervised

Dr. Mariam Altell

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This Thesis was defended successfully on 8/7/2013 and approved by:

Defense Committee Members		**Signatures**
Dr. Mariam Al-Tell	**(Supervisor)**	.....
Dr. Asma Imam	**(External Examiner)**	.....
Dr. Hamzeh Al Zabadi	**(Internal Examiner)**	

Dedication

بسم الله الرحمن الرحيم

و الصلاة و السلام على افضل المرسلين سيدنا محمد

أهدي هذه الرسالة:

الى من علمني العطاء بدون انتظار .. الى من احمل اسمه بكل افتخار

اليك والدي

الى من كان دعائها سبب النجاح..الى من كان حنانها بلسم الجراح

اليك أمي

الى من رافقني حياتي .. الى من كان عوني و سندي في اكمال رسالتي

اليك زوجي

الى من اعمل لأجلهم ..الى الذين اشق طريق الحياة لهم

اليكم ابنائي

ولا انسى اخواني و اخواتي و كل من دعمني و ساعدني لأتم دراستي و رسالتي

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الاقرار

أنا الموقع ادناه مقدم الرسالة التي تحمل عنوان

Knowledge and Practice of Standard Precaution and Sharp Injures among Nurses in governmental hospitals in the Northern West Bank; Palestine

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Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's name: **اسم الطالب :**

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List of Abbreviation

Abbreviation	Explanation
BBP	Blood Borne Pathogen
BSI	Body Substances Isolation
BF	Body Fluid
CDC	Center of Disease Prevention and Control
HAI	Health Care Associated Infection
HCW	Health Care Worker
ICU	Intensive Care Unit
NHMRC	National Health and Medication Research Council
NIOSH	National Institute for Occupational Safety and Health
NSI	Needle Stick Injury
SP	Standard Precaution
SI	Sharp Injury
PPE	Personal Protective Equipment
UP	Universal Precaution
WHO	World Health Organization

Definitions

Reservoir:

" Any animal, person, plant, soil, substance—or combination of any of these — in which the infectious agent normally lives. In addition, the infectious agent must primarily depend on the reservoir for its survival, and must be able to multiply there. It is from the reservoir that the infectious substance is transmitted to a human or other susceptible host**"(WHO, 2001; CDC, 2012)**

Susceptible hosts:

The person, or in a more generic definition, the organism, that is susceptible to the effect of the agent"**(CDC, 2012)**

Portal of entry :

"Is how the infectious agents to be transmitted to humans, such through broken skin ,mucous membrane, gastrointestinal tract, urinary tract and respiratory tract**"(WHO, 2001),**

Portal of exit:

"The pathway by which the agent can leave the host ", this pathway is essential to allow the infectious agent to be transmitted from a host to another such as execration, secretion, droplet, open skin lesions, the respiratory system, skin, and mucous membrane" **(WHO, 2001).**

This portal of exit "is related to site where the infectious agent is localized for example infectious agent which causes flu leaves through the respiratory tract".**(CDC, 2012)**

Mode of transmission :

It can be defined as " means of carrying infectious agent to the host"**(WHO, 2009).**

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Abstract

Introduction: Standard precautions defined as "a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status". The aim of these precautions is prevention and or reduction of transmission of HAI, and in the same time, protection of Nurses from sharp injuries .

Main objective: the main objective is to assess nurses' knowledge and compliance with standard precaution measures and those related to sharp injuries .

Method: a systemic random sample of (249) nurses was selected from Rafedia hospital, Alwatani hospital, Thabet Thabet hospital, Khalil Suleiman hospital and Darwish Nazzal hospital. Self administrated questionnaire was filled by participants, and data was analysis by using SPSS version 17.

Results: the result showed that (30%) of participants had high level of knowledge about SP measures and (36.4%) of participants had high level of knowledge about sharp injuries standard precaution . Also there was no significant association between mean of knowledge score of SP

measures/sharp injuries standard precaution and different educational level of nurses, and there was no significant association between mean of practice score of SP measures /sharp injuries standard precaution and educational level of nurses (P value >0.05) . In addition, the results showed that the prevalence of sharp injuries and needle stick injuries in previous 12 month were (66.8%) and (46.4%) respectively.

Conclusion and Recommendations: standard precaution is basic level of infection control precaution . However , the vast majority of participants in this study didn't always follow it. So more training program on infection control and more concentration on standard precaution by educational program and regular lectures must be given to nurses in order to improve their knowledge and practice of SP measures .

Chapter One
Introduction

This chapter reviews,in brief,Health Care Associated Infections (HAI), elements required for transmission of infectious agent within a health care setting (chain of infection, sources of infection, susceptible host, mode of transmission, portal of entry and portal of exit), HAI among health-care workers, Universal Precautions (UP), Body Substances Isolation (BSI) and Standard Precautions (SP).

1.1 Health care- associated infections (HAI):

Health-care associated infection (HAI), also referred to as nosocomial infection and hospital acquired infection, is defined by Center of Disease Control and Prevention (CDC) as an "infection caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care**"(CDC, 2012).** It either occurs while patients receive care or may develop after discharge. It also involves occupation infection among staff. HAI can also be defined as an "infection occurring in patients during the process of care in a hospital or health care facility which was not present or incubating at the time of admission. This includes infection acquired in the hospital, but appearing after discharge and also occupational infections among staff or facility" **(WHO, 2002).**

HAI is considered an important public health problem **(WHO, 2002).** Globally, hundreds of millions of patients are infected by HAI every

year in both developed and developing countries. According to WHO,its prevalence in developed countries varied between 3.5% and 12%, while in developing countries it varied between 5.7% and 19.1% **(WHO, 2012).** The highest occurrence of HAI were in acute surgical, orthopedic wards and Intensive Care Unit **(WHO, 2002).** The prevalence rate of ICU-acquired infection in high-income countries was 30%, while in middle and low-income countries, it was at least 2-3 times higher than that in high -income countries**(WHO, 2009; WHO, 2012).**

The consequences of HAI at patients' level imply more suffering, more complications, more treatments, and increase in hospitalization periods. For example, in Europe duration of hospitalization increased to nearly 16 million extra days **(WHO, 2012).**This is in itself considered a risk factor for acquiring HAI, and it means an increase in costs **(WHO, 2001).** In addition, it increases economic burden on the health care systems of countries. For example, in England, the annual financial costs topped 1.3 billion euro's, while in the United States of America, the costs amounted to approximately 3.5 billion euro's and 7 billion euro's in Europe **(WHO, 2002; WHO, 2012; Agozzino et al., 2008).**

1.2 Health-associated infections among health care workers /nurses:

HAI can affect both patients and health-care workers.It involves occupational infections among nurses. Due to the nature of their

occupations, the major occupational hazard is the transmission of blood-borne disease such as hepatitis B and AIDS by being exposed to injuries caused by contaminated sharp objects such as scalpels and broken glass and needle stick **(CDC, 2012).** Nurses can be infected by HAIs while dealing with patients or providing them with health treatment. They can play a role in the widespread of infections. For example,the nurses played an important role in the amplification of the outbreak of Marburg viral hemorrhage fever in Angola **(WHO, 2009)**. The mode of transmission depends on many factors such as immunity of HCW and amount of blood transferred during injuries **(CDC, 2012).** According to WHO, nearly three million HCW are exposed to percutaneous blood borne pathogens each year worldwide; 2 million of those were exposed to HBV ,0.9 million to HCV and 170, 000 to HIV. These sharp injuries resulted in 15,000 HCV, 70,000 HBV and 500 HIV infections. About 90% of these events happened in the developing countries **(WHO, 2002).** The infectious agent is transmitted to nurses mainly via droplet: direct contact or contact with inanimate contaminated objects by infectious material. The risk of transmission of infectious agents would increase if infection control practice and standard precautions were not applied **(WHO, 2001).**

1.3 Solutions to HAI problem :

Solutions of this problem include the following **(WHO, 2012):**

- Determination of the local factors of the HAI burden.

- Encouragement of the reporting and surveillance system.
- Improvement of education and training of nurses in applying safety precaution.
- Implementation and application of standard precaution which is simple and low-cost but helpful in controlling spread of HAI as it saves money and saves life.

1.4 Universal Precautions (UP):

In 1983, CDC disseminated a document called (Guidelines for Isolation Precautions in Hospitals). This document included a section about precautions that must be taken when dealing with blood and body fluid of suspected patient infected by blood-borne pathogen **(CDC, 2001).**

In 1985, in response to HIV /AIDS epidemic**(CDC, 2007),** CDC developed precautions to be applied to all patients irrespective of their blood-borne infection status. They were called universal precautions. These precautions are defined as " a set of precautions devised to prevent, and minimize accidental transmission of all known blood-borne pathogens including HIV, hepatitis B virus, and hepatitis C virus to/from health care personnel when providing first aid or other health care services" **(Vaz et al., 2010).** These universal precautions can also be defined as an "approach to infection control to treat all human blood and certain human body fluids as if they were known to be infectious for HIV,HBV and other blood borne pathogens" **(NIOSH, 1999).** These precautions apply to blood, body fluid

containing visible blood, semen, cerebrospinal, synovial, pleural, peritoneal and amniotic fluid but don't apply to feces, nasal secretion, sputum, sweat, tears, urine and vomits unless blood appears **(Vaz et al., 2010).**

1.5 Body Substances Isolation (BSI):

BSI appeared in 1987. This precaution supposed that all moist substances except sweat (execrations and secretions) were infectious (not just blood in UP) **(Vaz et al., 2010).** It depended mainly on using gloves, and it was advised to use clean gloves before dealing with or touching mucous membranes or contact with body fluids or moist substances,but after removing gloves there would be no need for hand washing if there was recommended(**CDC, 2007; Vaz et al., 2010**). UP and BSI were presented nearly in the same period.Some hospitals adapted UP while others adapted BSI. This problem and other problems required additional precautions to prevent transmission of diseases that are transmitted via airborne and droplet routes. However, there was no agreement on the washing of hands after using gloves. The existence of such problems led to emergence of another system of precautions called Standard Precautions(SP) (**Vaz et al., 2010).**

1.6 Standard Precautions (SP):

The main principles of Universal Precautions and Body Substance Isolation practice were mixed by CDC in a new precaution system called Standard Precautions (SP) which now has replaced the "Universal

Precautions". Standard precautions are defined as “group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status” **(CDC, 2012).** These precautions are the basic level of infection control precautions which are to be used, as a level of precautions **(CDC, 2007; WHO, 2007)**. The fact is that “standard precautions” are recommended when delivering the care to all patients,regardless of their presumed infection status. It is also recommended that when handling equipment and devices that are contaminated or suspected of contamination, and in situations of contact risk with blood, body fluids, secretions and excretions except sweat, without considering the presence or absence of visible blood and skin with solution of continuity and mucous tissues. They included precautions against agents that are transmitted by the following routes of transmission: air-borne, droplet and contact routes **(CDC, 2007; Vaz et al., 2010).**

The aims of standard precautions are the following: prevention and/ or reduction of transmission of HAI, and, at the same time, protection of nurses from sharp injuries. These aims can be achieved by the application of SP measures which consist of the following elements: hand hygiene, personal protective equipment (gloves, gown, gaggle, facemasks, head protection, foot protection and wearing face shields) and prevention of sharp injuries **(CDC, 2007; WHO, 2007).**

1.6.1 Hand hygiene:

Hand washing is the most important element of SP measures. This concept includes hand washing with soap (plain or antiseptic soap) and water or rubbing hands by using alcohol-based products without using water.

Hand hygiene is recommended in following situations **(WHO, 2009):**

After direct contact with patients

Before direct contact with patients.

After exposure to blood, body fluids, secretions, excretions, non-intact skin, and contaminated items.

After contact with patients surrounding

Before doing aseptic tasks like using an invasive device.

1.6. 2 Personal Protective Equipments (PPE):

The second part in the SP is PPE. It is defined as a group of barriers that are used alone, or in combination, to prevent transmission of infectious agents to mucous membrane, skin, airways and clothing of nurses when they are in contact with infectious agents. It is also used when contamination or splashing with blood or body fluids is anticipated and it is important to protect nurses from getting infections during contact with patients. This PPE should be found in each hospital, and the selection of

this PPE is dependent on the nature of procedures, skills of nurses, nature of patients and mode of transmission. PPE includes the following: disposable gloves, face protection (masks, safety glasses, goggles) and gowns or aprons **) (Vaz et al., 2010; WHO, 2007).**

Gloves :

Gloves are used while dealing with or touching blood, secretion, body fluids, execration, impaired membranes and mucous membranes,handling contaminated equipment and when in contact directly with patients who are infected with disease transmitted by direct contact. After removing them, hand hygiene should be done. In addition to this, nurses must know that gloves have to be changed if there was risk of cross contamination when dealing with the same patient and before going to another patient to prevent transmission of infections and prevent the occurrence of HAI **(WHO, 2007).** Removal of gloves has to be considered, as shown in Figure1.

Isolation gown:

This is worn to protect the clothes and skin of nurses from contact and contamination with blood or body fluid. The gown covers the body from neck to mid-thigh or below to prevent contamination of skin or clothe **(WHO, 2007)**. Removal of gown has to be considered,as shown in Figure1.

Face protection (mask,goggles and face shield):

Mask:

This must be used when there is a possibility for splashing or spraying of blood or body substances,and when nurses are doing procedures requiring sterile condition to prevent transmission of infection or infectious agents to patients. In addition to this, sometimes patients must wear mask especially if patient is suffering from coughing to limit spreading of his or her infection **(CDC, 2007; WHO, 2002; WHO, 2007).** Mask must be removed in a correct way as described in Figure 1.

Goggles:

Infectious agents can enter body from mucous membrane in eyes, by direct route through exposure to infectious agents from splash of blood or from cough, or by an indirect way through touching of the eye by contaminated hands. Many types of infectious agents are transmitted in this way including both viruses (for example, adenovirus) and bacteria (for example, hepatitis C) **(CDC, 2007).**

Face shield :

Face protection can be used with other PPE if there is potential splashing of blood, body and respiratory secretions. Face shield can be worn as an alternative to goggles but face shield covers more face area than goggles which covers only the eyes **(CDC, 2007).**Like other PPE, caution

must be taken when removing face protection, as described in Figure 1, taking into account its removal after removing gloves.

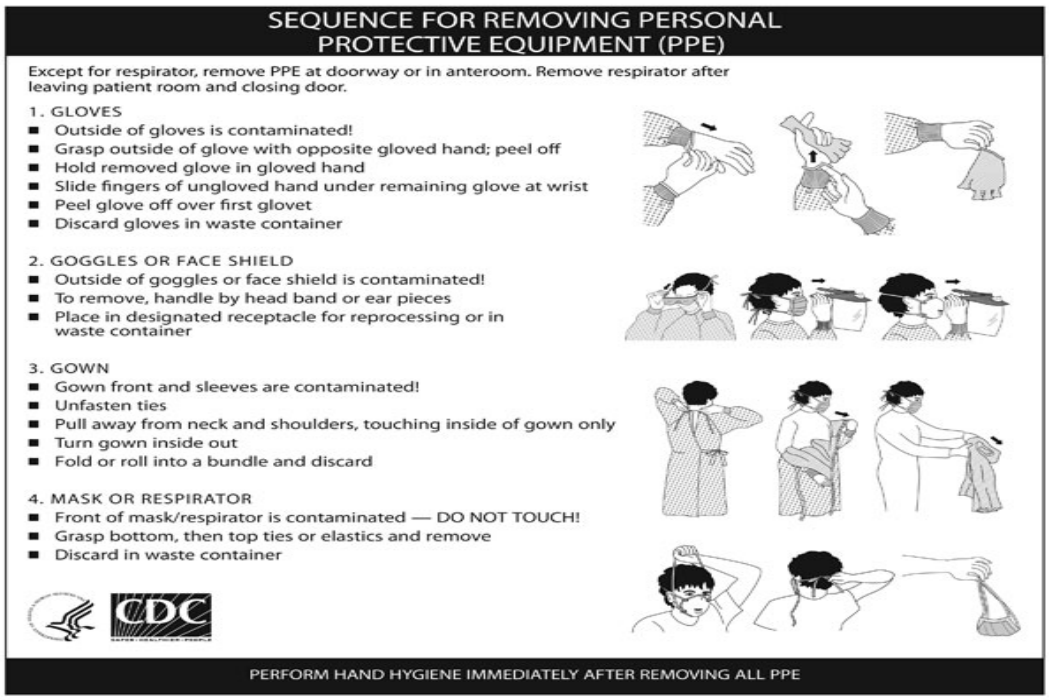


Figure (1): Sequences for removing personal protective equipment.(Casanova et al.,2008).

1.7 Sharp Injuries (SI) :

SI are defined as “an exposure to event occurring when any sharp penetrates the skin" **(CDC, 2012)**. These include needles, scalpels, broken glass, and other sharps. This term is interchangeable with percutaneous injury. It is considered a serious hazard in hospitals because it may allow the contaminated blood that has pathogen to be in contact with nurses. SI and NSI lead to infection. They expose nurses to blood- borne pathogens which mean " pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus” **(CDC, 2012).** SI and NSI are considered a major source of Hepatitis C Virus (HCV) infection among HCWs. Nearly

(39%) of cases of HCV that occurred worldwide happened among HCWs,while hepatitis B virus (HBV) formed (37%) (**Goniewicz et al., 2012).** Furthermore, needle stick injuries can transmit more than twenty types of infections such as malaria, syphilis and herpes **(Elizabeth et al., 1998).**

SI and NSI are a problems that threaten nurses and form a significant risk in professional nursing. This is due to their daily activities which may expose nurses to NSI and SI. These activities or procedures include the following: recapping needle, suturing, placing intravenous line, drawing blood**,** failing to get rid of used needles in puncture-resistant sharps containers, using needles or glass equipment to transfer body fluid between containers**,** disassembling needle or sharp device, giving injections to patients, filling injection, opening the lid of the injection and many others **(CDC, 2007; CDC, 2013).** These tasks and activities of nurses in daily work may expose them to SI or NSI. Therefore, to prevent transmission of blood borne pathogens to nurses after being exposed to such injuries, they should immediately wash the wound with water and soap. On the other hand, squeezing the wounds is not recommended as this will not reduce the risk of blood- borne pathogen. In case of the splash of blood or body fluid touches the nose or the mouth or the skin, they must flush these splashes with water and in case of blood or body fluid comes in contact with the eye,they should irrigate eyes with clean water or saline. Then they should inform the supervisor about injury to begin a reporting system (incidence

report). At the same time, they should test the source patient for hepatitis B, hepatitis C and AIDS. After that, infected nurses should receive the appropriate treatment, and post exposure prophylaxes (PEP) should be taken if the source patient was unknown or the source patients' test was positive**(CDC, 2007; NHMRA, 2010).**

Sharp injuries and needle stick injuries are costly; these injuries have direct and indirect cost at the same time. The direct cost includes the cost of laboratory test of exposed nurses and source patient, in addition to the cost of treatment that may be required or post exposure prophylaxis. On the other hand, the indirect cost includes loss of nurses, loss of productivity, loss of time during reporting or taking of treatments and cost for replacing the infected nurses **(NIOSH, 2011).** According to CDC's estimation,there were nearly (385,000) SI cases yearly among HCWs, and most reported cases occurred among nursing staff, but laboratory staff, physicians and other HCWs were also injured **(NIOSH, 2011).** Nearly half of SI were not reported; this was due to many reasons:lack of time to report, lack of knowledge of the reporting procedure, possibility of getting in trouble for having the exposure, belief the source patient was low for hepatitis B or hepatitis C or AIDS,and underestimation of the importance of reporting **(Honda et al., 2011; Lukianskyte, Gataeva and Radziunaite, 2011; Smith and Leggat ,2005)**. Reporting of NSI and SI is an important step, and it is essential to report such cases of injuries because it can protect injured nurses by ensuring right time for taking treatment or doing required

test (or post-exposure follow up). Also reporting can help in obtaining data which can be used to assess the health of nurses and safety of surrounding workplace (**CDC, 2001; Irmak, 2008).** Prevention of needle stick injuries and injuries from other sharps instruments is an important element of SP **(WHO, 2007).** Accordingly, care must be taken when using sharp objects or when cleaning the used one or when disposing of used needle and other sharp objects. The used needle and other sharp objects should be disposed of properly in Sharp Disposal Containers (or Box**)**.

1.8 Sharp Disposal Containers (or Box):

Sharp objects must be disposed in separate containers in every hospital to prevent risk of transmission of infection. These containers are called sharp disposal containers and they must be puncture-resistant, liquid –proof, closed when not used and sealed and when (75%) of them are filled. They should be put nearby work place and close to place where sharp is used. This would reduce the occurrence of recapping needles and needle-stick injuries that are associated with recapping (**OSHA, 2011;WHO,2001)**.

National Institute for Occupational Safety and Health (NIOSH) made a focus group to know elements needed for making sharp disposal containers safe. The elements were as follows **(NIOSH, 1998):**

Functionality:This means the containers should be puncture-resistant, liquid-proof, shape and size are suitable, closed well and low risk of incidence of injuries when closed.

Accessibility:This means containers should be easy to reach, put in visible place, and away from certain areas such as near doors or near light swatch.

Visibility:This means the containers should be clearly visible, and easy to see the amount that fills them.

Accommodation:This means containers should be easy to store and assemble, they don’t need too much worker training, and have a flexible design.

1.9 Problem statement:

Nurses get in contact with patients on a daily basis, so they are exposed to sharp injuries and many types of infections due to the nature of their occupation. It is important to follow standard precautions to reduce transmission of infections. In Palestine, despite of the availability of protocol for infection control in hospitals, it is applicable in varied degree from hospital to hospital. In addition, after reviewing documents from Palestinian Health Information Centre in MOH, it doesn't have any statistics regarding nurses' knowledge and practice of SP measures and those related to SI among nurses. In addition, it doesn’t have any statistics regarding nurses who have SI or who acquired infection during work. As

an expected outcome , this study will identify the importance of nurses' knowledge about SP measures and those related to SI. Also it will highlight the size of problem of stick injuries among nurses during work.

1.10 Significance of the study:

This research,the first of its kind to be done in governmental hospitals in West Bank, to assesses knowledge and practice of SP measures and those related to SI among nurses. Globally, many studies have been conducted about knowledge and practice of SP measures and those related to sharp injuries.

Safety of Nurses and patients is considered an important issue in controlling and limiting the transmission of infectious disease between nurses and patients. Following such standard precautions, which are easy and simple, would reduce the transmission of many types of contagious disease, thus reducing the economic burden of treating these diseases.

This study also calculated SI and NSI among participants. It is important to know prevalence of SI and NSI because needle sticks and sharps injuries represent a significant hazard in professional nursing and exposure to blood and body fluid has been considered as part of nurses' job.

It is expected that this study will play an important role in highlighting the importance of knowledge and compliance with SP among

nurses during daily work. It is also expected to highlight the size of the problem of SI and NSI.

1.11Objectives

Main objective :

To assess nurses' knowledge and compliance with standard precaution measures and those related to sharp injuries and their compliance with those related standard precautions.

Specific objectives :

1. To compare mean of score of knowledge about standard precaution measures and those related to SI among different educational level of nurses.
2. To compare mean of score of practice of standard precaution measures and those related to SI among different educational level of nurses.
3. To identify the correlation between nurses' knowledge and their practices of standard precaution measures.
4. To identify the correlation between nurses' knowledge and their practices of standard precaution measures related to sharp injuries.
5. To identify level of nurses' knowledge of SP measures, those related to SI which might be attributed to variables of years of experience, place of work and gender of participants.

6. To estimate the prevalence of sharp injuries and needle stick injuries among nurses in the target hospitals.
7. To identify the percentage of needles sticks as a result of sharp injuries.

1.12 Hypotheses:

1. The nurses don't have a good level of knowledge about SP and those related to SI
2. There is no difference in mean of knowledge of SP measures and different educational level of nurses.
3. There is no difference in mean of practice of SP measures and different educational level of nurses.
4. There is no difference in mean of practice of SP measures related to SI and different educational level of nurses.
5. There is no difference in mean of knowledge of SP measures related to SI and different educational level of nurses.
6. There is no linear relationship between nurses' knowledge and their practice of SP measure related to SI.
7. There is no linear relationship between nurses' knowledge and their practice of SP measures.
8. There is no association between good level of nurses' knowledge about SP measures related to SI and their years of experience, place of work and gender.

Summary:

SP measures are a basic level of infection control precautions. Compliance of nurses with all elements of SP measures and those related to SI would reduce transmission of many types of disease and occurrence of HAI.In addition,the prevalence of SI and NSI would drop. Consequently, knowledge and practice of SP measures and those related to SI deserves to be studied especially when we plan for the development of the health system.

Chapter Two

Literature Review

This chapter presents theoretical background about infection precautions. This is in addition to several international and regional studies regarding knowledge of Standard Precaution (SP), practice of Standard Precaution (SP), Sharp Injuries (SI) and prevalence of Needle Sharp Injuries (NSI) among nurses.

2.1 : Knowledge and practice regarding SP measures and those related to SI among nurses:

SP are developed to reduce the occurrence of nosocomial infection that may occur from known and unknown sources in hospital, so nurses and heath care workers should have a high level of knowledge before they practice their profession **(CDC, 2007).**

Studies regarding knowledge and practice of SP measures and those related to SI were done on international, regional and national levels. These studies showed differences regarding knowledge and practice of nurses of SP measures and those related to SI.

Standard precautions are considered a basic level that should be followed by nurses to prevent occurrence of hospital infections. Therefore, nurses must be educated on these SP measures and must have a high level of knowledge about these precautions **(WHO, 2007).** A study was done by

Ofili, Asuzu and Okojie.(2003) at the Central Hospital, Benin City, Nigeria, to find out the knowledge and practice of standard precautions among nurses. The results showed that the knowledge about SP measures among nurses was poor and that only (34.2%) of nurses had heard about SP measures**.** A cross-sectional study, conducted **by Melo Dde et al.(2006)** in public hospital in Goiania, showed that (11%) of all participants understood SP as protective measures for nurses only as opposed to (52.4%) who believed that SP were meant to protect both nurses and patients**.**

Another cross-sectional study was conducted by **Lue, He** and **Zhou.(2010)** in Hunan, China, to find out the knowledge about SP measures. The findings of the study showed that approximately (50%) of participants were knowledgeable about all SP measures**.** Another study was conducted in Maldives by **Najeeb and Taneepanichsku (2008)** to assess knowledge, attitude and practice of SP measures. It showed that only (3.4%) of participants had high level of knowledge about SP measures**.** Another study was done in a teaching hospital in Ajman by **Sreedharan, Muttappillymyalil and Venkatramana**, **(2011)**. It aimed to assess the knowledge about SP among nurses. The findings of the study showed that (97.0%) of participants were familiar with the concept of SP**.** A cross-sectional study was conducted to assess the knowledge and degree of compliance regarding standard precautions measures among student nurses in Philippines by **Labrague et al.(2012)**. It showed that (89.7%) of the participants had good knowledge about SP measures.Another study done

by **Abou El-enein and El Mahdy.(2011)** in university hospital of Alexandria. It aimed to assess knowledge and attitude of nurses towards the application of SP measures.The results about the knowledge of SP measures showed that less than (50%) of nurses had heard about it**.**

SP measures are composed of key elements such as hand hygiene, wearing gloves, facial protection (goggles, mask), gown, prevention of injuries from needle stick and other sharp instruments. They also include other elements such as waste disposal, environment cleaning, linens handling and patient care equipment. A study was conducted in Abuja, Nigeria, by **Okechukwv and Motshedisi.(2012**)**,** to determine knowledge and practice of standard precaution measures. The results of knowledge part showed that (22.38%) of participants knew the situation requiring hand washing. Regarding the practice part; (68.95%) of participants reported that they always washed hands. In contrast, (2.52%) of participants never washed hands, and (97.83%) of the participants reported regular use of gloves. In addition to that, (68.95%) and (88.44%) of participants reported using goggles and gowns when performing procedure like drawing blood or collecting body fluid. Furthermore, (11.86%) of participants always recapped the used needles**.** Another study, conducted in the university hospital in Western Algeria by **Beghdadli et al.(2008)**, to assess adherence of participants to SP measure practice during their daily practice, found that approximately (95%) of participants reported washing their hands after

using gloves as opposed to (69%) of participants who washed their hands between patients and nearly two-third of nurses reported recapping needles.

A study was conducted in the Philippines by **Labrague, Rosales and Tizon**, **(2012**) to assess nurses' knowledge and practice regarding SP measures. It showed that (84.5%) of participants confirmed applying SP measures to all patients, (96.6%) of participants had knowledge about hand washing before and after contact with patients. However, only (50%) were always washing hands before and after contact with patients. The knowledge about wearing of mask, goggles and gown were (93.10%), (96.55%) and (94.3%) respectively. Also (65.52%) of participants always wore gloves when drawing blood; (74.14%) of participants didn't recap the used needles and (82.76%) of participants always disposed of the used needle into sharp containers**.** Another study was conducted in Iran by **Askarian et al.(2007)** to asses knowledge and practice of SP measures.It was done in a medical center in Shiraz. The results showed that (95.6%) of participants knew that hands should be washed before and after patients' care while only (31.9%) of participants always washed their hands before and after providing patients' care. The results also showed that (97.4)% of participants knew that hands should be washed after accidental exposure to blood or body fluid as opposed to (89%) of participants who always washed their hands after accidental exposure to blood or body fluid. Moreover, this study showed that the (86.6%) of participants knew that goggles should be worn when there was a risk of exposure to blood or body

fluid as opposed to (90.1%) and (89.4%) respectively who said that masks and gown should be worn. Furthermore, (28.6%) of the participants always wore goggles as opposed to (48.4%) who always wore masks and (35.9%) who wore gowns when there was a risk of exposure to blood or body fluid. About (27.8%) of participants knew that needle should not be bent before disposal and (36.6%) of participants never bent the used needle before disposal. The results showed that their means of score of knowledge about SP measures (mean ±SD) (6.71±1.10) were higher than their means of score of practice about SP measures(3.52±1.09). Another study was done in Rouen University, France by **Tavolacci et al (2008),** to evaluate knowledge about SP measures. The results showed that the mean of score about knowledge regarding SP measure was (8.5±1.4) { maximum score was 9} **.**

A study was conducted in a primary health care centre in Kuwait by **Alnoumas et al.(2012**) to assess workers' knowledge, attitude and behavior of participants toward health care associated infection (HAI). It was found that (20.5%) of participants reported that they always wore goggles when there was a risk of exposure to blood or body fluid as opposed to (31.5%) who wore masks. In contrast, (62.67%) of participants wore gloves when there was a direct contact with patients. It also showed that (36.8%) of participants always recapped needles and (67.8%) reported placing the used needle into sharp containers. Also another study was conducted in a teaching hospital in Ajman by **Sreedharan,**

Muttappillymyalil and Venkatramana.(2011). It aimed to assess the knowledge about SP among nurses,the results showed that the participants knew that gown, mask and goggles should be worn during surgery. They were (100%) ,(99%) and (92%) respectively. However, (98%), (93%) and (80.4%) of participants reported that they always wore gown, mask and goggles during surgery. It also showed that (98%) of participants knew that sharp instruments should be disposed of immediately into sharp containers. Another study was conducted in the dialysis unit of the university hospital in Alexandria by **Abou El-enein and El Mahdy.(2011**) to assess compliance of participants with SP measures. The results showed that (47.1%) of participants knew that hands should be washed before and after patient care whereas (52.9%) of participants knew that hands should be washed only after patient care. The researcher found that none of the participants felt that hand washing, before and after a procedure, was required and none of the participants had worn a gown or face protection.

2.2 Factors affecting non -compliance to standard precaution measures:

After reviewing the related literature , it is crystal clear that there are many factors that affect nurses compliance with SP measure. A study that was done by **Akgur and Dal.(2012)** in Cyprus to assess factors that led nurses not compliant with SP. The results showed that,the barriers to apply the SP measures were lack of equipment, negative influences of protective equipment on nurses such as skin irritation overwork of nurses, lack of

nurses, and psychological factors, time consuming application of guidelines, working experiences, and influence on nurses' appearance. Another study that was conducted in Hunan, China by **Ofili, Asuzu and Okojie. (2003)** showed that many factors were responsible for non-compliance of nurses with SP. These factors were insufficient knowledge of SP measures, insufficient training, and department where nurses worked. Nurses who worked in surgical departments followed SP measures more than nurses who worked in medical departments. In contrast, in a study that was done by **Abou El-enein and El Mahdy.(2011)** in a university hospital in Egypt, the factors and barriers that influenced and impeded non - compliance to the SP measures were interference with the practice of care, absence of role model from colleagues or superiors, and the high work load or lack and inaccessibility of sinks.Another study that was done in Western Algeria by **Beghdadli et al.(2008),** revealed that the factors that led to non-compliance were lack of awareness and knowledge and lack of equipment and material such as lack of soaps.

2.3 Sharp Injuries (SI) and needle stick injuries (NSI) among nurses:

According to CDC's estimation, there are nearly (385,000) SI were occurred yearly among HCWs. Nearly more than twenty types of infections are transmitted through needle stick injury. These include syphilis, hepatitis B, cholera and AIDS (**Elizabeth et al.,1998 ;NIOSH,2011).** SI and NSI occurred mostly among nurses more than other occupational group

(Hosoglu et al.,2009). Many studies were conducted about SI and NSI prevalence among nurses at international, while few studies were done at regional and national levels.

A study was done by **Sharma et al.(2010)** in a hospital setting in New Delhi, India, to determine the prevalence of NSI among various group of HCW. The prevalence of NSI in the past 12 month among participants was (80.1%). The highest percentage was among nurses (100%), then junior residents, nursing students, laboratory technicians, interns, senior residents and undergraduate students. The most common cause of occurrence of NSI was the failure to recap the needle after using it. After occurrence of the injuries, nearly (60%) of them were immediately cleaned with water and soap, while (26%) who failed to clean the wounds.

A study was done by **Smith and Leggat (2005),** to find out the prevalence of NSI and investigate injuries among nursing students who studied in a large university in north Queensland, Australia. The results showed that only (13.9%) of participants had NSI or SI in the past 12 month. Of these, nearly (45%) occurred in nursing laboratory while (37%) occurred in teaching hospitals. The most common cause of these injuries was the opening of the cap of needles.

A descriptive analytical cross-sectional study was done by **Galougahi. (2010)** among nurses working in Tehran Khanevadeh hospital to find out prevalence of NSI and investigate associated factors. The

results showed that the prevalence of NSI during the past 12 month among participants was (22.15%).The study showed that after the occurrence of these injuries, (5.6%) of injured persons washed the wound with soap and water, (70%) washed the wound with antiseptic and only (14.4%) of nurses who washed the wound by antiseptic tested the blood of patients for human immunodeficiency virus (HIV) and hepatitis B virus (HBV). Also only (41.1%) of the nurses had taken complete doses of hepatitis B vaccine. A cross-sectional study was conducted in tertiary health care facility in Lahore, Pakistan, by **Manzoor et al.(2010)** to find out the prevalence of NSI and factors associated with NSI among nurses. The prevalence of NSI was (71.9%) in the past 12 months; nearly (35.1%) of participants wore gloves when they gave injections to patients as opposed to (64.9%) of participant who didn't wear the gloves while giving injections to patients. The causes of NSI in this study were as follows: (6%) of participants reported that the NSI occurred while they were drawing blood, (9%) while giving injections to patients, (19%) while filling injections, (25%) while opening syringe cap and (32%) while recapping syringes. After exposure to NSI, (92.2%) of participants cleaned the area with alcohol swab, while (87%) of participants washed the area with water and soap, and (75.3%) of participants used plaster. In addition to that, only (49.4%) of participants who were exposed to NSI had reported the injury to higher officials. This study also measured the awareness of participants towards NSI; nearly (23%) of the participants knew that Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) could be transmitted by contaminated needle

injury, while (44.2%) of participants who didn't know that HBV, HCV and HIV could be transmitted via contaminated needles**.**

A cross-sectional study was conducted in a hospital in Kaunas, Lithuania, by **Lukianskyte, Gataeva and Radziunaite.(2011)**, to determine the prevalence of NSI among nurse staff and nurse students and to assess factors that affected occurrence of NIS among staff nurses and nursing students. The prevalence of NSI among nurses staff was (38.5%), while the prevalence among nursing students was (78%). In this study, recapping the needle was the most prevalent (46%) cause of occurrence of NSI among nurses staff, while the ampoules breaking was responsible for the occurrence of highest percentage of NSI (59%) among nursing students. It also showed that (45.9%) of injuries were not reported; (38%) didn't think it was important to report the injury; (31%) didn't have enough time to report these injuries and (12%) didn't know when and who to report these injuries. Also the study showed that only (16.9%) of nurses staff had taken the three doses of hepatitis B vaccine. Another study was done by **Honda et al.(2011),** to determine the prevalence of SI and examine factors associated with SI among nurses working at a regional hospital in Thailand. The results showed that the prevalence of SI among nurses was (55.5%) in past year of conducting the study, and the most common SI occurred during using needles (It formed 52.8 % of all causes of SI). Nearly (26.2%) of SI occurred by ampoules. Also nearly (70%) of participants reported that they had taken all doses of hepatitis B vaccine. A study

conducted in primary health care clinics (PHCC) in Abha, Saudi Arabia, **by Mahfouz et al.(2009)**, to study knowledge and practice of physicians and nurses, who worked in PHCC, regarding injection safety. The results showed that the percentage of exposure to NSI among nurses was higher than that among physicians (16.5 % and 14.9% respectively). In addition, the result showed that the most important causes of injuries were recapping the needle after using it (for both nurses and physicians) and bending the needle before disposal (this cause was significant only for physicians). The results also showed that nearly (74.4%) of physicians and (82.4%) of nurses had taken at least 3 doses of hepatitis B vaccine. However, only (35.5%) of nurses and (55.3%) of physicians had known about the injection-associated transmission of AIDS, hepatitis B and hepatitis C.

A study that was done in three teaching hospitals in Alexandria **by Hanafi et al.(2011)** to investigate the prevalence and causes of NSI among HCW revealed that (67.9%) of participants had at least one NSI in previous 12 months of conducting the study. NSI among nurses was higher than among other occupational group (62.3%). The most common cause for these injuries was recapping the needles (36%); (28.3%) of injuries occurred during the recapping of the used needles. In addition, (70.3%) of injuries weren't reported and the main reason was lack of appropriate procedures to report the injuries.

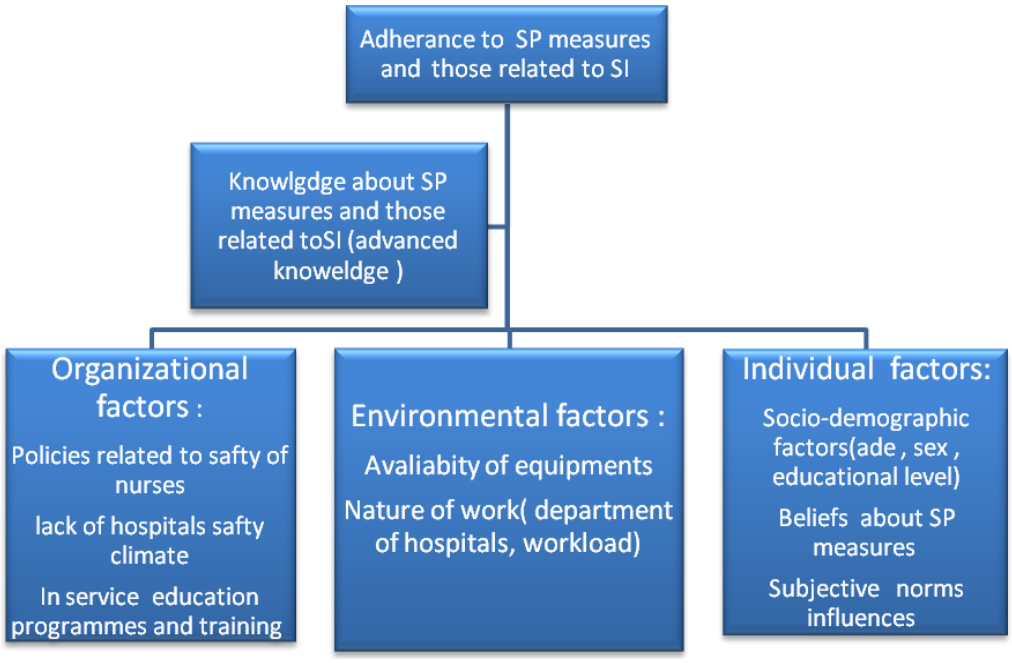
A study was conducted in Jordan by **Hassan and Wahsheh (2007)** to identify the percentages of HCWs among nurses,who were exposed to

SIs in the past 12 months of conducting the study, and to identify the types of devices involved in SI based on the responses of different occupational groups. This data was collected using a survey that was developed by the CDC. The results showed that nurses were the most frequent group exposed to SIs (81%). The study also showed that most of the SI among HCWs, including nurses were due to needles stick injuries (58.7%). Nearly (40%) were exposed to one injury during the last year, (15.4%) were exposed to 2 SIs in the previous year, and (15.8%) were exposed to 3 SIs in the previous year. The significant factor associated with SI was blood drawing which represented (22.6%); nearly (11.3%) of SI occurred during placing intravenous line while (11%) of SI happened during recapping of the needle, (10.5%) of SI occurred during needle disposal and (5%) of these injuries resulted from neglected needles. In Palestine, a study was done by **Al-Dabbas and Abu-Rmeileh (2012),**

to find out the prevalence of NSI among interns and medical students and to assess knowledge about protective strategies against exposure to blood borne pathogen. It was conducted in the medical schools in Al Najah, Al-Azhar and Al-Quds universities. The results showed that the prevalence of NSI was(41.1%), and the most common cause for these injuries was intramuscular injection (33.5%). It also showed that (48.6%) of injuries weren't reported because (29.5%) didn't know to whom and where they had to report; (27.7%) didn't know it had to be reported and (17%) forgot to report these injuries.

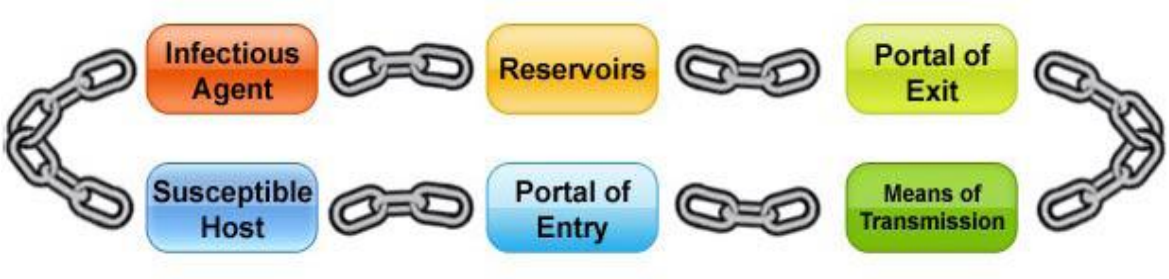
2.4 Conceptual Framework:

Nurses are often exposed to microorganisms, which can cause infections **(Aiken, Sloane and Klocinski,1997; Park et al., 2008**). Although the simplicity of standard precautions, but compliance among nurses is law. Compliance of standard precaution can be influenced by many factors such as;lack of knowledge lack of equipments, individual, environmental, economic and social factors and others (**Efstathiou et al.,2011)** as shown in following figure:



Figure(2): Factors may have influences on knowledge and compliance of SP

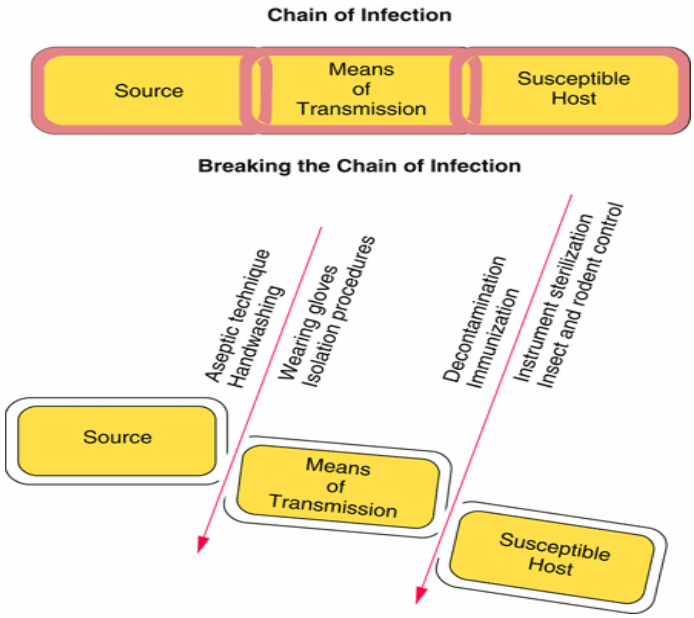
SP measures consider as a first-line approach to infection prevention and control in the hospital, and it is followed to break the link of cycle of infection and therapy prevent occurrence or transmission of infection **(NHMRA,2010**).



Figure(3):cycle of infection(CDC,2007).

Because break the cycle of infection is the foundation of infection prevention. Therefore, nurses must have knowledge about each element of this cycle to know how infection occurs also measures and precaution that leading to break links of this cycle **(WHO, 2001)**

The following figure show example about breaking the chain of infection by SP .



Figure(4) : Braking the chain of infection(MCcALL ET AL.)

Summary:

International and regional studies concentrated on knowledge and practice of SP measures and those related to SI in addition to prevalence of SI and NSI. At the national level,one study was done but it was done among doctors. The researcher's literature review showed no previously published study at national level about knowledge and practice of SP measures and those related to SI among nurses. Therefore, this study is expected to show the importance of this topic in the health sector.

Chapter Three

Methodology

This chapter presents steps taken to achieve the study objectives. The chapter includes the study design and its setting, the study population and sampling method, tool of data collection, pilot study, instruments of data collection, scoring method, data analysis and ethical issues.

3.1 Study design:

A cross-sectional study was used to assess nurses' knowledge and compliance with standard precaution measures and those related to sharp injuries.

3.2 Setting:

This study was conducted at the governmental hospitals of Nablus, Jenin, Qalqilya and Tulkarm in the northern West Bank.

3.2.1 Rafidiya hospital:

Rafidiya hospital, established in 1976, is located in Rafidiya suburb, west of Nablus city. It is one of the largest health institutions in the city. It serves about 300,000 people and also has 213 beds **(MOH, 2012).** It consists of number of medical departments: pediatrics, operations room and ICU, burns and plastic surgery, gynecology and obstetrics, surgery for men, and specialized surgeries: (Ear, Nose and Throat in addition to the

eyes and nerves). In addition, the hospital has an emergency department and an outpatient clinic **(MOH, 2012).**

3.2.2 Al-Watani hospital:

Al- Watani hospital, also located in Nablus city, it was the first hospital to be established in Nablus city. It is also considered one of hospitals which has played a prominent role in the history of the city. It consists of the following medical departments: intensive care unit, women's department, men's department, emergency department, kidney department (old and new).

3.2.3 Dr . Khalil Suleiman hospital:

Dr. Khalil Suleiman hospital, which is also called Jenin governmental hospital, is located in Jenin city and was established in 1961. It has 172 beds. This hospital is the only governmental hospital in Jenin city and it provides health care services to people who live mainly in Tubas and Jenin. Furthermore this hospital provides services to the people who are living in other parts in northern West Bank **(MOH, 2012).** This hospital houses the following departments: obstetrics and gynecology, pediatric, orthopedic surgery, men's surgery, women's surgery, men's internal medicine, and women's internal medicine. This is in addition to an ICU, and an emergency department.

3.2.4 Dr. Thabet Thabet hospital:

Dr.Thabet Thabet hospital is also called Tulkarm governmental hospital. It is the only governmental hospital in Tulkarm city and has 105 beds **(MOH, 2012).** This hospital consists of the following departments: men's surgery, women's surgery, men's internal medicine, women's internal medicine. It also has an ICU, operation room, emergency department, obstetrics and gynecology departments, pediatric department and kidney dialysis department.

3.2.5 Darweesh Nazzal hospital:

Darweesh Nazzal hospital, which is also called Qalqilya governmental hospital, is located in Qalqilya city. It has 56 beds **(MOH, 2012).** This hospital consists of the following departments: kidney dialysis, emergency, surgery (men and women), pediatric, and gynecology and obstetrics.

3.3 Population of the study:

Based on MOH report of 2011, there were (547) nurses working in the five aforementioned hospitals.

3.4 Sample and Sampling method:

The calculated sample size was (249) nurses: (226) using the sample size calculator by Raosoft with a (95%) confidence level, (5%) error, and (50%) response distribution + (10%) drop out.

The systematic random technique was used;the number of nurses from each hospital was chosen, using the proportion method. That is,t he numbers of participants from each hospitals were calculated by the ratio of the nurses working in that hospital to the total number of nurses working in all these hospitals.

Table(1): Number of chosen nurses from each hospital (MOH, 2011)

Governmental hospitals	Number of nurses	Number of nurses in the test sample
Thabet Thabet hospital	102	46
Rafidya hospital	172	78
Al- Watani hospital	88	40
Khalil Suleiman	133	61
Darweesh Nazzal	52	24
Total number	547	249

A list of nurses' names was obtained from the head of each department in the hospital. Afterwards, using these lists, the sample of subjects was selected by using a simple random method. That is, the first subject was picked randomly from the list,and the interval between two successive nurses on the list was calculated by dividing the number of the nurses on the list on the number of the calculated sample size for that hospital. For example, in Thabet Thabet hospital, the total number of nurses was (102) and the sample size was (46), so by dividing (102) over (46) we get (2.21) approximated to (2) (the interval). Therefore, the first nurse was selected

randomly as the first participant. Then, every second nurse was chosen from the list for a total of 46 participants out of (102).

3.4.1 Inclusion criteria :

- All nurses were registered in the aforementioned governmental hospitals.

3.4.2 Exclusion criteria:

- Participants who participated in the pilot study
- Nurse students

3.5 Tool of data collection:

Anonymous self- administered questionnaire.

The knowledge and practice of SP measures and those related to SI parts of the questionnaire were developed after making review of related literature and studies. These include studies done by **Askarian et al.(2007), Najeeb and Taneepanichsku (2008) and Tavolacci et al.(2008).**

The part of questionnaire that asked about exposure to NSI and SI and measurement taken by hospital regarding infection control was developed on the basis of survey done by CDC. This survey is called Survey of Healthcare Personnel on Occupational Exposure to Blood and Body **(CDC,2005).**

3.5.1 Questionnaire parts:

1. Socio-demographic data:this part included questions about age, gender, categories of nurses, department of hospital, years of experience, place of work.

2. The second part contained two questions about SP training of nurses: if nurses received SP training and where they took this training.
3. The third part of questionnaire contained questions about knowledge of nurses regarding:

A. SP measures (it had questions about knowledge of nurses about washing hands, using gloves, worn gown, goggles, masks and other questions)

B. SP measures related to SI (it contained questions about knowledge for using gloves when drawing blood or throwing needles, disposing of the used needle immediately in sharp containers, availability of sharp containers, recapping and bending of used needles before disposing.

4. The fourth part assessed the nurses practice of /or compliance:

   A. SP measures (it contained questions about application of SP measures in nurses' work, such as washing hands, using gloves, wearing gown, goggles, and masks). There were also other questions.

B. SP measures related to SI (it contained questions about application of SP related to NSI and SI during nurses' daily activity such as using gloves when drawing blood or throwing needles, disposing of the used needle immediately in sharp containers, availability of sharp containers, recapping and bending of used needles before disposing). There were also other questions

5. The fifth part assessed exposures to needle stick injuries and sharp injury (it contained questions about times of NSI or SI in the past 12 months and causes that led to these injuries).

6. The sixth part covered measures taken by hospitals regarding infection control to prevent injuries and their consequences:

   (Questions about reporting of injuries, and causes of not reporting these injuries, place of sharp containers and vaccination of nurses against hepatitis B virus).

3.6 Pilot study:

A pilot study was conducted at 2 hospital: Rafidya and Thabet Thabet. Twenty five nurses were randomly selected to fill in a self-administered questionnaire in order to identify the problems that faced the participants, and the time taken by participants to fill in/out the questionnaire and the required modification . After that, some questions

were modified as some participants thought that those questions were redundant but they were not. Those questions were asking about different aspects (i.e., knowledge and practice of SP and those related to SI) separately. So, these questions were revised to make them easily understood and target the aim clearly.

Based on the pilot results,some modifications were made on some questions. In the main questionnaire, the questions regarding hand washing were primarily reworded to ask about hand washing before and after contact with patients as a single question. This was modified later to include two separate questions,one asking about hand washing before contact with patients and the other asking about hand washing after contact.

3.7 Validity and reliability of the test:

Validity of the questionnaire was tested as follows :

- The questionnaire was developed by researcher, based on review of related literature, to achieve the study objectives.
- The questionnaire was reviewed by two academic scholars with a experience in developing and administering questionnaire. (annex 1)
- A pre -test was conducted as a pilot study on a group of nurses and questionnaire was modified according to that process.

Reliability:Reliability of questionnaire was calculated by cronbach’s alpha

Table 2:Reliability of questionnaires' part

Part of questionnaire	Cronbach's alpha
Knowledge regarding SP measures	0.69
Knowledge regarding SP measure relatrd to SI	0.71
Practice regarding SP measure	0.81
Practice regarding SP measures related to SI	0.86
Exposure to SI and NSI	0.87
Measurement taken by hospital regarding infection control	0.70

3.8 Ethical considerations:

Approval from Institutional Review Board (IRB) at An- Najah National University was obtained.In addition,an approval was obtained from the selected hospitals.Consent of participants was also obtained.Data was collected anonymously and was kept confidential.All collected data was used for research purposes and it was stored in private place. In addition to this, at any time of study,participants were given the right to withdraw.

3.9 Field work:

After the approval was obtained from all hospitals included in the study, the pilot study was conducted. Some modifications accordingly were made. Data collection lasted from November 6 to December 29, 2012.

The directors of nurses and heads of departments in each hospital were met and had the aims of study explained to them. After that, the questionnaire was given to the heads of departments in order to be distributed to selected nurses who were working in those departments and who were selected to participate in the study. The heads of departments were kept updated and were visited many times to collect the completed questionnaires.

3.10 Operational definition of study variables

Independent Variables:

1. Age
2. Sex
3. Educational level of nurses
4. Work place
5. Departments of hospital .
6. Years of experience.

7. Variables related to knowledge about (when it in relation to practice):

a-Standard precaution measure.

b-Standard precaution measures related to sharp injuries

Dependant variables (Outcome variables):

1-Variables related to knowledge:

a-Standard precaution measure.

b-Standard precaution measures related to sharp injuries .

When it in relation to work place, years of experiences and gender of participants.

2-Variables related to practice of /compliance:

a-Standard precaution measures .

b-Standard precaution measures related to sharp injuries .

When it in relation to work place, years of experiences and gender of participants.

3.11 Scoring method

- Knowledge about SP measures and those related to SI are composed of statements with three choices: yes, no and don't know. The right answer was given 1 score,and the other answers were given 0. Then the score was calculated (maximum score was 9) .

- The researcher adopted a study done by Najeeb and Taneepanichsku (2008). In that study, high level of knowledge group had ≥ 80% of correct answers and in this we considered that ≥80% of correct answers as high level of knowledge.
- The practice and compliance to SP measures and those related to SI part; the questions were composed of statements of five choices: always, often, sometimes, seldom, never. The always answer took 1 point and the other answers took zero point. Then the score was calculated (maximum score was 9).

A binary scoring system was used in measuring practice of / compliance to the SP measures and those related to SI,because the terms, "always, often, sometimes, seldom and never " are objective terms and may differ from person to person. Moreover, anyone who is not applying a single precaution from the SP measures all the time would be vulnerable to infections from patients at a specific point of time for not being compliant to that single SP, so he/she will be described as a "non compliant" to that precaution,and the aim of study was to assess nurses' knowledge about and compliance with the standard precaution measures and those related to sharp injuries and their compliance to these related standard precautions measure. Therefore, anyone who is not applying that SP measures all the time is considered a non-compliant. And it will be more difficult for nurses to fill in the questionnaire if the question was a "yes or no" choice rather than a range of choices.

3.12 Data analysis and test used:

All statistical analyses were conducted by using Statistical Package for Social Sciences (SPSS) version 17.0 for Windows. Descriptive analyses were done for continuous variables such as means and standard deviations. Frequency was used for nominal variables. Chi-square and logistic regression correlation analysis were used. P value less than (0.05) was considered significant.

3.13 Limitation of the study :

The current study had a number of limitations which can be summarized as follows:

First, potential reporting bias associated with the self-administered questionnaire concern always existed about accuracy in these surveys. It was difficult to determine with certainty whether the responses reflected what nurses actually did. Specifically, compliance to control measures was based solely upon the subjective views of nurses with the possibility that they tended to over-report compliance. A more effective method of measuring compliance would be the direct observations of actual practice; in this study it was difficult to do so due to time limitation.

A second limitation was that the study took place in governmental hospitals. All other hospitals were not included, and so the results can’t be generalized among all the nurses working in the north of the West Bank.

Finally, and due to the high workload in governmental hospitals, some of the participants failed to complete the questionnaire in the first time while others forgot to fill it and a number of them had their questionnaires lost, so they were visited again and new copies were provided to them to fill.

Summary:

This cross-sectional descriptive study was done in governmental hospitals in northern West Bank. The sample consisted of (220) nurses. Data was collected by a self- administered questionnaire. Then data was analyzed by using SPSS version 17. Different statistical tests were used to calculate frequency and percentages and correlations.

These tests were Chi-square, one way ANOVA and multiple logistic regression.

Chapter four

Results

This chapter presents in detail the results of the study.It includes description of the sample, nurses' knowledge/ practice of standard precaution measures and those related to sharp injuries. Moreover, this chapter includes prevalence of sharp injuries and needle stick injuries and measures taken by hospitals regarding infection control.

Of the 249 copies of the questionnaire distributed, a total of (220) were returned by the participants with a final response rate of (88.4%):(100%) from Darwish Nazzal hospital, (95.7%) from Thabet Thabet hospital, (70.5%) from Khalil Suleiman hospital, (92.3%) from Rafidya hospital and (92.5%) from Al-Watani hospital.

4.1 :Socio-Demographic Data:

The sample of study was distributed according to socio - demographic data.

Table (3):Distribution of participants according to their socio-demographic data

Items		Work Place(Hospitals)											
		Darwish Nazzal		Thabet Thabet		Khalil Suleiman		Rafidya		Al-Watani		Total	
		No.	%	No	%	No	%	No	%	No	%	No	%
Age Group	20-29	13	54.2	17	38.6	24	55.8	31	43.1	12	32.4	97	44.1
	30-39	7	29.2	18	40.9	12	27.9	33	45.8	15	40.5	85	38.6
	40-49	4	16.7	7	15.9	6	14.0	6	8.3	10	27.0	33	15
	50-59	0	-	2	4.5	1	2.3	2	2.8	0	-	5	2.3
Gender of Participants	Male	13	54.2	14	31.8	23	53.5	30	41.7	23	62.2	103	46.8
	Female	11	45.8	30	68.2	20	46.5	42	58.3	14	37.8	117	53.2
Educational level of participants	Practical nurses	10	41.7	21	47.8	21	48.9	34	47.2	16	43.2	102	46.4

	Staff nurses	11	45.8	19	43.2	19	44.2	28	38.9	21	56.8	98	44.5
	Practical midwife	2	8.3	2	4.5	2	4.6	6	8.3	0	-	12	5.5
	Staff midwife	1	4.2	2	4.5	1	2.3	4	5.6	0	-	8	3.6
Years of Experience	0-9	19	79.2	28	63.6	30	69.7	50	69.4	20	54.1	147	66.8
	10-19	5	20.8	14	31.8	12	27.9	20	27.7	13	35.1	64	29.1
	20-29	0	-	2	4.6	1	2.4	2	2.9	4	10.8	9	4.1
Training on SP measure	Yes	7	29.2	9	20.5	10	23.3	24	33.3	8	21.6	58	26.4
	No	17	70.8	35	79.5	33	76.7	48	66.7	29	78.4	162	73.6
Taking training about SP measure through	Training program	1	4.2	3	6.8	2	4.7	9	12.5	1	2.7	16	7.3
	Workshop	2	8.3	1	2.3	1	2.3	4	5.6	2	5.4	10	4.6
	University study	3	12.5	4	9.1	4	9.3	9	12.5	1	12.7	21	9.5
	In-service education program	1	4.2	1	2.3	3	7.0	2	2.7	4	10.8	11	5

As table (3) shows, (44.1%) of participants were (20-29) years old; (46.8%) of the participants were males and (53.2%) of them were females. Also it shows that (46.4%) of the participants were practical nurses; (44.5%) were staff nurses; (5.5%) were practical midwives and (3.6%) were staff midwives. Regarding years of experiences (66.8 %) of participants had (0-9) years of experience and (4.1%) had (20-29) years of experience. Regarding training on standard precaution measures (73.6%) of the participants didn't take training on standard precaution measures as opposed to (26.6%) who attended training on standard precaution measures; (9.5%) of them had this training during their university study; (7.3%) of them attended training on SP measures through a training program and (4.5%) of them attended training on SP measures through workshop.

Participants were distributed according to work place as shown in table (4).

Table (4): Distribution of nurses according to department of hospital:

Hospitals / Departments	Work place (hospitals)											
	Darwish Nazzal		Thabet Thabet		Khalil Suleiman		Rafidya		Al-Watani		Total	
	No.	%	No.	%	No.	%	No	%	No	%	No	%
Emergency unit	3	12.5	7	15.9	3	7.0	10	13.9	9	24.3	32	14.5
ICU	0	-	3	6.8	12	27.9	7	9.7	9	24.3	31	14.1
Pediatric	3	12.5	5	11.4	5	11.6	9	12.5	1	2.7	23	10.4
Surgical	5	20.8	10	22.7	6	14.0	8	11.1	0	-	29	13.2
Internal medicine	5	20.8	5	11.4	8	18.6	0	-	11	29.8	29	13.2
Kidney unit	4	16.7	3	6.8	0	-	0	-	7	18.9	14	6.4
obstetrics and gynecology	4	16.7	6	13.6	3	7.0	13	18.2	0	-	26	11.8
Operation	0	-	5	11.4	2	4.7	10	13.9	0	-	17	7.7
Orthopedic	0	-	0	-	4	9.3	5	6.9	0	-	9	4.1
Burn	0	-	0	-	0	-	5	6.9	0	-	5	2.3
Urology	0	-	0	-	0	-	5	6.9	0	-	5	2.3

According to working area of participants in hospital departments,the participants were distributed among different (11) departments: (14.5%) of participants worked in the emergency units while (2.3%) worked in urology departments.

4.2: Distribution of participants regarding their knowledge about standard precaution measures:

Figure (5) shows the knowledge of participants about SP measures:

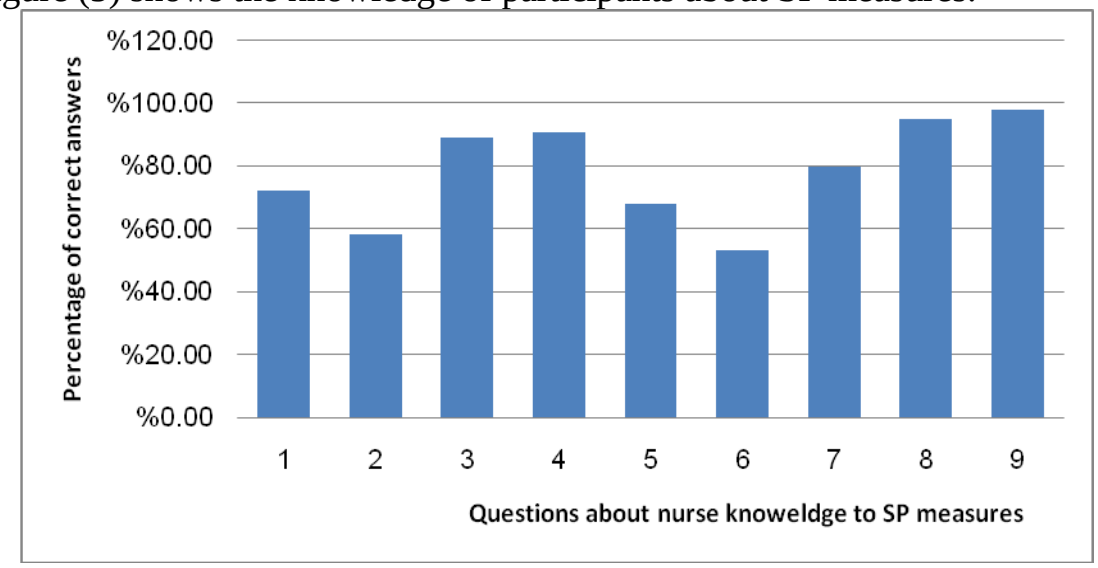


Figure (5): Distribution of participants regarding their knowledge about standard precautions measures

Key of Figure(5**):**

1-SP applies to all patients .

2-SP considers all patients have blood- borne pathogens,

3-Hands should be washed before contact with patients.

4- Gloves should be worn when there is a risk of splashes of blood and body fluids.

5- Mask should be worn when there is a risk of splashes of blood and body fluids.

6- Goggles should be worn when there is a risk of splashes of blood and body fluids.

7 Gown should be worn when there is a risk of splashes of blood and body fluids.

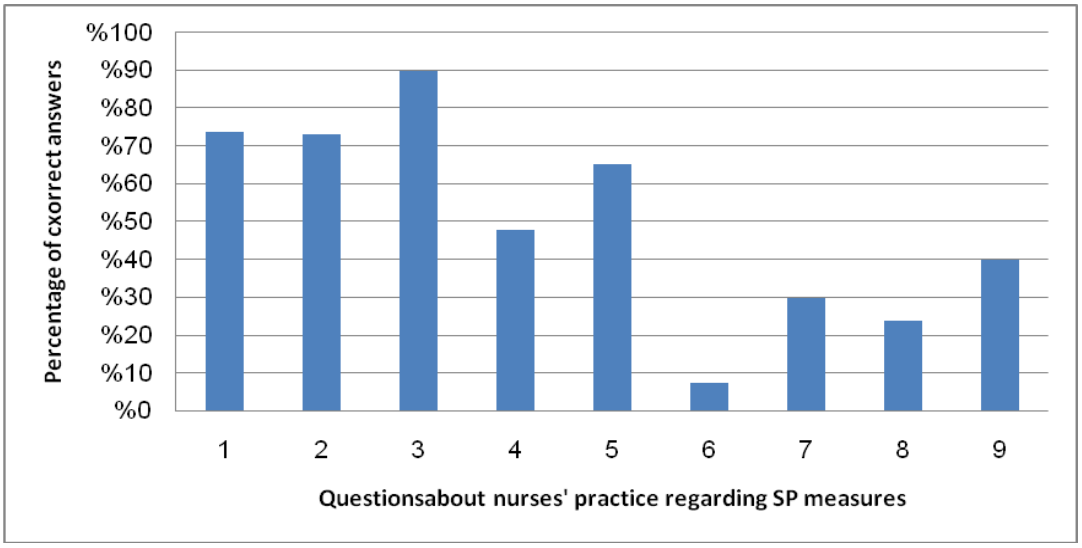
8-Hands should be washed after contact with patient.

9- Hands should be washed after sudden exposure to blood or body fluid.

After data processing, it was found that (72.4%) of the participants agreed that these measures should be applied when dealing with all patients while (58.4%) of participants agreed that these measures considered all patients as if they had blood-borne pathogen. Moreover, (98.2%) of the participants agreed that hands should be washed after sudden exposure to blood or body fluid; (95.0%) of participants knew that hands should be washed after contact with patient, and (89.1%) of participants knew that hands should be washed before contact with patients. More than (90%) of participants agreed that gloves should be worn when there is a risk of splashes of blood and body fluids while (53.4%) of them agreed that goggles should be worn when there is a risk of splash of blood or body fluid.

4.3: Distribution of participants according to their practice of the standard precaution measures:

The following figure shows the participants' practice of the SP measures.



Figure(6) : Distribution of participants according to their practice of the standard precaution measures

Key of Figure (6):

1-I wash my hands after contact with patients.

2- I wash my hands before contact with patients.

3-I wash my hands after accidental contact with blood , body fluid , secretion or contaminatewd items.

4-I wash my hands before and aftert using gloves.

5- I wear gloves when procedure and activities are likely to generate splash or spray of blood or body fluids .

6- I wear goggles when procedure and activities are likely to generate splash or spray of blood or body fluids.

7- I wear gown when procedure and activities are likely to generate splash or spray of blood or body fluids.

8- I wear masks when procedure and activities are likely to generate splash or spray of blood or body fluids.

9-I apply SP on all patients

Figure (6) shows that (40.2%) of participants always applied SP measures when dealing with patients. Regarding hand washing, (90%) of participants reported that they always washed hands after accidental contact with blood, secretion and contaminated items; (48%) of participants

always washed their hands after and before using gloves. Moreover,(73.8%) and (73.2%) of them always washed their hands after and before contact with patients respectively. About (65.2%) of participants always wore gloves when procedures and activities were likely to generate splashes or sprays of blood or body fluids. It also shows that only (7.7%) of participants always wore goggles when procedures and activities were likely to generate splashes or sprays of blood or body fluids.

4.4:Distribution of participants according to their knowledge about standard precaution measures related to sharp injuries:

Figure (7) shows the participants' knowledge about SP measures related to SI.

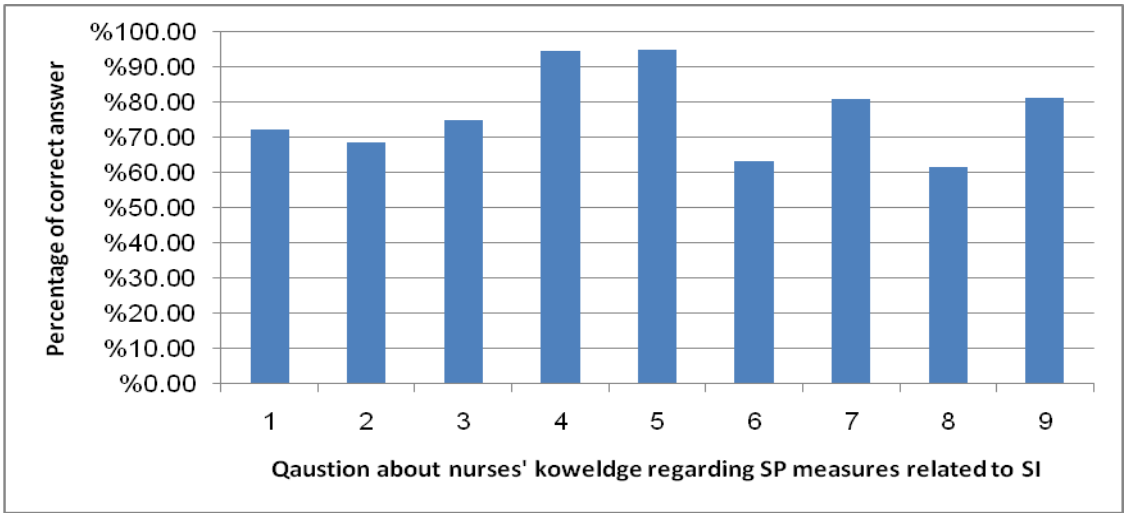


Figure (7): Distribution of participants according to their knowledge about SP measures related to SI.

Key Figure(7):

1-Correct SI definition .

2-Correct definition of needle stick injuries

3- Gloves should be worn when drawing blood

4- The used needles or sharps should be thrown into the sharp containers immediately

5- Sharpbox for disposal of sharp and needles avliable at your work place

6- The needle should not be separated from syringe prior to disposal

7- The needle should not be recapped

8-After the injuries occurred, the wound should be left to bleed

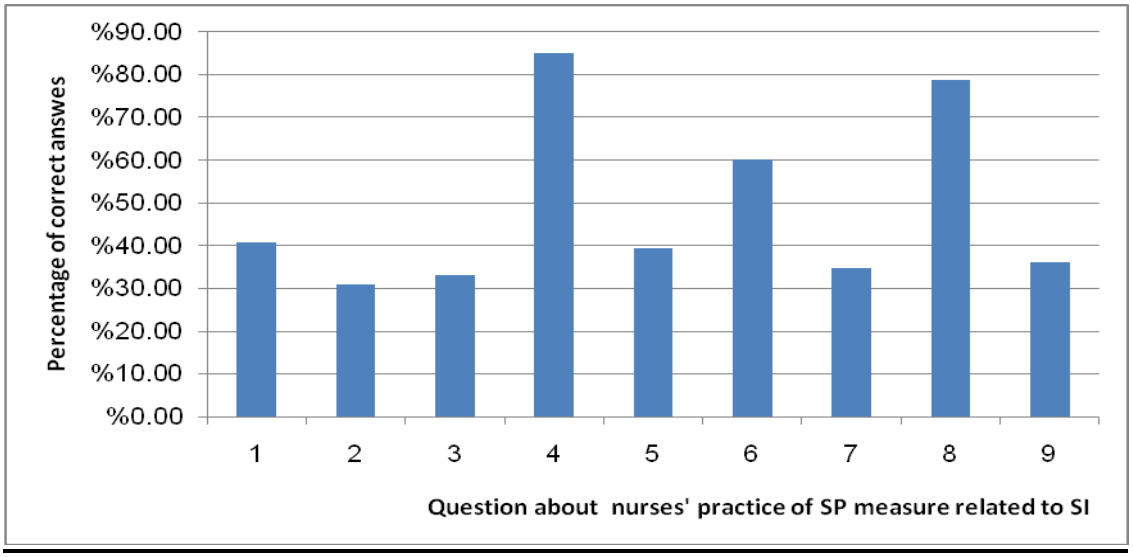
9-After the injuries occurred, the wound should be washed with water

Figure (7) shows that (72.4 %) of participants knew the definition of SI, and (68.8%) knew the correct definition of NSI. About (95%) of participants knew that sharp containers were available in their work place and (94.6%) of participants agreed that used needles should be immediately disposed of into sharp containers. Moreover, (81%) of

participants agreed that the needle should not be recapped or bent after it has been used and (63.3%) agreed that the needle should not be separated from syringes after use. After injuries occurred, (81.5%) of participants agreed that the wound should be washed with water while (61.4%) agreed that the wound should be left to bleed.

4.5: Distribution of participants according to their practice of standard precaution measures related to sharp injuries:

Figure (8) shows the participants' practice of standard precaution measures related to SI:



Figure(8): Distribution of participants according to their practice of SP measures related to SI

Key of Figure (8):

1- I wear gloves during the process of withdrawing blood , puncture veins.

2- I wear gloves when disposing of contaminated needles.

3- I don't separate needle from the syringe prior to disposal.

4- I throw the used needles or sharps into the sharp containers immediately.

5- I don't recap the needle after use

6- I don't bent the needle after use.

7- I allow the wound to bleed.

8- I wash the wound with water.

9-I am not squeezing the wound.

As figure (8) shows, (85.1%) of participants reported always threw the used needle and sharp objects into sharp containers immediately and (30.8%) always wore gloves when disposing of contaminated needle. Around (40.7%) of participants always wore gloves during the process of withdrawing blood or puncture vines. Close to (33%) of participants failed to separate needle from syringe prior to disposing of needle; (39.4%) of participants didn't recap the needle after use and (60.2%) of participants didn't bent needle after use. Regarding the questions about wounds, (34.8%) of participants said that they always allowed the wound to bleed; (78.7%) of participants always washed the wound with water and (36.2%) of participants never squeezed the wound.

4.6 Means of knowledge and practice score of participants regarding SP and SP measures related to SI:

The following table illustrates the means of knowledge and practice score.

Table (5): Distribution of participants according to means of knowledge and practice score regarding SP measures and those related to SI.

Item	Mean of score * (mean ± standard deviation)
Knowledge about SP	6.79±1.42
Knowledge about SP related to SI	6.90±1.62
Practice of SP measures	4.15±1.75
Practice of SP measures related to SI	4.45±1.73

*Maximum score was 9.

Table (5) shows that the means of knowledge score about SP measures and those related to SI were (6.79±1.42) and (6.90±1.62) respectively while the means of practice score about SP measure and those related to SI were (4.15±1.75) and (4.45±1.73) respectively.

The following table illustrates the frequency distribution of nurses regarding knowledge level .

Table(6): Frequency distribution of nurses regarding knowledge and practice level

Item	Score< 80%	Score ≥ 80%
Knowledge about SP	70%	30%
Knowledge about SP related to SI	63.6%	36.4%
Practice of SP measures	97.3%	7.2%
Practice of SP measures related to SI	96.4%	3.6%

Table (6) shows that (30%) of participants had a high level of knowledge about SP measures but only(7.2%) of them had a high level of practice of SP measures. It also shows that (36.4%) of the participants had a high level of knowledge about SP measures related to SI but only (3.6%) had a high level of practice of SP measures related to SI.

4.7 Means of scores of SP knowledge and practice among different educational levels of nurses

The following table shows means of scores of knowledge and practice of SP measures and those related to SI in relation to educational level of nurses.

Table (7): Distribution of participants' means of scores of knowledge and practice in relation to their educational level

Items (mean ± standard deviation)	Educational level of participants				P value Sig.	F value
	Practical nurses	Staff nurses	Staff midwife	Practical midwife		
Mean of scores of participants' knowledge of SP measures	6.57±1.53	6.93±1.43	7.13±1.64	6.58±1.64	0.499	0.874
Mean of scores of participants' knowledge of SP measures related to SI	6.75±1.45	7.04±1.75	7.12±1.55	6.50±1.67	0.294	1.234
Mean of scores of participants' practice of S P measures	4.28±1.66	4.0±.1.82	4.25±1.03	4.5±1.44	0.253	1.370
Mean of scores of participants' practice of SP measures related to SI	4.49±1.75	4.60±1.9	4.38±1.40	3.92±1.38	0.575	0.664

One-way ANOVAs test

By applying Kolmogrov-Smirnov test of normality, the results shows that the score of participants' knowledge of SP measures, score of participants' knowledge of SP measures related to SI, the score of participants' practice of SP measures and the score of participants' practice's of SP measures were normally distributed.

Table (7) shows that the mean score of knowledge about SP measures in relation to educational levels of staff nurses, practical nurses, staff midwife and practical midwife. They were (6.93±1.43), (6.57±1.53), (7.13±1.64) and (6.58±1.64) respectively, with no significant differences between these levels of education (***p value*** 0.499). And the mean score of practicing these measures were (4.0±1.82), (4.28±1.66), (4.25±1.03) and (4.5±1.67) respectively, with no significant differences between these levels of education (***p value*** 0.253).

Regarding the mean scores of knowledge about SP measure related to SI in relation to level of education of staff nurses, practical nurses, staff midwives and practical midwives, they were (7.04±1.45), (6.75±1.45), (7.12±1.55) and (6.5±1.67) respectively, with no significant differences between these levels of education (***P value*** 0.294). And those means of scores of practicing or adherence to these measures were (4.6±1.9), (4.49±1.75), (4.38±1.4) and (3.92±1.38) respectively, with no significant differences between these levels of education (***p value*** 0.575).

Table (7) shows he means of scores of nurses' knowledge of SP measures and those related to SI were better than the mean of score of nurses' practice regarding SP and those related to SI. At the same time the mean of score of nurses' knowledge of SP measures and those related to SI were not excellent because the participants were nurses. The mean score of knowledge had to be higher than that found in the result.

4.8 Association between scores of participants' knowledge about SP measures, SP/SI and some variables

Table (8) shows the scores of participants' knowledge about SP measure and those related to SI which could be attributed to gender, work place,and years of experiences.

Table(8): Distribution of scores of participants' knowledge about SP measures and those related to SI in relation to work place, years of experience and gender

Items		Knowledge score about SP measures				P VALUE Sig.*	Knowledge score about SP measures related to SI				P VALUE Sig.*
		< 80%		≥80%			< 80%		≥80%		
		No	%	No	%		No	%	No	%	
Work place	Darwish Nazzal	15	62.5	9	37.5	0.225	12	50	12	50	0.011
	Thabet Thabet	27	61.4	17	38.6		20	45.5	24	54.5	
	Khalil Suleiman	28	65.1	15	34.9		29	67.4	14	32.6	
	Rafidya	55	76.4	17	23.6		50	69.4	22	32.7	
	Al-Watani	29	78.4	8	21.6		29	78.4	8	21.6	
Years of experience	0-9	105	72.4	40	27.6	0.552	97	66.9	48	33.1	0.362
	10-19	36	64.3	20	35.7		30	53.6	26	46.4	
	20-29	8	80	2	20		6	60	4	40	
Gender of participant	Male	75	72.8	28	27.2	0.393	69	67	34	33	0.332
	Female	79	67.5	38	32.5		71	60.7	46	39.3	

*Chi-square test

Work place: Regarding the relationship between work place and participants who had knowledge about SP measures, the score was ≥80; (38.6%) of participants in Thabet Thabet hospital, (37.5%) of participants in Darwish Nazzal hospital, (34.6%) of participants in Khalil Suleiman hospital, (23.6%) of participants in Rafedia hospital and (21.6%) of participants in Alwatani hospital had this score. Accordingly, there was no significant association between knowledge score about SP measure and work place (***p values*** 0.225).

Regarding the relationship between work place and knowledge score about SP measure related to SI; the percentage of those who had knowledge score about SP measure related to SI ≥ 80 in Thabet Thabet hospital, Darwish Nazzal hospital, Khalil Suleiman hospital, Rafidya hospital and Alwatani hospital were (54.5%), (50%), (32.6%), (32.7%) and (21.6%) respectively, with significant association between knowledge score of SP measure related to SI and work place (***p values*** 0.011). The highest level was in Thabet Thabet hospital and lowest level was in Al-Watani hospital.

Years of experience: Regarding relationship between years of experience and knowledge score of SP measures in each group of years of experience: (0-9), (10-19) and (20-29). The percentages of participants who had knowledge score ≥ 80 for SP measures were(27.6%), (35.7%) and(20%) respectively, with no significant association between score of knowledge of SP measures and years of experience (***P value 0***.552).

Regarding the relationship between years of experience and knowledge score of SP measures related to SI, (46.4%) of participants who had (10-19) years of experience achieved knowledge score of SP measure ≥ 80; (33.1%) of participants who had (0-9) years of experience achieved knowledge score of SP measure ≥ 80,with no significant association between score of knowledge about SP measures and years of experience (***P value 0***.362).

Gender of participants: About (32.5%) of females and (27.2%) of males had knowledge score about SP measure ≥80 and (39.3%) of females and (33%) of males had knowledge score about SP measures related to SI ≥80, with no significant association between score of knowledge about SP measure and those related to SI and gender (***P value 0.393*** and ***0.332*** respectively).

4.9 Association between scores of participants' practice about SP measures, SP/SI and some variables:

The following table shows distribution of scores of participants' practice of SP measures and those related to SI in relation to their gender, work place and years of experience.

Table (9): Distribution of scores of participants' practice of SP measures and those related to SI in relation to work place, years of experience and gender.

Items		Score of participants' practice of SP measures				P VALUE Sig.*	Score of participants' practice of SP measures related to SI				P VALUE Sig.*
		< 80%		≥80%			< 80%		≥80%		
		No	%	No	%		No	%	No	%	
Work place	Darwish Nazzal	23	95.8	1	4.2	0.772	23	95.8	1	4.2	0.278
	Thabet Thabet	42	95.5	2	4.5		41	93.2	3	6.8	
	Khalil Suleiman	24	97.7	1	2.3		40	93	3	7	
	Rafidya	70	79.2	2	2.8		71	98.6	1	1.4	
	Al-Watani	37	100	0	-		37	100	0	-	
Years of experience	0-9	142	97.9	3	2.1	0.596	142	97.9	3	2.1	0.016
	10-19	53	94.6	3	5.4		25	92.9	4	7.1	
	20-29	10	100	0	-		9	90	1	10	
Gender of participant.	Male	98	95.1	5	4.9	0.079	97	94.2	6	5.8	0.102
	Female	116	99.1	1	0.9		115	98.3	2	1.7	

***chi-square test , Fisher exact test**

Work place: Regarding the relationship between work place and practice score of SP measures, it was found that (100%) of participants in Al-Watani hospital had practice score <80 while (79.7%) of participants in Rafidya hospital had practice score <80,with no significant association between work place and participants' practice of SP measures(***p value* 0.772**).

Regarding the relationship between work place and score of participants' practice of SP measures related to SI, it was found that (100%) of participants in Al- Watani hospital and (93%) of participants in Darwish Nazzal hospital had practice score of SP measures related to SI <80. Accordingly, there was no significant association between score of participants' practice of SP measures related to SI and work place (***p value 0.278***).

Years of experience: Pertaining to the relationship between years of experience and scores of participants practice of SP measure, (100%) of participants who had (20-29) years of experience had practice score <80 while (94.6%) of participants who had (10-19) years of experience had practice score <80, with no significant association between years of experiences groups and score of participants' practice of SP measures (***P value*** 0.596). Regarding the relationship between years of experience and scores of participants practice of SP measure related to SI, it shows that when years of experience group increased, the percentage of participants who had practice score about SP measures, related to SI ≥80, increased.

That is, the percentages of participants who had practice score about SP measure related to SI≥ 80 in years of experience groups (0-9;10-19 and 20-29) were (2.1%), (7.1%) and (10%) respectively, with significant association between years of experience and score of participants' practice of SP measure related to SI (***p value*** 0.016).

Gender of participants: More than (95%) of males and (99%) of females had practice score of SP measure <80 with no significant association between gender of participants and score of participants' practice of SP measure***(p value*** 0.079). Also (94.2%) of males and (98.3%) of females had practice score of SP measure related to SI <80. Accordingly, there was no significant association between gender of participants and score of participants' practice of SP measure related to SI ***(p value*** 0.102).

4.10 Relationship and correlation between score of participants' knowledge and their practice:

The following table shows the correlation between participants' score of knowledge and their practice of SP measures and those related to SI.

Table (10): Correlation, regression between knowledge score and practice score of participants of SP measures and those related to SI

Relationship	Correlation (r value)	Regression (r^2 value)	P value sig
Knowledge score-practice score of participants of SP measure	+0.143	0.021	0.034
Knowledge score-practice score of participants of SP measure related to SI	+0.179	0.032	0.008

As the table shows, there was a significant weak positive correlation between knowledge score and practice score of SP measure ***(p value*** 0.034). There was also a significant weak positive correlation between knowledge score and practice score of SP measures related to SI(***p value*** 0.008).

4.11 Prevalence of SI:

The following figure illustrates the prevalence of SI in the past 12 month.

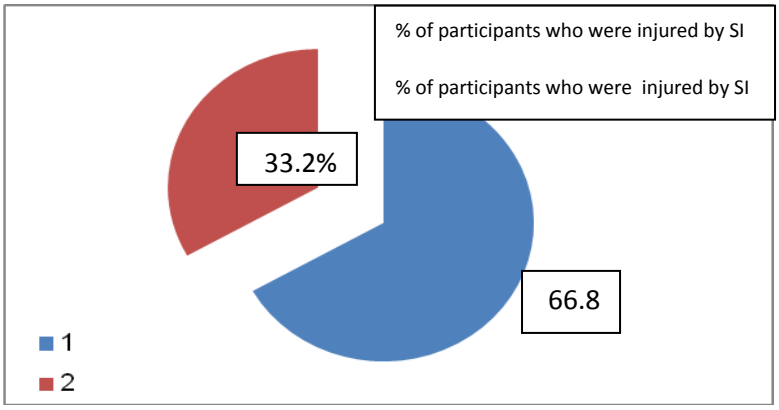
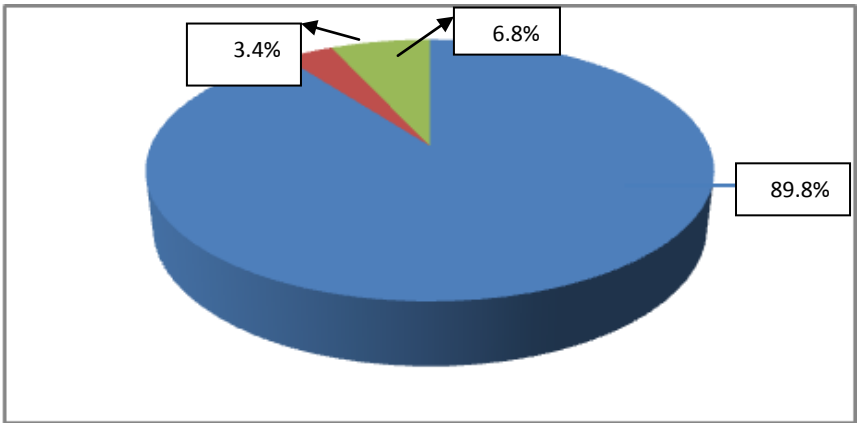


Figure (9): Distribution of participants according to exposure to sharp injuries in the past 12 months

Figure (9) shows that (66.8%) of participants were injured by sharp objects in the past 12 month preceding the study.

The following figure illustrates the distribution of injured participants according to their injuries were occurred by sharp object was previously used on patients or not

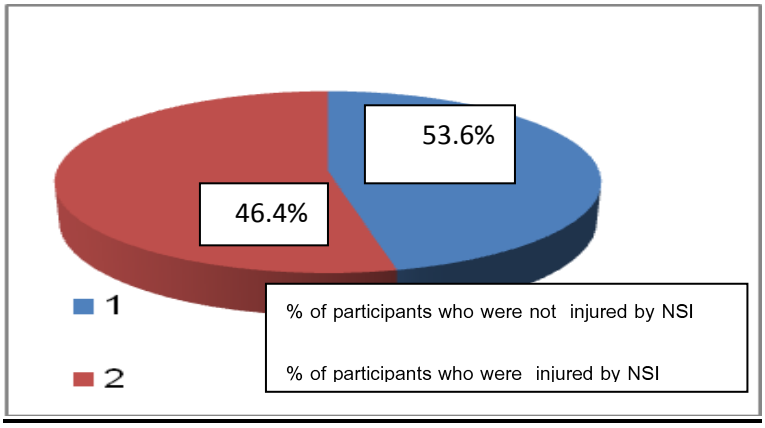


Figure(10): Distribution of injured participants according to their knowledge on whether the sharp object was previously used on patients or not

Figure (10) shows that (89.8%) of injured participants said that their injuries occurred due to an object that was previously used on patients but only (3.4%) of injured participants said that the injuries occurred due to an object that was not used on a patient and only (6.8%) of injured participants reported that they didn't know if sharp object was previously used on patients or not.

4.12 Prevalence of NSI:

The prevalence of NSI is shows in the following figure:



Figure(11): Distribution of participants according to exposure to NSI in the past 12 months

Figure (11) shows that in the past 12 months, prior to the study,(46.4%) of participants were exposed to NSI as opposed to (53.6%) who were not exposed to them.

The following figure illustrates the distribution of injured participants by needle according to their injuries were occurred by needle was previously used on patients or not.

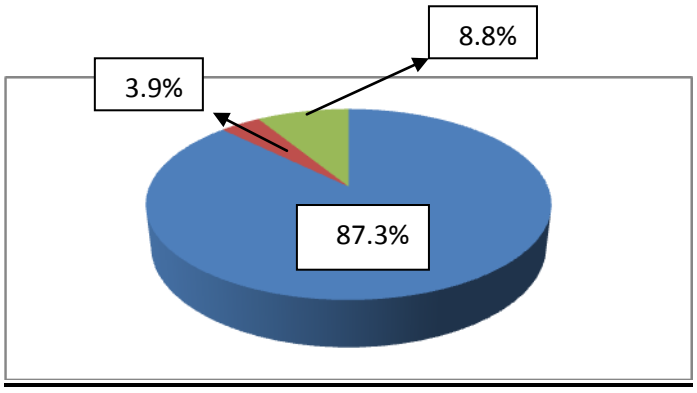


Figure (12): Distribution of injured participants by needles according to their knowledge of whether the needle was previously used on patients or not

Figure (12) shows that the knowledge of participants about whether needle was used previously on patients before injuries had occurred. More than (87%) of injured participants by needle reported that the needle was previously used on patients while only (3.9%) of injured participants by needle reported that the needle was not previously used on patients. In contrast, (8.8%) of injured participants by needle reported that they didn't know if needle was previously used on patients.

4.13 Number of injuries in past 12 months:

The following table shows the numbers of SI and NSI that participants were exposed to during 12th months before conducting the study.

Table (11): Distribution of participants according to number of injuries during 12th months before conducting the study

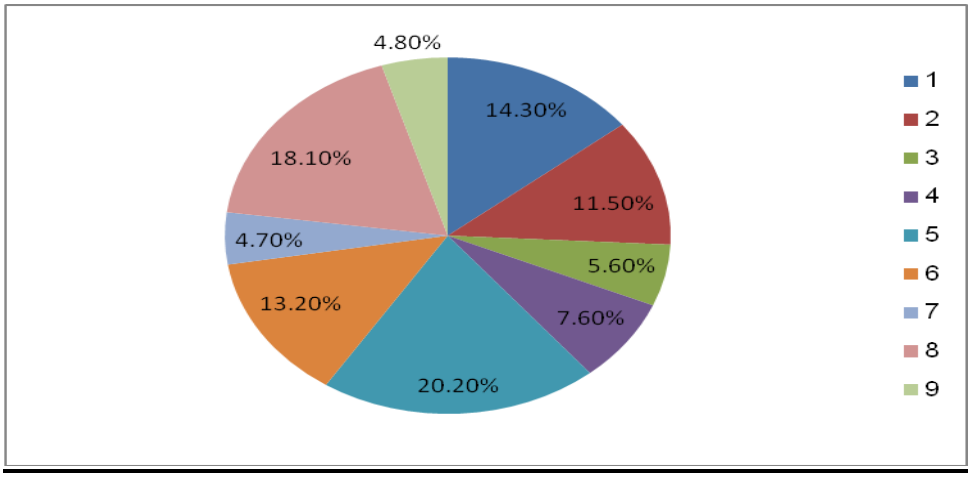
No. of SI/NSI during past 12 months	SI		NSI	
	No	%	No	%
1	78	53	63	61.8
2	51	34.7	28	27.5
3	14	9.5	7	6.9
4	2	1.4	3	2.9
5 or more	2	1.4	1	0.9

Table (11) shows that (53%) and (61.8%) of participants were exposed to SI and NSI once during 12th months before conducting the study

respectively as opposed to (34.7%) of participants who were exposed twice to SI during 12th months before conducting the study. About (27.5%) of participants were exposed twice to NSI during 12th months before conducting the study but only (1.4%) and (0.9%) of participants were exposed to five and more SI and NSI during 12th months before conducting the study respectively.

4.14 Causes of Sharp Injuries:

The following figure shows frequency of distribution of injured participants according to cause of injuries.



Figure(13): Frequency of distribution of participants regarding causes of SI

Key of figure(13):
1- Blood drawing
2-Giving injection to patients
3- Filling the syringes
4-Opening the lid of injection
5-Recapping the needles
6-Disposing of the needle
7-Placing intravenous line
8-Suturing
9- Others

Figure (13) shows the causes of sharp injuries: (20.2%) of injured participants were injured during recapping needle; (8.1%) of injured participants were injured during suturing, (14.3%) were injured during blood drawing; (13.2%) were injured during needle disposal; (11.5%) were injured during giving injections to patients and (4.8%) of participants were injured due to other causes.

4.15 Measures taken by hospitals regarding infection control:

The following table shows the distribution of percentages of participants' knowledge according to measures taken by hospitals pertaining to infection control.

Table (12):Distribution of percentages of participants' knowledge about measures taken by hospitals regarding infection control.

Measures taken by hospitals regarding infection control			
Item		**No**	**%**
Numbers of completed reports about sharp injuries			
	0	112	76.2
	1	29	19.7
	2	4	3.04
	3 and more	2	1.06
2- Reasons for not reporting the injuries			
	I did not have time to report	12	10.7
	I did not know the reporting procedure	57	50.9
	I did not think it was important to report	23	20.5
	I thought I might be blamed or get in trouble for having the exposure	7	6.3
	I was concerned about confidentiality	2	1.8
	I thought the source patient had low risk for HIV and/or hepatitis B or C	5	4.4
	I thought there was a low risk for the type of exposure for HIV and/or hepatitis B or C	4	3.6
	others	2	1.8
3-Availability of protocol/ procedure for reporting the injuries			
	Yes	101	45.9
	No	69	31.4
	Don't know	50	22.7
4-If yes (in previous points 4), are you familiar with how to report these exposures?			
	Yes	39	38.6*
	No	62	61.4*

5-Places where participants received care after getting injured			
	Employee Occupational Health	13	8.8
	Infection Control	34	23.1
	Emergency Room	39	26.5
	Personal Physician	13	8.8
	Outpatient Clinic	2	1.4
	Others	4	2.8
	I didn't Receive Care	42	28.6
6-Place of Sharp Containers			
	Each Procedure Room	88	40
	Each Patient Room	18	8.2
	Medication Carts	91	41.3
	Soiled Utility Rooms	14	6.4
	Laundry	4	1.8
	Others	5	2.3
7-Participants received hepatitis B vaccine			
	yes	197	89.5
	No	23	10.5
8-Doses of hepatitis B vaccine			
	0	23	10.5
	1	8	3.6
	2.00	30	13.6
	3.00	139	63.2
	4.00	20	9.1

(*)This percentage is out of 45.9%

The table shows that, regarding numbers of completed reports about injuries, (66.8%) of participants admitted that they were exposed to injuries by sharp objects, and (76.2%) of them had not reported these injuries. Only (19.7%) of them had completed one report about these injuries and (3.04%) of them had completed two reports about SI as opposed to only (1.06%) of them had completed three and more reports of these SI.

Regarding the reasons behind not reporting the contaminated injuries, (50.9%) of injured participants didn't report their injuries because they didn't know the reporting procedure; (20.5%) didn't report their injuries because they considered reporting of these injuries unimportant. Fear to be blamed or get in trouble was another reason for not reporting the injuries.(6.3%) of injured participants reported it. Confidentially about these injuries was another reason behind not reporting injuries. Only (1.8%) cited it as a reason.

Regarding availability of protocol/ procedure for reporting the injuries, (45.9%) said that the hospital had a procedure/protocol for reporting exposure as opposed to (31.4%) who reported that the hospitals hadn't a procedure/protocol for reporting exposure. In contrast, (22.7%) of participants didn't know if hospital had a procedure or protocol. Out of (45.9%) who knew of the availability of this protocol, (38.6%) of them were familiar with how to report these exposures as opposed to (61.4%) who were not familiar with how to report these exposures.

Regarding receiving care after exposure to injuries, (28.6%) of injured participants didn't receive care, as opposed to (26.5%) who received care in emergency room while (23.1%) received care in the infection control unit, and (1.4%) received care in outpatient clinics.

Concerning distribution of participants according to where the sharp containers were placed in hospital, (40%) of participants said that the sharp containers were placed in the procedure room while (40.3%) reported that they were placed in medication carts.

Pertaining to hepatitis B vaccine, the table shows that (89.5%) received hepatitis B vaccine as opposed to (10.5%) who didn't take it. Concerning number of hepatitis B vaccine doses,(63.2%) took three doses of hepatitis B vaccine, (9.1%) took the poster doses in addition to these three doses, and (3.6%) received one dose of vaccine.

Summary:

The results of study showed that (30%) of participants had a high level of knowledge about SP measures, while (36.4%) of participants had a high level of knowledge about SP measures related to SI. Moreover, the means of scores of nurses' knowledge about SP measures and those related to SI were higher than the mean score of nurses' practice regarding SP and those related to SI. The results also showed that there was no significant difference in the mean of score of nurses' knowledge of SP measures and those related to SI among different educational levels of nurses. There was

also no significant difference in mean of score of nurses' practice of SP measures, those related to SI among different educational levels of nurses. In addition, the results showed that there was no significant association between nurses knowledge level of SP measure/those related to SI and years of experience, and gender of nurses. However, there was a significant association between level of SP measure related to SI and work place.

Pertaining to SI, (66.8%) of the participants were injured by sharp objects in the past 12 month preceding the study, while NSI represented (46.4%).

Chapter Five

Discussion

In this chapter, the study result will be discussed in terms of sample distribution, and the results of tested hypotheses. The study results will be compared by similar studies done globally and regionally.

5.1 Socio-demographic data:

The study results (Table3) revealed that (44.1) of participants belonged to age group (20-29) as opposed to (55.9%) who were more than (29 years)old. This might be due to the lack of job opportunities and lack of employment. Only (17.3%) were more than (40 years) old.

Pertaining to population of the study, (53.2%) were females and (46.8%) were males. This finding is in line with the Palestinian Centre Bureau of Statistics (2007) which estimated that more than half of nurses in nursing sector were females. This result is compatible with the statistics of the Palestinian Ministry Of Health (2008) which estimated that (60%) of nurses in West Bank were females.

The results also showed that (46.4%) of participants were practical nurses, (44.5%) were staff nurses while (5.5%) and (3.6%) of all participants were practical midwives and staff midwives. The percentage of practical midwives/practical nurses was more than the percentage of staff midwives/staff nurses. This might be due to that the governmental

hospitals' preference to employ practical nurses because their salaries are lower than staff nurses.

Regarding department of hospital (Table4), (14.5%) of participants were working in the Emergency Unit. This high percentage might be due to the fact that all hospitals in this study had emergency units.

Regarding training on SP, the vast majority participant hadn't taken training on SP measures. It was found that only (26.4%) of participants received training on SP; (9.5%) of them had training during university study and (7.3%) of them had a training program and only (4.6%) had training on SP in workshops.

5.2 Knowledge and practice of participants of SP measures in comparison with other studies:

Regarding the knowledge about hand washing, Figure (5) showed that the vast majority of participants (98.2%) agreed that hands should be washed after sudden exposure to blood or body fluid. These results were in agreement with those of **Askarian et al (2007**). In their study in Iran they found that (97.9%) of participants were aware that hands should be washed after exposure to blood or body fluid.

Pertaining to hand washing when dealing with patients, (95%) and (89.1%) of participants knew that hands should be washed before and after contact with patients respectively. These findings were similar to findings revealed by **Labrague, Rosale and Tizon, (2012)** in the Philippines, and

by **García-Zapata et al.,(2010)** in Goiania, Brazil. In the two studies, (96.5%) and (100%) of participants respectively knew that hands should be washed before and after contact with patients. In contrast, other studies showed lower percentages; **Oliveira et al.(2009)** in their study in Brazil and **Askarian et al.(2007)** in Iran found that (86%) and (76.2%) of participants respectively knew that hands should be washed before and after contact with patients. **Abou El-enein and El Mahdy.(2011)** carried out a study in Alexandria University hospital and found that only (47.1%) of participants knew that hands should be washed before and after caring of patients.

Regarding knowledge of participants about application of SP measures when dealing with patients, (72.4%) of participants knew that SP measures should be applied to all patients regardless of their diagnosis (as shown in Figure 5). Other studies, like **Labrague, Rosales and Tizon (2012)** study, showed that (84.5%) of participants knew that SP should be applied to all patients. **Okechukwv and Motshedisi.(2012)** study also revealed that (91.8%) of participants were aware that SP measures should apply to all patients. Also the results (Figure 5) showed that more than half of participants (58.4%) knew that SP measures believed that all patients had blood-borne pathogen(BBP). These results was lower than those found by **Sreedharan, Muttappillymyalil and Venkatramana. (2011)** study, who reported that (61.2%) of participants agreed that SP consider all patients had blood-borne pathogen(BBP).

Concerning the knowledge about the use of personal protective equipment (Figure 5), the results showed that (79%) of participants knew that the gown should be worn when there was a risk of splash of blood or body fluid, and (68%) were aware that mask should be worn when there was a risk of splash of blood or body fluid. This was lower than the study finding of **Askarian et al (2007)** who found that (90.1%) of participants knew that mask should be worn when there was a risk of splash of blood or body fluid. However, only (53.4%) of participants knew that the goggles should be worn when there was a risk of splash of blood or body fluid. **Thu et al.(2012)** study showed that (94.8%) of the nurses knew that goggles should be worn to protect mucous membranes of the eyes when procedures and activities were likely to generate splashes and sprays of blood or body fluids.

Regarding the practice of the standard precaution measures, Figure (6) showed that majority (90%) of participants always washed their hands after exposure to blood fluid or body fluid. In another study by **Labrague, Rosales and Tizon.(2012)**, it was found that (93.1%) of nurses always washed their hands after exposure to blood fluid or body fluid.The results also showed that more than two third of participants (73.8%) and (73.2%) always washed their hands before and after contact with patients respectively. In comparison with other countries, **Garcia-Zapata and Souza. (2010)**, in a study done in Brazil, found that (26.9%) of participants washed hand after and before patients care.

Regarding compliance of participants to PPE (goggles, gown and mask), the results showed that less than one third (29%) of participants always wore gown when procedures and activities were likely to generate splashes or sprays of blood or body fluids, while (24%) of them always wore masks when procedures and activities were likely to generate splashes or sprays of blood or body fluids. Only(7.7%) of them always wore goggles when procedures and activities were likely to generate splashes or sprays of blood or body fluids.One study done by **Okechukwu and Motshedisi. (2012)** found that (88.5%) of participants wore gown when procedure was likely to generate splash or spray of blood or body fluid as opposed to (67%) who wore goggle or eye protector when procedure was likely to generate splash or spray of blood or body fluid. **Alnoumas et al. (2012)** study showed that only (20.5%) of the participants wore goggles as opposed to (31.5%) who wore masks when there was risk of splash of blood or body fluid. **Luo, He and Zhou, .(2010),** in a study conducted in China, reported that the use of PPE among participants had the lowest compliance.The low compliance of participants regarding PPE might due to the shortage of PPEs, such as goggles, protective masks, in those departments.

The frequency of knowledge about SP measures was much higher than that of practice but in varying degrees (as shown in Figure 5 and 6). This might be due to several factors such as lack of supervision of participants' application of these SP measures during daily work, hospitals'

lack of PPEs, forgetfulness to follow these SPs, and workloads. This might be due to some of participants' uncomfortable feeling when wearing these PPEs. These PPEs may impede them from doing their work. A study that was done in a university hospital in Egypt by **Abou El-enein and El Mahdy.(2011)** showed that non-compliance to SP measures was due to absence of role model from colleagues or superiors and workload. Another study by **Akgur and Dal.(2012)** showed barriers that led to non-compliance. These barriers were emergency situations, lack of equipment and negative side effect of protective equipment on the skin.

5.3 Knowledge and practice of participants regarding SP measures related to SI in comparison with other studies:

Concerning the participants' knowledge regarding SP measures related to SI, Figure (7) showed that the vast majority of participants (95%) knew that there was a sharp box for disposal of sharps and needles at workplace. In contrast, **Sreedhran, Muttappillymyalil and Venkatramana**,.**(2011),** in their study conducted in the United Arab Emirates,found that (98%) of participants knew that there was a sharp box for disposal of sharps and needles, while **Okechukwv and Motshedisi. (2012)** study found that (89%) of participants knew that there were sharp containers in the workplace. Another study done in Kuwait City by **Alnoumas et al.(2012)** indicated that only (67.8%) of participants knew that there was a sharp container in the workplace.

Regarding the participants' practices of the SP measures related to SI, Figure (8) showed that (85.1%) of participants always threw the used needle and sharp objects into sharp containers immediately. **Labrague, Rosales and Tizon (2012)** reported that (82.8%) of participants threw the used needle and sharp object into sharp containers immediately.**Najeeb and Taneepanichsku (2008)** found that only (75.2%) of participants in Maldives threw the used needle and sharp objects immediately into sharp containers .

Concerning adherence of participants to wearing gloves, Figure (8) showed that only (40.7%) of the participants always wore gloves when withdrawing blood and vein puncture process. These results were similar to results of others studies; **Aslam et al.(2010)** study showed that approximately half of the participants (54.4%) wore gloves when withdrawing blood and vein puncture process. **Labrague, Rosales and Tizon (2012)** study found that (65.6%) of participants wore gloves when withdrawing blood and vein puncture process.

By making comparison between knowledge and practice of participants regarding the recapping of the needles,the percentage of participants who knew that used needle should not be recapped after use was higher than percentage of participants who never recapped the used needles. The results were (81%) and(39.4%) respectively (as shown in Figures 7 and 8).This might be due to the fact that only (26.4%) of participants received training on SP. Other reasons are absence of

supervision,lack of guidelines to deal with used needles, ignorance of the risk of needle stick injuries that may result from recapping of the needle and possibility of transmission of blood-borne pathogen, exposure participants to risk, or forgetfulness of recapping the needle.

5.4 Means of knowledge and practice score of participants regarding SP and those related to SI in comparison with other studies:

Finding of the study (Table 6) indicate that (30%),and (36.4%) of participants had a high level of knowledge ≥ 80% concerning SP measures and those related to SI respectively.This was higher than findings of study done in Maldives by **Najeeb and Taneepanichsku (2008).**In that study, only (3.4%) of participants had a high level of knowledge(score ≥80%) about SP. Another study, done by **Labrague, Rosales and Tizon (2012),**indicated that the vast majority (89.7%) of participants had good knowledge (score≥63%) about SP. Another study, done in west of India by **Vaz et al. (2010),** found that (90%) of participants were very knowledgeable about SP measures.

Mean of score of participants' knowledge about SP measure was less than their mean of score of knowledge about SI (Table 5). They were (6.79 ±1.42) and (6.90±1.62) respectively. Results of other studies were approximately close to results of study done by **Askarian et al.(2007)** in Iran;in this study the mean of knowledge score was (6.71±1.10) (the maximum score was 9). Another study that was done by **Tavolacci et al. (2008)** reported that the mean of score of knowledge about SP was (8.5±1.4)

(the maximum score was 10). Regarding the current study,the mean of scores of participants' practice of SP measures was less than mean of scores of participants' practice of SP measures related to SI (Table 5). They were (4.15 ±1.75) and (4.45±1.73). This was higher than finding of study done by **Askarian et al.(2007)** which reported that the mean of scores of participants' practice of SP measures was (3.52±1.09).

It was also found that (Table 5) mean of score of participants' knowledge about SP/those related to SI were higher than mean of scores of participants' practice of SP measures / those related to SI; this might be due to attitude problem, system problem, insufficient supply of personal protective equipment, insufficient number of nurses, increased workload, lack of supervision, lack of awareness campaigns about the importance of following SP, lack of training opportunities of students about application of these SP measures while studying in university or college and absence of updating of the knowledge of older participants.

Regarding the participants' means of score of knowledge about SP in relation to educational level of participants, Table (7) showed that staff midwives had the highest means score of both knowledge about SP measures and those related to SI. They were (7.13±1.64) and (7.12±1.55) respectively, while practical nurses' related mean of score of knowledge about SP measures was (6.57±1.53). In contrast, practical midwives had the lowest mean of score of knowledge about SP measure related to SI. It was(6.50±1.67). This was a reasonable finding because staff

nurses/midwives had more academic qualifications, more job responsibility, and so more knowledge than practical nurses/ midwives, but these differences in means score of knowledge about SP measures and those related to SI were not significant: *p values* (0.499 and 0.294) respectively.

Pertaining to the participants' practice and adherence to SP measures and those related to SI, the lowest means score of practice of SP measures was among staff nurses (4±1.82) and the highest means score was among practical midwives (4.5±1.44). At the same time, staff nurses had the highest means score of practice of SP measures related to SI (4.60±1.90) and practical midwives had the lowest means score of practice of SP measures related to SI (3.92±1.38), with no significant association between score of participants' practice of SP measures and those related to SI and educational level of nurses: *P* values (0.253 & 0.575) respectively. In spite of different academic degrees or academic qualification and number of years of studying and duties among different educational levels of participants (staff participants , practical participants , staff midwives and practical midwives) the differences in the mean of score of participants' practice of SP and SP related to SI were not significant. This might be due to the fact that all participants, in spite of differences in educational levels, had nearly the same knowledge score about SP measures and those related to SI. They might also be due to exclusion of the concept of SP measure and those related to SI in their curriculum during their studying,high workload,unawareness of the importance of adherence to SP and insufficient training.

5.5 Association between knowledge/practice level of participants of SP measures and those related to SI in relation to variables:

Work place: Regarding knowledge level about SP measures, it was (37.5%) in Darwish Nazzal, (38.6%) in Thabet Thabet, (34.9%) in Khalil Suleiman,(23.6%) in Rafidya and (21.6%) in Al-Watani hospitals. They all had good level of knowledge (knowledge level ≥80%) with no significant association between knowledge level of SP measures and work place: ***p value*** (0.225) (as shown in Table 8). On the other hand,and regarding knowledge score of SP measures related to SI, (50%) of participants in Drawish Nazzal hospital had a good level of knowledge about SP measures related to SI (knowledge level ≥80%)as opposed to (54.5%) in Thabet Thabet hospital. Approximately one third of nurses (32.7% and 23.6% respectively) had that good knowledge in Rafidya and in Khalil Suleiman. However, only one fifth (21.6%) in Al-Watani hospital had that good level of knowledge, with statistically significant association between knowledge level of SP measures related to SI and work place (***p value*** 0.011) as shown in Table(8). In spite of this significant association between knowledge level of SP measures related to SI and work, practice of these SP measures and those related to SI was not statistically a significant association between practice level of SP measures, those related to SI and work (P values 0.772 and 0.278) respectively (as shown in Table 9).

Years of experience: Regarding the relationship between years of experiences and knowledge level about SP measures and those related to

SI (as shown in Table 8) the highest percentage of participants who had good level of knowledge about SP measures and those related to SI(knowledge level≥80%) was among nurses who have (10-19) years of experiences,with no statistically significant association between knowledge score about SP measures and those related to SI and years of experiences (***p values*** 0.552 & 0.362) respectively(as shown in Table 8). **Vaz et al (2010)** reported that those who had worked ≥ (16) years had high levels of knowledge than those who had worked for less than five years ($p<0.0001$). In spite of the lack of association between knowledge level about SP measures related to SI and years of experience,there was a statistically significant association between practice level of SP measures related to SI and years of experience (***p value*** 0.016). This might due to the fact that as participants had more years of experience that means they worked more , and they had more skills in doing work or had more training.

Gender of participants: Approximately one third of participants (27.2%) of males and (32.5%) of females (as shown in Table 8) had a high level of knowledge about SP measures(knowledge level ≥80%), while regarding knowledge level about SP measure related to SI, only nearly one third (33%) of males and less than two fifths (39.3%) of females had good level of knowledge about SP measure related to SI,with no significant association between knowledge level about SP measures, those related to SI and gender (***p values*** 0.393 &0.332) respectively. This finding contradicts that of the study was done **by Vaz et al.(2010)** in west of India.

In that study, it was found that there was a significant correlation between knowledge about universal precautions and gender of participants (***p value*** <0.0001). Pertaining to gender and the practice level of SP measures related to SI. Table (9) showed that the vast majority of males and females had practice level<80, with no statistically significant association between practice level of SP measures and those related to SI and gender of participants (***p values*** 0.079&0.102) respectively.

5.6 Correlation between score of participants' knowledge and practice in comparison with other studies:

Regarding correlation between knowledge and practice results (Table 10) revealed that the knowledge about SP measures was significant. It was positively correlated with practice about SP (r=+0.143 ,p=0.034). Also the knowledge about SP measures related to SI was significant.It was positively correlated with related practice measures (r=+0.179, p=0.008). This suggests that greater knowledge means better practice. It also showed that the approximately (3.2%) variation in practice score of participants to SP measures was explained by knowledge scores of participants to SP measures,and (2.1) % of variation in practice score of participants to SP measure related to SI was explained by knowledge scores of participants to SP related to SI.This finding is in agreement with a study by **Luo, He and Zhou.(2010)** (r=0.24 ,*p* value0.00). Also these results are in agreement with a study conducted by **Kim et al. (2001)** (r=0.317 , p=0.00). However, this finding contradicts the finding of study done by **Labrague,Rosales**

and Tizon(2012). In this study there was positive not significant correlation between knowledge and practice of SP measures (r=0.05,p=0.386). This means that knowledge about SP didn't necessarily affect practice of this SP. **Najeeb and Taneepanichsku (2008)** study showed that the correlation between knowledge and practice was negative and it wasn't significant (r=-0.001, p=0.993).

5.7 Prevalence of sharp injuries (SI) and needle stick injuries (NSI) in comparison with other studies:

The results (Figure 9) showed that more than two thirds (66.8%) of participants were injured by sharp objects in the past 12 months. This finding is similar to the finding of study done in Turkey by **Ilhan et al. (2006)**. In that study, it was found that (68.4%) of participants were exposed to SI in the past 12 months. Another study, done in United Arab Emirates by **Sreedharan, Muttappillymyalil and Venkatramana (2011**), indicated that the prevalence of SI was (20.1%) .

Regarding NSI from SI, Figure (11) showed that less than half of the participants (46.4%) were exposed to NSI. NSI represented (69.4%) of all SI in past 12 months. Comparison of the prevalence of NSI among nurses between developing and developed countries

Table(13):Comparison of prevalence of NSI between developed and developing countries:

Author / date	country	Prevalence of NSI
Developed countries		
Smith and Leggat /2005	Australia	13.9%
Yao et al /2010	China	26.05%
Developing countries		
Jahan /2005	Saudi Arabia	66%
Askarian et al /2007	Iran	49.6%
Smion /2008	India	55.5%
Manzoor et al /2010	Pakistan	71.9%

The prevalence of NSI in developed countries was lower than in developing countries. The prevalence of NSI in the current study was (46.4%) and it was close to developing countries as Palestine is one of these countries. As shown, the prevalence of NSI in the current study was high. This might be due to a problem in the health system such as lack of knowledge about the dangerous effect of NSI, haste, reluctance, inadequate number of nurses, insufficient training of nurses on dealing with needles to prevent injuries and shortage of the numbers of sharp containers to dispose of the used needles in these sharp containers, in addition to the recapping of the used needles,and insufficient knowledge about dealing with needles.

Pertaining to the numbers of injuries that happened in the past 12 months, table (11) showed that (61.8%) of participants were exposed once to NSI in the past 12 months. It also showed that (53%) of participants were exposed once to SI in the past 12 months. This finding was in agreement with a study done in Jordan by **Hassan and Wahsheh.(2007).**In that study, it was found that more than half of participants were exposed to SI at least once in the past 12 months. It was (39.9%). **Akgur and Dal. (2012)** study found that (28.1%) of participants had (1-2)injuries and (34.1%) had (3-6) injuries.

5.8 Causes of sharp injuries in comparison with other studies:

Regarding the causes of sharp injuries, Figure (13) showed that most of injuries occurred during recapping of needle. They represented (20.2%) of all SI in the past 12 months inspite of CDC's advice not to recap the needle to prevent of NSI. This finding is different from other findings. **Manzoor et al.(2010)** reported that the recapping of the needle after use represented (31.5%) of all SI. In contrast, **Lukianskyte, Gataeva and Radziunaite.(2011)** reported that the recapping of needles represented (51.46%). In addition, **Ebrahim and Khosrav.(2007**) found that (51.8%) of all injuries occurred while recapping used needle and before disposing of it into sharp containers. On the other hand **Al-Dabbas** and **Abu-Rmeileh, (2012)** conducted a study among doctors and found that wound suturing represented (33.5%) of all SI, the highest of all injuries. **Akgur**

and Dal. (2012) showed that (70.9%) of all injuries occurred during drug administration as opposed to (7.7%) in the current study.

5.9 Measures taken in hospitals regarding infection control (precautions and post exposure)in comparison with other studies:

Exposure of nurses to SI/NSI and exposure to blood or body fluid of patients should be reported in order to take an appropriate procedure or precaution and appropriate post-exposure treatment if it was recommended **(Irmak ,2008)**. In spite of the importance of reporting injuries, many of injuries was underreported. Table (12) showed that (76.2%) of injuries had not been reported. The main reason was that the participants didn't know the reporting procedure. This represented (50.9%) of all causes of not reporting the injuries. A study done in Turkey reported that (39.5%) of injuries had not been reported because participants were too busy **(Irmak,2008)**. Another study found that (45.9%) of injuries had not been reported by the participants and the main reason was that the participants didn't think it was important to report them (**Honda et al.,2011).** A third study found that (69.1%) of participants failed to report the injuries **(Ayranci and UKosgeroglu, 2004).** On the other hand,other studies had higher percentage of injuries that hadn't been reported. For example,in one study (76%) of participants hadn't reported the injuries and the main reason was that the participants did not consider SI serious **(Honda et al.,2011).** Another study found that (84.5%) of injuries hadn't been reported and the

main reason was that the participants didn't know that injuries should be reported **(Akgur and Dal, 2012).** Another study found that (92%) of participants hadn't reported the injuries. The main reason was that participants (students) didn't think it was important to report them **(Lukianskyte, Gataeva and Radziunaite, 2011).**

Sharp injuries and needle stick injuries may increase the risk of transmission of blood-borne pathogen (BBP) especially hepatitis C, hepatitis B and HIV which have bad consequences such as disabilities, and long term illnesses. These may lead to death **(WHO, 2002).** Therefore, it is very important to follow up the injured participants and give them post-exposure prophylaxis and hepatitis B vaccine. Table (12) showed that (28.6%) of the injured participants hadn't received care. **Vaz et al. (2010)** reported that (40.5%) of participants did not receive any medical attention. Regarding hepatitis B vaccine, table (12) revealed that the vast majority of participants (89.5%) had taken hepatitis B vaccine. This high percentage might be due to the requirement of MOH. Concerning the numbers of doses of hepatitis b vaccine, table (12) showed that (63.2%) of participants admitted they had taken vaccine (3 doses of hepatitis B vaccine), while only (9.1%) of them had taken 3 doses of hepatitis B vaccine and poster dose. In a study done in Syria, **Yacoub et al.(2010)** reported that (8.6%) of participants had never been vaccinated against hepatitis B vaccine and (68.6%) had taken complete doses of vaccine.In one study done in Thailand **Honda et al.(2011)** found that (70%) of the participants had

taken all doses of hepatitis B vaccine .In another study done in Turkey, **Iramk (2008)** study found that (81.8%) of participants were immunized against hepatitis B. In a third study in Abha, Saudi Arabia done by **Mahfouz et al, (2009)** found that (82.4%) of participants had received at least 3 doses of hepatitis B vaccine.In a study in Cyprus, **Akgur and Dal (2012)** reported that (92%) of participants had taken hepatitis B vaccine.

Summary:

In general, knowledge and practice of SP is an important issue in public health to reduce transmission of HAI. Several international and regional studies have found that the frequency of knowledge was much higher than that of practice of each single measure but in varying degrees .

Regarding the prevalence of NSI in this study, it was close to prevalence of NSI in developing countries as Palestine is one of them.

Chapter Six

Conclusion and Recommendation

This chapter includes conclusions and recommendations related to the results obtained from our study.

6.1conclusion:

In the light of the review of literature,the study found that in the Arab world and in Palestine in particular, there is a need for studies in this field of research because standard precautions are considered one of the most important public health concerns. This is also important in planning for the improvement of people's health.

The study also found that the frequency of knowledge was much higher than that of practice of each single measure but in varying degrees. At the same time, the greater knowledge leads to better practice.

It was also found that,when participants were classified according to their categories,there were no statistically significant differences in means' scores of knowledge and practice of SP measures and those related to SI among the different educational level of nurses. That is, knowledge and practice aren't related to undergraduate study.

The study found that prevalence of sharp injuries was high. They represented (66.8%) while the needle stick injuries represented more than two thirds of these injuries. Therefore, it is important for the health sector

and hospitals to take proper actions and procedures to reduce these injuries, thus reducing incidence and spread of infections.

6.2 Recommendations:

- Conducting further observational studies to assess practice of standard precautions because they are more accurate than using questionnaires. The observation method also gives an idea about reasons behind this.
- Conducting further studies to identify the reasons or factors behind the significant correlations between knowledge of SP measures related to SI and work place.
- Providing the hospitals with personal protective equipment to reduce exposure of nurses to blood-borne pathogens and nosocomial infection.
- Holding regular lectures, educational programs and training for nurses to improve their knowledge about standard precaution measures which could improve their compliance with standard precaution measures.
- Making changes in behavior to reduce exposure to nosocomial infections,sharp injuries and needle stick injuries (for example not recapping or bending the needle after use).
- Developing surveillance systems or protocol in hospitals for reporting injuries, and exposure to blood and body fluid.

- Introducing standard precautions into nursing curricula and pre-employment education. This is in addition to holding qualifying exams for nurses before working in hospitals.
- Implementing complete sharp injuries and needles stick injuries prevention systems which include training of nurses, surveillance system, availability of sharp containers or an effective disposal system to dispose of sharp objects in a safe way.

Summary:

Our results confirmed many other findings of studies globally and nationally. All results agreed that SP is an important factor to reduce transmission of infections, and occurrence of SI. More efforts are needed from ministry of health and hospitals to confirm and promote the importance of this topic and the important finding of this study .

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Annex(1)

Name of academic scholars with a experience in developing and administering questionnaire

Name	Specialty
Dr. Mariam Altell	Community Health Nursing
Dr.Samah Shtayah	Management and administration in nursing

Annex(2)

حضرة الممرض/ة المحترم/ة ،،

تحية وبعد،،

الموضوع: -

دراسة إحصائية/ صحية.

تهدف هذه الدراسة الى قياس مدى معرفة و تطبيق الاحتياطات المعيارية اثناء التعامل مع المرضى وقد تم اختياركم للمشاركة في الدراسة، لذا نأمل منكم الإجابة بموضوعية على أسئلة الاستبيان، بوضع إشارة على الإجابة التي ترونها مناسبة في المكان المخصص لها.

مؤكدين إقتصار إستخدام المعلومات الواردة في هذه الإستبيان على أغراض البحث العلمي، ومراعاة السرية التامة والحرية الكاملة بعدم الاجابة عن اية سؤال.

(شاكرين لكن حسن التعاون)

بشرى المر

جامعة النجاح الوطنية

2013/2012

القسم الأول :المعلومات الشخصية:

الجنس: ☐ ذكر

☐ أنثى

العمر: .....

المستوى التعليمي : ☐ ممرض مؤهل (practical nurses)

☐ ممرض قانوني (staff nurse)

☐ قابلة قانونية (staff midwife)

☐ قابلة مؤهلة (practical midwife)

مكان العمل: .....

القسم: .....

عدد سنين الخدمة/الخبرة :.....

القسم الثاني: اسئلة تتعلق بالاحتياطات المعيارية:

1-هل تلقيت تدريبا على **بالاحتياطات المعيارية** :

☐ نعم

☐ لا

2-اذا كان الجواب نعم هل تلقيت التدريب من خلال : ☐ برنامج تدريبي

☐ الدراسة بالجامعة

☐ ورشة عمل

☐ تدريب خلال العمل بالمستشفى

القسم الثالث : اسئلة متعلقة بالمعرفة :

أ – اسئلة متعلقة بالمعرفة بالامراض المنقولة بالامراض المنتقلة عن طريق الدم:

1-اسئلة حول المعرفة بالامراض المنقولة بالدم	نعم	لا	لا اعلم
أ-هل تعتقد ان ممارسة الاحتياطات المعيارية تعمل على الحماية من الاصابة بالعدوى المنقولة بالدم؟			
ب-يعتبر الدم و سوائل الجسم الدموية اكثر المصادر احتمالا لانتقال فيروس الايدزو فايروس التهاب الكبد بي؟			
ت-يمكن لالتهاب الكبد بي ان ينتقل بواسطة نخز الابر اوالاصابات الحادة؟			
ج-يمكن لالتهاب الكبد بي ان ينتقل بواسطة نخز الابر اوالاصابات الحادة؟			
د- يمكن للايدز ان ينتقل بواسطة نخز الابر اوالاصابات الحادة؟			
و-يشكل انتقال التهاب الكبد بعد الاصابة الحادة او بوخر الابرة اكثر احتمالية من انتقال التهاب الكبد الوبائي من نوع سي واكثر من احتمالية انتقال الايدز؟			
ه-يوجد لقاح متوفر حاليا لمرض الايدز؟			
ز-يوجد لقاح متوفر حاليا لمرض التهاب الكبد بي؟			
ي --يوجد لقاح متوفر حاليا لمرض التهاب الكبد سي؟			

ب-اسئلة متعلقة بالمعرفة بالاحتياطات المعيارية بشكل عام:

المعرفة بالاحتياطات المعيارية	نعم	لا	لا اعلم
1- يجب استخدام الإحتياطات المعيارية عند التعامل مع كل المرضى			
2- الاحتياطات االمعيارية تعتبر أن جميع المرضى حاملين لمسببات الأمراض المنقولة عن طريق الدم			
3- يجب غسل الأيدي قبل التعامل مع المريض			
4- يجب استخدام القفازات عند التعامل مع مريض وهنالك احتمال لخروج رذاذ دم أو سوائل الجسم			
5-يجب ارتداء الكمامة فقط عند التعامل مع مريض وهنالك احتمال لخروج رذاذ دم أو سوائل الجسم			
6 -يجب ارتداء النظارات الواقية عند التعامل مع مريض وهنالك احتمال لخروج رذاذ من الدم أو سوائل الجسم			
7- يجب ارتداء المعطف عند التعامل مع المريض و هناك احتمال لخروج الرذاذ و السوائل			
8- يجب غسل الأيدي بعد التعامل مع المريض			
9- يجب غسل اليدين عند التعرض المفاجئ للدم و سوائل			

ج-اسئلة متعلقة بالمعرفة الاصابات الحادة:

المعرفة بالاحتياطات المعيارية المتعلقة بالإصابات الحادة	نعم	لا	لا اعلم
1-اي اختراق للجلد بواسطة أي اداة حادة كالمشرط و المقض يمكن تعريفها بأنها اصابة حادة			
2-تعرف الاصابات بوخز الابر بأنها هي الجروح الناجمة عن الأدوات الحادة مثل إبر الحقن والإبر جمع الدم، قنينة (الكانيولا) التي توضع بالوريد أو الإبر تستخدم لربط أجزاء نظام التوصيل الوريدي			
3- يجب ارتداء القفازات عند عملية سحب الدم ووخز الوريد			
4- يجب ان اقوم برمي الإبر المستخدمة أو الأدوات الحادة في صناديق التخلص من الادوات الحادة على الفور			
5- يوجد صناديق للتخلص من الأدوات الحادة و الإبر في مكان عملك			
6- لا يجب فصل الابرة عن المحقنة قبل التخلص منها			
7- لا يجب اعادة تغطية الابرة بعد الاستعمال			
8- عند حدوث الاصابة الحادة يجب السماح لموقع الجرح ان ينزف (دون الضغط عليه أو مصه لاخراج الدم)			
9- عند حدوث الاصابة الحادة يجب غسل مكان الاصابة بالمياه الجارية			

القسم الرابع :اسئلة متعلقة بممارسة الاحتياطات المعيارية

أ-اسئلة متعلقة بممارسة الاحتياطات المعيارية بشكل عام:

ممارسة الاحتياطات المعيارية	دائما	غالبا	احيانا	نادرا	ابدا
1-أقوم بغسل الأيدي بعد التعامل مع المريض					
2-أقوم بغسل الأيدي قبل التعامل مع المريض					
3-أقوم بغسل اليدين بعد التعرض المفاجئ للدم و سوائل الجسم					
4-أقوم بغسل اليدين قبل و بعد استخدام القفازات					
5-أقوم باستخدام القفازات التعامل مع مريض وهنالك احتمال لخروج رذاذ من الدم أو سوائل الجسم					
6-أقوم بارتداء النظارات الواقية عند التعامل مع مريض وهنالك احتمال لخروج رذاذ من الدم أو سوائل الجسم					
7-أقوم بارتداء المعطف عند التعامل مع المريض و هناك احتمال لخروج الرذاذ و السوائل					
8-أقوم بارتداء القناع /الكمامة عند التعامل مع المريض و هناك احتمال لخروج الرذاذ و السوائل					
9-اقوم بممارسة الاحتياطات المعيارية عند التعامل مع جميع المرضى					

ب- اسئلة متعلقة بممارسة الاحتياطات المعيارية المتعلقة بالاصابات الحادة:

ممارسة الاحتياطات المعيارية	دائما	غالبا	احيانا	نادرا	ابدا
1- أقوم بارتداء القفازات عند عملية سحب الدم وثقب الوريد					
2- أقوم بارتداء القفازات عند التخلص من الابر الملوثة او الادوات الحادة					
3- لا أقوم بفصل إبرة عن المحقنة من قبل التخلص منها					
4- أقوم برمي الإبر المستخدمة أو الأدوات الحادة في صناديق التخلص من الادوات الحادة على الفور					
5- لا أقوم باعادة تغطية الابرة بعد الاستعمال					
6-لا أقوم بحني الابرة بعد الاستعمال					
7 - عند حدوث الإصابة الحادة أقوم بالسماح للجرح ان ينزف					
8- عند حدوث الاصابة الحادة اغسل الموقع بالمياة الجارية					
9 -عند حدوث الاصابة الحادة لا أقوم اضغط على مكان الاصابة					

القسم الخامس : اسئلة متعلقة بالتعرض للاصابات الحادة:

1-خلال 12 الشهر الماضي هل أصبت بجرح بواسطة أداة حادة (كمشرط او مقص او ابرة او غيرها من الادوات الحادة) قد تم استخدامها سابقا لمريض

☐ نعم ، تعرضت للاصابة بواسطة ادوات حادة تم استخدامها سابقا لمريض

☐ لا ، تعرضت للاصابة بواسطة ادوات حادة لكنها لم تستخدم سابقا لمريض

☐ لا اعلم إن كانت الأداة استخدمت سابقا على مريض

☐ لا لم اتعرض للاصابة بواسطة اداة حادة خلال 12 الشهر الماضي

3-اذا كان الجواب نعم فكم عدد الإصابات الملوثة التي تعرضت لها خلال 12 الأشهر الماضية ؟ .....

4-كم مرة من هذه المرات التي تعرضت بها للإصابة بواسطة أداة حادة كمشرط قمت بإكمال أو بتقديم تقرير عن التعرض لدم أو سوائل الجسم؟.....

5-خلال 12 الشهر الماضي هل أصبت بجرح **بواسطة إبرة** قد تم استخدامها سابقا لمريض

☐نعم ، تعرضت للاصابة بواسطة ابرة تم استخدامها سابقا لمريض

☐ لا ، تعرضت للاصابة بواسطة ادوات حادة لكنها لم تستخدم سابقا لمريض

☐ لا اعلم إن كانت الأداة استخدمت سابقا على مريض

☐ لا، لم اتعرض للاصابة بواسطة اداة حادة خلال 12 الشهر الماضي

6-اذا كان الجواب نعم فكم عدد الإصابات الملوثة التي تعرضت لها خلال 12 الأشهر الماضية ؟ .....

7-كم مرة من هذه المرات التي تعرضت بها للإصابة بواسطة ابره قمت بإكمال أو بتقديم تقرير عن التعرض لدم أو سوائل الجسم؟.....

8- اي من التالية أدت لحدوث وخز الإبرة لديك

☐ سحب الدم ☐ إعطاء الحقن للمرضى،

☐ ملء الحقن ☐ فتح غطاء الحقنة

☐ إعادة السد الحقن ☐التخلص من الإبرة

☐ خلال وضع خط الوريد ☐ الخياطة

☐غير ذلك يرجى التوضيح.....

القسم السادس:اسئلة تتعلق بكتابة التقارير للابلاغ عن الاصابة:

1-هل يوجد في المستشفي طريقة أو برتوكول للتبليغ عن حالات التعرض للدم أو سوائل الجسم؟

☐ نعم

☐ لا

☐ لااعلم

2-إذا كان الجواب نعم، هل أنت على دراية بكيفية الإبلاغ عن هذه التعرض؟

☐ نعم

☐ لا

3-ما هي الأسباب التي أدت الى عدم الإبلاغ عن الاصابة

☐ لم يكن لدي الوقت الكافي للتقرير

☐ لم أكن أعرف إجراء الإبلاغ

☐ اعتقد أنه من المهم تقديم تقرير

☐ قد اعتقدت أنني يمكن توجيه اللوم أو الحصول مشكلة بسبب هدا التعرض

☐ كنت اهتم بسرية الإصابة

☐ اعتقدت ان المريض المصدر كان منخفض الخطر أن يكون مصابا فيروس نقص المناعة البشرية والتهاب الكبد Bأو c

☐ اعتقدت ان نوع التعرض كان قليل منخفض الخطر أن أصاب بفيروس نقص المناعة البشرية والتهاب الكبد Bأو c

☐ اسباب اخرى يرجى التوضيح

القسم السابع :اجراءات المستشفيات المتعلقة بالتحكم بالعدوى:

1- أين ذهبت لتلقي الرعاية بعد ان اصبت بواسطة إبرة أو أداة حادة أخرى؟

☐ موظف الصحة المهنية

☐ التحكم في العدوى

☐ غرفة الطوارئ

☐ الطبيب الشخصي

☐ العيادة الخارجية

☐ أخرى (يرجى التوضيح)

☐ لم يتلق الرعاية

2-في المستشفى أين يتم وضع صناديق التخلص من الأدوات الحادة؟

☐ كل غرف الإجراءات

☐ كل غرف المرضى

☐ عربات الدواء

☐ غرف الادوات المتسخة

☐ غرفة غسيل /المغسلة

☐ اماكن اخرى

3-هل تلقيت لقاح ضد مرض التهاب الكبد الوبائي من النوع B؟

☐ نعم

☐ لا

4-اذا كان الجواب نعم كم عدد الجرعات التي تلقيتها من لقاح التهاب الكبد الوبائي من النوع B؟

☐ 1

☐ 2

☐ 3

☐ اكثر من 3

جامعة النجاح الوطنية

كلية الدراسات العليا

معرفة وممارسة الاحتياطات المعيارية لمنع العدوى والإصابات الحادة بين الممرضين في مستشفيات شمال الضفة الغربية، فلسطين

اعداد

بشرى جمال المر

اشراف

الدكتورة مريم الطل

قدمت هذه الاطروحة استكمالا لمتطلبات درجة الماجستير في الصحة العامة بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس – فلسطين.

2013

معرفة وممارسة الاحتياطات المعيارية لمنع العدوى والاصابات الحادة بين الممرضين في مستشفيات شمال الضفة الغربية، فلسطين

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الدكتورة مريم الطل

الملخص

المقدمة:الاحتياطات المعيارية تعرف بأنها مجموعة من الاجراءات الوقائية التي يتم تطبيقها على جميع المرضى . تعتبر هذه الاحتياطات المستوى الاساسي من اجراءات مكافحة العدوى التي يجب استخدامها بغض النظر عن وجود عدوى او الاشتباه بوجود عدوى . تهدف تلك الاحتياطات الى منع او تقليل انتشار العدوى داخل المستشفيات كما أنها تهدف الى حماية الممرضين من حدوث الاصابات الحادة.

الهدف الرئيسي : تهدف الدراسة الى تقييم المعرفة وامتثال الممرضين/ات بتطبيق الاحتياطات المعيارية كما تهدف الى تقييم المعرفة وامتثال الممرضين/ات بتطبيق الاحتياطات المعيارية المتعلقة بالإصابات الحادة .

الاساليب : تم اختيار عينة عشوائية نظامية مؤلفة من 249 ممرض وممرضة تم اختيارهم من المستشفيات التالية مستشفى رفيديا، مستشفى الوطني، مستشفي ثابت ثابت، مستشفى سليمان خليل ومستشفى درويش نزال . قام المشاركين بتعبئة الاستبيانة لهذه الدراسة، ومن ثم تحليل البيانات بواسطة برنامج الرزم الاحصائية للعلوم الاجتماعية SPSS رقم 17 .

النتائج : اظهرت النتائج ان نسبة المشاركين الذين كانوا على مستوى عالي من المعرفة بالاحتياطات المعيارية هي (30%) بينما كانت نسبة المشاركين الذين كانوا على مستوى عالي من المعرفة بالاحتياطات المعيارية المتعلقة بالاصابات الحادة هي (36.4%).

اظهرت الدراسة ايضا انه لا يوجد ارتباط بين متوسط مجموع نقاط المعرفة بالاحتياطات المعيارية والمستوى التعليمي للمشاركين، كما انه لا يوجد ارتباط بين متوسط مجموع نقاط المعرفة بالاحتياطات المعيارية المتعلقة بالاصابات الحادة والمستوى التعليمي للمشاركين.

كما اوضحت الدراسة انه لا يوجد ارتباط بين متوسط مجموع نقاط ممارسة الاحتياطات المعيارية والمستوى التعليمي للمشاركين ، كما انه لا يوجد ارتباط بين متوسط مجموع نقاط ممارسة الاحتياطات المعيارية المتعلقة بالإصابات الحادة والمستوى التعليمي للمشاركين.

أظهرت الدراسة ان معدل انتشار الاصابات الحادة بين المشاركين خلال 12 الشهر السابقة للدراسة كانت (66.8%) و بينما كانت معدل انتشار الاصابة بوخز الابر بين المشاركين خلال 12 الشهر السابقة للدراسة (46.4%).

الاستنتاجات والتوصيات : تعتبر الاحتياطات المعيارية لمنع العدوى من الاجراءات الاساسية لمكافحة العدوى التي يجب استخدامها ، لكن الاغلبية العظمى من المشاركين لم يقوموا دائما بإتباع هذه الاحتياطات المعيارية.

يجب اعطاء الممرضين/ات المزيد من البرامج التدريبية، البرامج التعليمية والمحاضرات من اجل تحسين المعرفة وممارسة هذه الاحتياطات المعيارية.