

Effect of Primary prevention for Infection with Hepatitis B & C on Nurses' Knowledge and practices

Elsayeda Said Elwaleil¹, Suheir A.H. Mekhemar², Nadia Hamed Farahat³, Hala Mohamed Mohamed⁶, Ayman El-sebaey El-ghreib⁵

¹Master degree., ²Professor of Community Health Nursing, ³Professor of Community Health Nursing, ⁴Assist. Professor of Community Health Nursing, ⁵ Assist. Professor of Hepatology, National Liver Institute, Menoufia University
Department of Community Health Nursing, Faculty of Nursing, Ain Shams University

Abstract

Background: Primary prevention of viral hepatitis B & C is a vital element in controlling the spread of the disease between nursing staff. **The aim** of the study was to assess nurses' knowledge about viral hepatitis B and C, assess nurses' preventive practices about viral hepatitis B and C, **The research design:** A descriptive study was utilized for current study. **Setting** The study was conducted in two setting, National Liver Institute and Menoufia University Hospital in Shebin El-Kom City. **Sample** convenient sample consist of 117 nurses were recruited for the study. **Tools:** Data were collected through self administered questionnaire sheet to assess socio-demographic characteristics data about nurses, assessing the nurses knowledge about HBV &HCV, Observational checklist used to assess nurses' practices and infection control in hospitals. **Results:** The majority of studied nurses were knowledgeable about viral hepatitis B&C and preventive measures of viral hepatitis B&C, the majority of studied nurses had unaccepted practices. The study also revealed a statistical significant relation between nurses' knowledge, practices and their years of work. **Conclusion:** This study concluded that, the nurses had adequate knowledge about viral hepatitis B& C except incubation period. The level of the nurses' practices regarding preventive measures of viral hepatitis B&C not accepted. The hospital had an important role to prevent transmission of viral hepatitis B&C to nursing staff through availability of hepatitis B vaccination infection control devices, equipment and solutions. **Recommendations:** The study recommended a periodic training program for nurses about viral hepatitis B& C. Further researches about nurses' compliance to infection control practices. Booklet and simplified teaching material should be available for nurses about infection control practices and safety measures.

Keywords: HCV, HBV, Nurses' Knowledge and practices, primary prevention.

Introduction:

Hepatitis is an infection of the liver caused by several viruses, the most common of which are Hepatitis A, B and C. Both Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) are spread mainly through contaminated blood and blood products, contaminated needles and sexual contact. Although there has been a decrease in the incidence of viral hepatitis over the last decade, it is still the most common cause of chronic liver disease worldwide (Yang, 2016).

Hepatitis B (HB) and hepatitis C (HC) infection are a major public health problem globally. It is the tenth leading cause of mortality worldwide and one of the most important infectious diseases, especially in developing countries. HB and HC infection are the most common cause of chronic liver disease globally accounting for 80% of all liver cancer mortalities worldwide (Abeje, 2015).

Viral hepatitis B and C infection are caused by blood contact and is a public health problem throughout the world. Its

clinical course may be severe and can lead to work disability or to death. Considerable costs are incurred for prophylactic and treatment measures and result from the chronic clinical progress of the disease, loss of working hours and premature death. According to the WHO, approximately 150 million people in the world are chronically infected with HCV, and hepatitis C is the cause of 350 000 deaths annually. HCV is mainly transmitted by contact with infected blood due to injuries to the skin or mucous membranes. Acute infection is often asymptomatic and therefore frequently overlooked. In up to 80% of patients, the clinical course is chronic, leading to an increased risk of developing hepatic cirrhosis or hepatic cell carcinoma (*WHO, 2015; Askarian, 2016*).

Viral hepatitis B & C caused 1.34 million deaths in 2015. Most viral hepatitis deaths in 2015 were due to chronic liver disease (720 000 deaths due to cirrhosis) and primary liver cancer (470 000 deaths due to hepatocellular carcinoma). Globally, in 2015, an estimated 257 million people were living with chronic HBV infection, and 71 million people with chronic HCV infection. The epidemic caused by HBV affects mostly African Region and the Western Pacific Region. The epidemic caused by HCV affects all regions, with major differences between and within countries (*WHO, 2016*).

Viral hepatitis B & C was first identified as an occupational hazard for health care workers more than 60 years ago. For the past few decades, hepatitis B has been one of the most significant occupational infectious risks for health care providers. With the increasing prevalence of hepatitis C infections around the world, occupational transmission of this virus from infected patients to their providers has also become a significant concern. Several factors influence the risk for occupational blood-borne hepatitis infection among health care providers, among them: the prevalence of infection among the population served, the infection status of the

patients to whom workers are exposed, the types and frequencies of parenteral and mucosal exposures to blood and blood-containing body fluids, and whether the patient or provider has been immunized with the hepatitis B vaccine (*Holla, 2016*).

Health care personnel are at increased risk of contracting blood borne pathogens due to their occupational exposure to blood and body fluids. More than twenty diseases can get transmitted through needle stick injuries including Hepatitis B, Hepatitis C. Global burden of HBV due to contaminated sharp injuries in HCWs is estimated to be 66,000 cases and 261 deaths annually, in developing countries 40-60% HBV infections in HCWs are attributed to sharp injuries specially nurses because they often have to deal with spilt blood, needle stick and sharps injuries which can transmit blood-borne infections between patients and healthcare staff (*Holla, 2016*).

Susan (2016) reported that between all HCWs, nurses are the ones who sustain a high needle sticks injuries burden. Since these professionals are also the ones who most often handle such material while performing their tasks. Occupational accidents, particularly those involving cutting and piercing instruments among health professionals, have been a cause for increasing concern due to the prevalence of diseases and infections caused by Hepatitis B and Hepatitis C viruses, which are sometimes asymptomatic and unnoticed, thus increasing the possibility of contamination (*Dille, 2016*).

HBV can effectively be prevented by vaccination but there is no vaccine against HCV infection. WHO recommended implementing universal vaccination against hepatitis B for newborns in all countries with an HBV prevalence rate higher than 5% in 1995. A safe and effective vaccine for HBV has been available since 1982 and is 95% effective at preventing new infection, education about how to avoid risky behavior plays an important role in HBV prevention

and universal vaccination at a young age preferably at birth in high-endemicity countries is desirable, at the very least, vaccination should be offered to all individuals who are at risk and pregnant women must be screened for HBV before delivery, as this offers an opportunity to prevent another generation of chronically infected persons (*Shepard, 2015*).

Primary prevention of hepatitis B and hepatitis C, as a nurse activity to prevent the disease from occurring, includes activities to reduce or eliminate transmission of HBV and HCV to vulnerable persons, and focuses on decreasing risk factors. Blood, blood components, and plasma derivatives, such high-risk activities as injecting-drug use and percutaneous exposures to blood in health care, exposure to needle stick and other (tattooing and body piercing) settings. Infection with hepatitis B and hepatitis C among nursing staff can be prevented through immunizations against hepatitis, apply universal precautions, control measures, education and training and reporting and follow-up of exposure (*Page, 2015*).

Aim of the study:

The aim of this study was to assess preventive measures of hepatitis B and C among nurses through:

1. Assess nurses' knowledge regarding preventive measures of viral hepatitis B and C.
2. Assess nurses' preventive practices regarding viral hepatitis B and C.

Research questions:

1. Are Nurses having knowledge regarding to viral hepatitis B&C?
2. Are nurses having acceptable practices regarding to preventive measures of viral hepatitis B&C?
3. Are hospitals having a role in preventing infection of viral hepatitis B&C among nurses?

Subjects and Methods:

I. Technical design:

A. Research design:

A descriptive study was used in this study to fulfill the study aim.

B. Research setting:

The current study was conducted in two setting National Liver Institute and Menofia University Hospital in Shebin El-Kom City.

c. Sampling:

Convenient samples of 117 nurses, 96 work at national liver institute and 21 work at Menoufia university hospital,

- 46 nurses working in medical word at national liver institute.
- 22 nurses working in surgical word at national liver institute
- 28 nurses working in intensive care unit at national liver institute.
- 11 nurses working in male medical word at Menoufia university hospital.
- 10 nurses working in female medical word at Menoufia university hospital.

Tools of data collections.

Two tools were used for data collection:

1st tool: An interviewing questionnaire tool to assess:

Part I: Nurses' socio-demographic data which include hospital, word, sex, social status, level of education, years of experience , previous formal or informal training related to prevention of HBV & HCV infection, exposing to needle stick while dealing with patient and What did the nurse do when exposed to needle stick.

Part II: Nurses knowledge about HBV &HCV.

This was used to assess nurses' knowledge about hepatitis B virus and

hepatitis C virus. It was developed by the investigator based on review of literature. In this part, the questions are formulated to gather data about the nurses' knowledge, it consisted of 24 items as MCQs its include: definition of viral hepatitis, causative agent, mode of transmission, signs and symptoms, the incubation period, the most important source of infection with HBV& HCV inside hospital and the most susceptible person to be infected with HBV& HCV.

❖ Scoring system:

It was used to assess the level their knowledge. The response was divided into a correct and an in correct response. One point was given to each of correct response. These points were converted into percent score. Knowledge was considered satisfactory if the percent score was 60% or more, while considered unsatisfactory if the percent score was less than 60%.

2nd tool: Observational checklist which consist of two parts:

Part I; used to evaluate nurses' practices regarding to "wash hands before contact with the patient, wash hands after contact with the patient, wash hands between patients, wash hands before putting on gloves, wearing gloves before providing patient care, wearing gloves when handling of blood and blood products , wearing gloves when cleaning equipment prior to sterilization or disinfection, remove gloves immediately after providing patient care , replacement of gloves before administering intravenous medication, exchanging gloves between patients, wearing gown wearing mask when splattering of blood onto face is possible, don't recap syringe, received hepatitis B vaccine and if nurse doing follow up for being infected with HCV& HBV. Each item was checked by direct observation by the investigator adopted from (Nadira, 2016).

❖ Scoring system:

Twenty seven points were allocated to the checklist.

The response was divided into done and not done. One point was given to each of done practice. These points were converted into percent score. The practices of nurses in the checklist were categorized into accepted practices (17- 27 scores) and unaccepted practices (< 17 scores)

Part II: Evaluate hospital environment regarding to: Providing fiscal and human resource support for maintaining the infection prevention and control program, availability of enough personal protective equipment (gloves & gown), availability of Antiseptic solutions, hospital use proper methods of disinfection and sterilizing of equipment, availability of safety box next to each bed, cleaning and disinfection of beds and the areas around the patient daily and hospital use proper methods for wastes management. Each item was checked by direct observation by the investigator for the following criteria of availability: yes or no adopted from (CDC, 2015).

❖ Scoring system:

for the hospital assessment items, for each response, a point value of 1 indicates a (yes) recommended practice, and. responses with 0 point value are generally (no) or not recommended practice, the scored of the items were summed- up, the total score were 20 which is equal to 100%, **75-100%** possible points: **E** = Good hospital environment. **50-75%** possible points: **G** = Average hospital environment hospital. **<50%** possible points: **P** = Poor hospital environment needing immediate attention.

Reliability and validity of the tools:

Reliability was done by Cronbach's Alpha coefficient test which revealed the tools consisted of relatively homogenous of items as indicated by the moderate to high reliability of each tool. The questionnaire was tested to be reliable with Cronbach's Alpha coefficient of 0.78 for items showed tool proved to be strongly reliable.

Validity was tested for content validity by jury of five experts in the field of

community health nursing to ascertain relevance, clarity and completeness. Suggestions were incorporated into the tools.

II. Operational design

The operational design includes preparatory phase, pilot study, fieldwork, tool content validity and reliability.

a. Preparatory Phase:

A review of the past and current available related literatures covering all aspects of the research subjects using the available articles, magazines, Internet, journals and books in order to get a clear picture on the research problem, as well as, to design the study tools for data collection.

b. Pilot Study:

Pilot study was conducted on 12 nurses working at medical ward, surgical ward and intensive care unit at National Liver Institute and in medical department at Menofia University Hospital to assess the applicability and clarity of tools and estimate the time needed for the intervention. The necessary modifications were done as revealed from the pilot study. The sample of pilot study was excluded from the total sample to assure the stability of the result.

c. Field work

Data was collected from total nurses working at medical ward, surgical ward and intensive care unit at national liver institute and all nurses working in medical wards at menofia university hospital, after explaining the aim of the study to participants and reassuring them about the confidentiality of the data collected.

A written approval letter was obtained from the Dean of Faculty of Nursing, ain shams University for practice the study at national liver institute and menoufia university hospital at Menuofia Governorate.

The investigator started with introducing herself to the selected nurses and

explaining the aim of the study, assured that data collected will be confidential and will used only to achieve the purpose of the study. .

Administration Design:

Approval to carry out this study was obtained from Dean of Faculty of nursing, Ain Shams University

Ethical considerations:

- The search approval was obtained from the ethical committee before starting the study.
- The study subject's consent to participate in the study was obtained.
- The researcher was clarified the objectives of the study to the study subjects.
- The researcher ensured complete privacy and total confidentiality of any information.
- The study subjects were allowed to participate or withdraw from the study at any time.
- Three days /week, four hours /day (9am: 1 pm) were allocated for data collection (pretest), which was carried out through two month the average time consumed to fill tools was 30-45 minutes.

III. Statistical design:

Collected data were arranged, tabulated and analyzed using suitable statistical significance test.

Results:

Table (1): presents that the mean age of studied nurses was 29.01 ± 4.84 . 75.2% of nurses were females and 24.8 were male. Regarding to years of work the present study shows that, 55.6% of nurses worked from 5-10 years, 50.4% of nurses had nursing institute, 38.5% had bachelor of nursing and 11.1% had diplome of nursing.

Table (2): shows, 62.4% of nurses had correct knowledge regarding to Preventive measures of HBV& HCV. 93.2% of nurses know that that, the precautions for using rubber gloves is throw it in the red

basket. Additionally 87.2% of nurses had correct knowledge related to the save method of disposing needles.

Table (3): represented that, 63.2% of nurses had correct knowledge regarding that, needle stick is the most important source of infection with HBV& HCV inside hospital. 69.2%of nurses had correct knowledge regarding to factors contributing infection with HBV&HCV between nurses. Regarding to The most susceptible person to be infected with HBV& HCV 70.1% of nurses stated that health care workers.

Table (4): represented that, 27.4 % of nurses only wash their hands before, after, between patients and after removing gloves.

Table (5); represented that, 53% of nurses apply personal protective practices for avoid infection with viral hepatitis B& C.

Table (6: A) shows that, studied hospitals provide fiscal and human resource support for maintaining the infection prevention and control program provides written infection control policies

and procedures are available, current, and based on evidence-based guidelines and provide infection prevention education for health care workers. 50% of studied hospitals had enough personal protective equipment (gloves & gown), provides enough (water resources & soap) and fountains for performing hand hygiene and provides enough anti septic solutions. The studied hospitals didn't monitors and documents adherence to safe injection practices.

Table (6:B) shows that, 50% of studied hospitals have a competency-based training program for environmental cleaning provides proper safety box for discharge of sharp equipment, use proper methods for wastes management, provide hepatitis B vaccine for nursing staff and clean the unit and surfaces from top to bottom at daily and if soiling at any time. 50% of studied hospital used proper methods for wastes management, provides hepatitis B vaccine for nursing staff and clean the unit and surfaces from top to bottom at daily and if soiling at any time, totally studied hospital had good infection control practices.

Table (1): Distribution of the nurses according to their socio-demographic characteristics (no. = 117).

Items	The studied group no. =117	
	No.	%
Age/Year		
-20 >30	48	41.0
-30 >40	67	57.3
>40 years	2	1.7
Mean ± SD	29.01 ± 4.84	
Sex		
Male	29	24.8
Female	88	75.2
Marital status		
Single	41	35.0
Married	73	62.4
Divorced.	2	1.7
Widowed	1	0.9
Years of work		
- < 5	46	39.3
- 5- 10	65	55.6
>10 years.	6	5.1
Educational level:		
Bachelor of nursing.	45	38.5
Institute of nursing.	59	50.4
Deplome of nursing	13	11.1

According to research question No.1

Table (2): Distribution of nurses' corrects knowledge regarding to preventive measure of viral hepatitis B& C (No.= 117).

Items	No.	%
Preventive measures of HBV& HCV.		
▪ Washing hands before and after dealing with pt.	104	88.9
▪ Wearing gloves before dealing with pt.	103	88.0
▪ Don't share patient's personal tools.	20	17.1
▪ Avoid direct contact with blood and blood products.	109	93.2
▪ Taking vaccine of HBV.	66	56.4
▪ Surgical instrument management.	69	59
▪ Safe waste disposing.	67	57.3
▪ Covering of cut wounds.	45	38.5
Total	73	62.4
Importance of wearing gloves when dealing with blood?	114	97.4
Precautions for using rubber gloves?		
▪ Throw it in the red basket		
▪ Don't use it again.	109	93.2
	78	66.7
The save method of disposing needles	102	87.2

Table (3): Distribution of the nurses' corrects knowledge regarding to viral hepatitis B & C (No.= 117).

Items	No.	%
The most important source of infection with HBV& HCV inside hospital.		
▪ Needle stick.	74	63.2
▪ Using personal equipment of patient.	43	36.8
Factors contributing infection with HBV&HCV between nurses.		
▪ Dealing with patient without using gloves.	94	80.3
▪ Recapping syringe	64	54.7
▪ Use of pt. personal equipment	69	59.0
▪ Direct blood contact.	115	98.3
▪ Don't having vaccine.	66	56.4
Total.	81	69.2
The most susceptible person to be infected with HBV& HCV.		
▪ Health care workers.	82	70.1
▪ Visitors	20	17.1
It is necessary to take vaccination of HBV in the following case:		
▪ Dealing with patients	113	96.6
▪ Contact with body fluid	63	53.8
▪ Needle stick.	5	4.3
The most important test for diagnosis of HBV& HCV.	108	92.3

According to research question No.2

Table (4): Distribution of nurses' correctly done practices regarding hand washing. (No.= 117).

Hand washing	No.	%
▪ The nurse washes hands before contact with pt.	26	22.5
▪ The nurse wash hands after patient care	75	64.1
▪ The nurse wash hands between patients	18	15.4
▪ The nurse washes hands before putting gloves	5	4.3
▪ The nurse washes hands after removing gloves.	35	29.9
▪ Total	32	27.4

Table (5): Distribution of nurses' correctly done practices regarding to personal protective measures for viral hepatitis B& C. (No.= 117).

Personal protective measures	No.	%
▪ The nurse prepares medications in a room or area separated from the patient treatment area.	28	23.9
▪ The nurse avoiding direct contact with infected blood.	84	71.8
▪ The nurse exercise particular care in handling and disposal of sharps.	69	59
▪ The nurse clear up spillage of blood promptly and disinfect surfaces.	57	48.7
▪ The nurse disposes of sharp equipment in safety box.	84	71.8
▪ The nurse don't recap syringe.	92	78.6
▪ The nurse informed the Infection Control Committee when exposed to needle stick.	21	17.9
▪ The nurse received hepatitis B vaccine.	96	82.1
▪ The nurse follows safe procedures for disposal of contaminated waste.	68	58.2
▪ The nurse covers existing wounds, skin lesions and all breaks in exposed skin with waterproof dressings.	19	16.2
▪ Total	62	53.0

According to research question No.3**Table (6: A):** Distribution of fiscal and human resources support provided by hospital for maintaining of infection prevention and control (No. = 2).

Item	No.	%
▪ Hospital provides fiscal and human resource support for maintaining the infection prevention and control program.	2	100.0
▪ Hospital provides written infection control policies and procedures are available, current, and based on evidence-based guidelines.	2	100.0
▪ Infection prevention and control program provides infection prevention education for health care workers	2	100.0
▪ Availability of enough personal protective equipment (gloves & gown).	1	50.0
▪ Hospital provides enough (water resources & soap) and fountains for performing hand hygiene.	1	50.0
▪ Hospital use proper methods of disinfection and sterilizing of equipment.	2	100.0
▪ Hospital provides enough anti septic solutions.	1	50.0
▪ Hand hygiene policies promote preferential use of alcohol-based hand rub over soap and water except when hands are visibly soiled (e.g., blood, body fluids) or after caring for a patient with known or suspected hepatitis B or C.	2	100.0
▪ Hospital has a competency-based training program for use of personal protective equipment (PPE).	2	100.0
▪ Hospital regularly audits (monitors and documents) adherence to safe injection practices.	0	0.00

Table (6: B): Distribution of fiscal and human resources support provided by hospital for maintaining of infection prevention and control.

Item	No.	%
▪ Hospital has a competency-based training program for environmental cleaning.	1	50.0
▪ Hospital maintains current documentation of competency with environmental cleaning procedures for all personnel who clean and disinfect patient care areas.	1	50.0
▪ Hospital has protocols to ensure that healthcare personnel can readily identify equipment that has been properly cleaned and disinfected and is ready for patient use.	2	100.0
▪ Hospital has system in place for early detection and management of potentially infectious persons.	0	50.0
▪ Hospital provides proper safety box for discharge of sharp equipment.	1	50.0
▪ There is safety box next to each bed.	1	50.0
▪ Hospital use proper methods for wastes management.	1	50.0
▪ -Hospital provides hepatitis B vaccine for nursing staff.	1	50.0
▪ Clean the unit and surfaces from top to bottom at daily and if soiling at any time.	1	50.0
▪ The worker use proper and safe methods when dealing with spilled blood.	0	0.00
▪ Total	1	50.0

Discussion:

The present study showed that nurses' age ranged between 20- 40 years, with mean age 29.01 ± 4.84 years, (**Table1**) this finding agreed with *Khan (2017)*, who studied Knowledge and Preventive Practices Regarding Hepatitis B Among Nurses in Dhaka Medical College Hospital that, 54.1% of nurses were found in the age group of 18 to 30 years, where mean age was $33 + 0.2$ year. As regards years of work, this table revealed that 55.6% of nurses had from 5-10 years of work, also this finding are consistent with *Mbaisi (2015)*, who studied Factors Associated with Percutaneous Injuries and Splash Exposures among Health-Care Workers in Kenya, reported that, 59.4% of nurses had less than 10 years of working experience, but not agreed with *Salih (2014)*, who studied Effect of an Educational Program on Nurses' Knowledge and Practices toward Hepatitis B Virus in Emergency Hospitals in Erbil City, Iraq stated that, 58% of nurses had experience of 1-5 years.

According to the research question of the current `study that, are nurses having knowledge regarding to viral hepatitis B&C? the following part of discussion will answer the research question.

The present study (**Table, 2**) revealed that (62,4%) of studied nurses

knowledgeable about preventive measures of hepatitis B&C and this result is in agreement (*Tazeem*), 2016 who studied knowledge, attitude and Perception of medical students at Lahore Medi-cal & Dental College, Lahore, state (74%) of respondents stated the preventive measures for hepatitis B&C.97.4% of nurses stated that the importance of wearing rubber gloves when dealing with blood.

Table (3) shows 63.2% of nurses stated the most important source of infection with HBV& HCV inside hospital is needle stick and this results is in agreement with (*Faisal*), 2015 who studied preventive practice on hepatitis B virus infection among dentists in selected hospitals at Dhaka City, Bangladesh, stated that needle stick and sharps injury are the main causes of acquiring infection of viral hepatitis among health care workers.70.1% of nurses stated that the most susceptible person to be infected with HBV& HCV and this results is in agreement with (*susan*), 2016 who studied Preventing Needle Stick Injuries among Healthcare workers, stated that health care workers especially nurse are at high to be infected with hepatitis B& C due to due to contaminated sharp injuries, also 96.6% of nurses stated that the importance of taking vaccination of HBV and this result is in agreement with (*Bakry*, 2015)

who stated, about 85.0% of the nurses considered it necessary to receive HB vaccine.

According to the research question of the current `study that, are nurses having acceptable practices regarding to preventive hepatitis B&C? the following part of discussion will answer the research question.

Regarding to hand washing (**Table 4**) this study shows, only 27.4% wash hand before, after dealing with patient and between patients and this results is in agreement with (**Mahrous**), 2016 who studied Effect of Universal Precautions Intervention Program on Nurses' Knowledge and Practices toward Hepatitis B Virus in Egypt, who stated that As regards hand washing, the present study revealed that nurses practice low frequency of practice hand washing was observed among nurses. This may be attributed to inadequate knowledge of the important of hand washing.

Table (5) 53% of nurses apply personal protective practices that include avoiding direct contact with infected blood, exercise particular care in handling and disposal of sharps, clear up spillage of blood promptly and disinfect surfaces disposes of sharp equipment in safety box, don't recap syringe and the nurse received hepatitis B vaccine and this is not agreed with (**Setia**), 2015 who studied Attitudes and Awareness regarding Hepatitis B and Hepatitis C amongst Health-Care Workers of a Tertiary Hospital in India, stated that the majority of the nurses practiced universal precaution measures.

According to the research question of the current `study that, are hospitals having a role in preventing transmission of viral hepatitis B&C? the following part of discussion will answer the research question.

This study revealed (**Table 6**) two hospitals provides fiscal and human resource support for maintaining the infection prevention and control program, proper methods of disinfection and sterilizing of equipment have a training program for use

of personal protective equipment. One hospital provides enough personal protective equipment (gloves & gown), provides enough anti septic solutions, provides proper safety box for discharge of sharp equipment, provides hepatitis B vaccine for nursing staff and has a system in place for early detection and management of potentially infectious persons, totally the studied hospitals had good infection control practices.

Conclusion:

In the light of the present study finding, it might be concluded that from the results of the present study, the nurses had adequate knowledge about viral hepatitis B& C except incubation period. The level of the nurses' practices regarding preventive measures of viral hepatitis B&C not accepted. The hospital had an important role to prevent transmission of viral hepatitis B&C to nursing staff through availability of hepatitis B vaccination infection control devices, equipment and solutions.

Recommendations:

The findings of the current study suggested the following recommendations:

- A periodic training program for nurses about viral hepatitis B& C.
- Adequate education for nurses about the effect of the disease on their quality of life and infection control practices inside hospital.
- Further researches about nurses' compliance to infection control practices.
- Booklet and simplified teaching material should be available for nurses about infection control practices and safety measures.

References:

Abeje, G., & Azage, M. (2015). Hepatitis B vaccine knowledge and vaccination status among health care workers of Bahir Dar City Administration,

- Northwest Ethiopia: a cross sectional study. *BMC Infect Dis*, 15(1): 30-35.
- Askarian M, Yadollahi M, Kuochak F, Danaei M, Vakili V, Momeni M (2016).** Precautions for health care workers to avoid hepatitis B and C virus infection. *Int J Occup Environ Med*;2:191-8.
- Bakry, S., Mustafa, A., Eldalo, A., & Yousif, M. (2015).** Knowledge, attitude and practice of health-care workers toward Hepatitis B virus infection, Sudan. *International Journal of Risk and Safety in Medicine*, 24(2): 95–102.
- Centers for Disease Control and Prevention (2015).** Environmental Infection Control in Healthcare Facilities: http://www.cdc.gov/hicpac/pdf/guideline/s/eic_in_HCF_03.pdf
- Dillee P, Shree K P, Damaru P. (2016)** Preventive practices against Hepatitis B: A cross-sectional study among nursing students of Kathmandu. *J Sci Soc*;39:109-13.
- Faisal S, Shamim A, Syeda MA, Arup KS, Helal U, Abul KA, et al. (2015):** Preventive Practice on Hepatitis B Virus Infection among Dentists in Selected Hospitals at Dhaka City, Bangladesh. *City Dent. Coll* ;10:13-7.
- Holla R, Unnikrishnan B, Ram P, Thapar R, Mithra P, et al, (2016).** Occupational Exposure to Needle Stick Injuries among Health Care Personnel in a Tertiary Care Hospital: A Cross Sectional Study. *J Community Med Health Educ*;S2:004.
- KHAN NR1, RIYA S2, ISLAM MS3, MAJEED HA4, (2017):** knowledge and preventive practices regarding hepatitis B among nurses in Dhaka medical college hospital J Dhaka Med Coll. Vol. 26, No. 1. April; 26(1) : 36-42.
- Mahrous, Fatma Mostafa (2016):** “Effect of universal precautions intervention program on nurses’ knowledge and practices toward hepatitis B virus.”
- Mbaisi EM1, Ng'ang'a Z, Wanzala P, Omolo J, (2015).** factors associated with percutaneous injuries and splash exposures among health-care workers in a provincial hospital, Kenya: *Pan Afr Med J*. 14:10. doi: 10.11604/pamj.2013.14.10.1373. Epub 2015 Jan 6.
- Nadira Mehriban, GU Ahsan, and Tajul Islam (2016).** Knowledge and preventive practices regarding Hepatitis B among nurses insome selected hospitals of Dhaka city, Bangladesh; *South East Asia Journal of Public Health*;4(1):48-52.
- Page, K., Morris, M. D., Hahn, J. A., Maher, L., & Prins, M. (2015) , August 15.** Injection drugs use and hepatitis C virus infection in young adult injectors: Using evidence to inform comprehensive prevention. *Clinical Infectious Disease*, 57(Suppl 2), S32-S38. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC372207>
- Salih A. Abdulla * Zhian Abdulla, (2014):** Effect of an educational program on nurses' knowledge and practices toward Hepatitis B virus in emergency hospitals in Erbil City, *Zanco J. Med. Sci.*, Vol. 18, No. (1), 2 <http://dx.doi.org/10.15218/zjms.2014.0005>.
- Setia,S Gambhir, R.S., Kapoor V., Gindal, G.,and Garg S (2015).** Attitudes and Awareness Regarding Hepatitis B and Hepatitis C amongst Health-care Workers of a Tertiary Hospital in India. *Ann Med Health Sci Res*. 3(4): 551–558.
- Shepard CW, Simard EP, Finelli L, Fiore AE, Bell BP, (2015).** Hepatitis B virus infection: epidemiology and vaccination. *Epidemiol Rev*.
- Susan Q. (2016).** Preventing needlestick injuries among healthcare workers. *Int J Occup Environ Health*; 10:451–456.
- Tazeem S, Syed MR, Zain M, Ahmad J. (2016):** Hepatitis B and C: Knowledge, attitude and Perception of medical

students at Lahore Medi-cal & Dental College, Lahore. *PJMHS*;8:789-93.

World Health Organization, (2015). Health Care Worker Safety. http://www.who.int/occupational_health/activities/lam_hcw.pdf.

Yang S, Jiao D, Liu C, Lv M, Li S, Chen Z, Deng Y, Zhao Y and Li J (2016): Seroprevalence of human immunodeficiency virus, hepatitis B and C vi-ruses, and Treponema pallidum infections among blood donors at Shiyan, Central China. *BMC Infect Dis*; 16: 531.