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HEMŞİRELİK ANABİLİM DALI**

**DETERMINATION OF KNOWLEDGE LEVELS OF
NURSES ON HEPATITIS C INFECTION**

Master Degree

Ahmed KHAMMAT SAGBAN SAGBAN

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DETERMINATION OF KNOWLEDGE LEVELS OF NURSES ON HEPATITIS C INFECTION

Ahmed KHAMMAT SAGBAN SAGBAN

**Health Sciences Institute
Department of Nursing**

Master Degree

ADVISOR

Dr. Öğr. Üyesi Özlem BULANTEKİN DÜZALAN

Second Advisor: Qasim Ali KAZAL

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ACCEPTANCE AND APPROVAL

Ahmed KHAMMAT SAGBAN SAGBAN, graduate student of ÇAKU, Institute of Health Sciences, numbered 198205301, successfully presented his thesis titled "Determination of the knowledge level of nurses about hepatitis c infection", which he prepared after fulfilling all the necessary conditions determined by the relevant regulations, before the jury whose signatures are below.

Advisor :

**Özlem BULANTEKİN
DÜZALAN**

**ÇANKIRI
KARATEKİN
UNİVERSİTE**

Seminar Presentation Date :

02/August/2021



ETHICS STATEMENT

"Determination of Nurses' Knowledge Levels on Hepatitis C Infection", which I prepared and presented as a graduate seminar; Written by me in accordance with scientific morals and values.

I declare that the above mentioned facts are correct.

Signature :
02/August/2021
Ahmed KHAMMAT
SAGBAN SAGBAN

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DEDICATION

First of all, thank God, who is merciful and compassionate. I would like to express my deepest gratitude, special thanks and appreciation to Assist. Assoc. Dr. Özlem BULANTEKİN DÜZALAN and to my advisor, Dr. Qasim Ali Kazal . For his guidance and his help his time, his encouragement throughout the study and all that he has done for me. To Assoc. İlknur Göl " Head of Community Health Department " I would like to thank the experts for their generosity for reviewing and evaluating the study tool. Special thanks go to the Library staff at the School of Nursing and the staff at the Ministry of Health. I am grateful to my mother and family for supporting and encouraging me.

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ABBREVIATIONS AND SYMBOLS

HD	: Hemodiyaliz
CKD	: Chronic kidney disease
EMRO	: DSÖ Doğu Akdeniz Bölge Ofisi (EMRO)
ESKD	: End stage kidney diseases
HCV	: Hepatit C Virüsü
α	: Alfa
Δ	: Delta
Σ	: Sigma

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ÖZET

KHAMMAT SAGBAN SAGBAN Ahmed. Hemşirelerin Hepatit C Enfeksiyonuna Yönelik Bilgi Düzeylerinin Belirlenmesi, (Yüksek Lisans), Çankırı, 2021.

Hepatit C Virüsü (HCV) enfeksiyonu, dünya çapında bir sağlık sorunu olmaya devam etmektedir. Akut ve kronik hepatit, siroz, hepatoselüler karsinom (HCC) ve karaciğer yetmezliği (Bianco vd., 2013) dahil olmak üzere birçok ciddi belirtiler ve komplikasyonlarla ilişkilidir. Bu çalışmada hemşirelerin Hepatit C enfeksiyonuna yönelik bilgi düzeylerinin değerlendirilmesi amaçlandı. Tanımlayıcı ve kesitsel tipte bir araştırma olup Irak'ın Güney İllerindeki Hastanelerde yürütüldü. Çalışmanın tasarımında nicel araştırma kullanılmıştır. Örneklem seçimine gidilmemiş ve çalışmaya katılmayı kabul eden 124 hemşire çalışmaya alındı. Hemşirelere sosyo-demografik verilerden oluşan ve Hepatit C enfeksiyonuna yönelik bilgi düzeylerini değerlendirmek amaçlı sorular soruldu. Veriler yüz yüze soru sorma tekniği ile toplandı. Yüzdelik analizle değerlendirme yapıldı. Katılımcıların çoğunluğunun %60,5 erkek , %51,6'sının 21-25 yaşında ve olduğu, eğitim düzeylerine göre, örneklemin %39,5 ve %22,6 hemşirelik lisesi mezunu, çalışma yılı %29'u hastanelerde 6-10 yıl deneyime sahipken, %75,0'i 1-5 yıl hemodiyaliz ünitelerinde deneyime sahip olduğu görüldü. Hemşirelerin %71'8 I Hepatit C enfeksiyonunun karaciğer hastalığı olduğunu, %44,4'ü hastalığın kanve organ nakli şeklinde bulaş yolunun olduğunu bilmediği, %70,2'si kan veya sıvı bulaşında koruyucu ekipman kullanımı bilmediğini, %66,9'u Hepatit C enfeksiyonu olan hastalara ayrı bir diyaliz makinesi kullanılması gerektiği, %50'si tek kullanımlık olmayan materyallerin dezenfekte edilmesi gerektiğini bilmediği, % 49,2'si Hepatit C enfeksiyonu hakkında hekim ve hemşirelere eğitim programları düzenlenmesi gerektiğini bilmediği ve yine % 55,6'sı hastalar içinde eğitim programı verilmesi gerektiğini bilmediği görüldü. Hemşirelerin bilgi düzeylerinin orta seviyede olduğu görüldü. Hemşirelere, Hepatit C enfeksiyonuna yönelik belirli dönemlerde düzenli eğitim progranın uygulanması önerilir.

Anahtar Kelimeler: Hemşire, Hepatit C enfeksiyonu, Hemşirelik yönetimi.

SUMMARY

KHAMMAT SAGBAN SAGBAN Ahmed. Determination of Nurses' Knowledge Levels on Hepatitis C Infection, (Master Thesis), Çankırı, 2021.

Hepatitis C Virus (HCV) infection continues to be a worldwide health problem. It is associated with many serious symptoms and complications, including acute and chronic hepatitis, cirrhosis, hepatocellular carcinoma (HCC), and liver failure (Bianco et al., 2013). Objective: In this study, it was aimed to evaluate the knowledge level of nurses about Hepatitis C infection. This is a descriptive and cross-sectional study conducted in Hospitals in the Southern provinces of Iraq. Quantitative research was used in the design of the study. The sample selection was not made and 124 nurses who agreed to participate in the study were included in the study. Questions consisting of socio-demographic data were asked to the nurses to evaluate their level of knowledge on Hepatitis C infection. The data were collected using face-to-face questioning technique. Evaluation was made with percentage analysis. It was observed that the majority of the participants were 60.5% male, 51.6% were 21-25 years old. According to the education level, 39.5% and 22.6% of the sample were nursing high school graduates, 29% of the them had 6-10 years of experience in hospitals, and 75.0% had 1-5 years of experience in hemodialysis units. 71.8% of the nurses stated that Hepatitis C infection was liver disease, 44.4% did not know that the disease was transmitted by blood and organ transplantation, 70.2% did not know the use of protective equipment for blood or fluid contamination, 66.9% knew that patients with hepatitis C infection should use a separate dialysis machine, 50% did not know that non-disposable materials should be disinfected, 49.2% did not know that training programs should be organized for physicians and nurses about hepatitis C infection, and again 55.6% the patients did not know that a training program should be given to the patients as well. It was observed that the knowledge level of the nurses was at medium level. It is recommended that nurses should receive regular training programs for Hepatitis C infection at certain periods.

Key Words: Hepatitis C infection , Nurse, Nursing management

1. INTRODUCTION

Infection with the Hepatitis C Virus (HCV) continues to be a global health issue. Acute and chronic hepatitis, cirrhosis, hepatocellular carcinoma (HCC), and liver failure are all signs and consequences linked with it (Bianco et al., 2013). Furthermore, according to the World Health Organization (WHO) (2014) and the Centers for Disease Control and Prevention (CDC), 75-85 % of newly infected people develop chronic disease, and 60-70 % of chronically infected people develop chronic liver disease; 5-20 % develop cirrhosis, and 1-5 % die from cirrhosis or liver cancer. Hepatitis C is the underlying cause of liver cancer in 25% of individuals.

HCV infection poses a particularly serious hazard to dialysis patients. It has previously resulted in a large outbreak affecting patients and clinical personnel in dialysis units due to horizontal viral transmission. Although the situation in wealthy nations has improved, HCV infection is still quite common in dialysis facilities in many poor countries (Nguyen et al., 2018). As a result, viral hepatitis type C is a serious health risk for dialysis patients and personnel. (Timofte et al., 2020).

In their review study "current international recommendations regarding prevention of hepatitis type B and C virus transmission in hemodialysis centers," Elamin and Abu-Aisha (2011) explained that chronic hemodialysis patients are at high risk for infection because the process of hemodialysis necessitates vascular access for long periods of time. In a setting where several patients are receiving dialysis at the same time, there are numerous chances for infectious agent transmission, either directly or indirectly, through contaminated devices, equipment, and supplies, ambient surfaces, or staff hands.. Furthermore, hemodialysis patients are immunocompromised, making them more susceptible to infection, and they require repeated hospitalization and surgery, increasing their chances of contracting a nosocomial infection.

Hepatitis C virus infection can result in mortality in both patients and personnel, thus it is regarded as a serious health concern for patients and anyone who come into touch with them (Fallahian & Najafi, 2011). CDC (2012) emphasizes the

extent of this possible concern by reporting HCV in saliva, sperm, urine, menstrual blood, and vaginal secretions. These findings imply that these bodily fluids might be vehicles for HCV transmission, highlighting the difficulties in effectively controlling the virus in dialysis facilities.

Hepatitis C virus can enter dialysis units by the transfusion of contaminated blood or blood products to patients, or through the admission of HCV-infected patients, who may become chronic asymptomatic HCV carriers and a source of contamination for numerous ambient surfaces (Hafez, 2018). HCV virus has been discovered on clamps, scissors, dialysis machine control knobs, Intra Venous (IV) poles installed on dialysis machines, telephone, marking pens, walls, dialysis machine surface, and other surfaces in dialysis centers. (Carvalho-Filho et al., 2015).

Dialysis workers might get HCV through needle punctures or breaches in their skin or mucous membranes as a result of their frequent and continuous contact with blood and blood-contaminated surfaces in the unit (Coppola, 2016). Dialysis patients can contract the hepatitis C virus in the unit, through internally contaminated dialysis equipment like venous pressure gauges or filters, through injections if the injection site is contaminated with HCV, or through skin or mucous membrane breaks when in contact with contaminated objects. Dialysis staff, on the other hand, may physically transmit the hepatitis C virus from an infected patient to a vulnerable patient via contaminated hands, gloves, and other things. (Bravo Zuñiga et al., 2016; Jadoul & Horsmans, 2015).

Several steps have been made to minimize the incidence and prevalence of viral hepatitis in dialysis centers (HD). However, in order to reduce nosocomial transmission and seroconversion of viral hepatitis in HD units, isolation of dialysis patients and machines in separate rooms/halls, blood product screening, surveillance-serologic testing record keeping, educational program, control and prevention techniques, housekeeping and cleaning, and sterilization and disinfection are all recommended. (Bernieh, 2015). Because the staff was responsible for the use of these procedures in order to regulate and prevent the transmission of hepatitis C virus infection in the HD unit, they can play a key role in preventing transmission of the virus from HCV-positive patients to seronegative patients or staff. (Jadoul, 2018).

In a dialysis unit, the nurse is responsible for monitoring, assisting, assessing, and teaching the patient. The patient, the dialyser, and the dialysate bath must be

constantly monitored during dialysis because a variety of problems might occur, including circuit clotting, air embolism, insufficient or excessive ultrafiltration hypotension cramps, vomiting, blood leakage, access, and contamination. (Abdelsatir, 2013; Brunner, 2010).

Nurses are in a unique position to care for HD patients and are regularly asked to do so. Nurses, as members of the health-care team, lead the rest of the team in implementing infection-prevention methods for the patient. Nurses can improve patient recovery while reducing infection-related problems by utilizing the skills and knowledge of nursing practice. (Benson and Powers 2011). Infection prevention and control, according to the Community and Hospital Infection Control Association (2009), requires evidence-based knowledge, as well as up-to-date skills and implementation techniques. Nurses, particularly in HD units, can play an important role in modeling and disseminating knowledge about evidence-based procedures for preventing infections and minimizing their consequences.

1.1 The Significance of the Study

Infection with the Hepatitis C Virus (HCV) is a serious public health problem that affects around 2.8 percent of the world's population. Hemodialysis patients are more susceptible to HCV infection. Despite the fact that HCV seroconversion rates in hemodialysis units (HDU) have decreased, prevalence remains significantly higher than in the general population, ranging from 10% to 59 percent depending on the geographic location. (Mostafa Shehata et al., 2016; Carvalho-Filho, 2015).

HCV prevalence in patients undergoing HD varies globally, ranging from 5.5 % to 14 % in the United States, 3 % in the United Kingdom, Germany, 23 % in Italy, Spain, and 42 % in China (France). In other developing nations, the incidence of HCV in HD patients is considerably higher: Brazil has a prevalence of 24-47 %, India has a prevalence of 12-45 %, and Saudi Arabia has a prevalence of 43 %. Nonetheless, today's health policymakers and care professionals are concerned about the relatively high frequency of anti-HCV antibodies in HD. A variety of risk factors for HCV infection in HD patients have been discovered, including the number of blood transfusions, length of hemodialysis therapy, and nosocomial infections due to inadequate infection-control measures. (Jadoul et al., 2019; Fabrizi et al., 2017).

Iraq has the world's highest burden of HCV infection, according to well-documented and extensive research. Furthermore, studies in Iraq have determined the prevalence of HCV in groups with various degrees of risk (researcher). In compared to HD patients in the Fertile Crescent, several of them reported a higher frequency of HCV infection. 9.2 percent in Jordan, 40.3 % in Iraq, 0.16 % in Lebanon, 27,4 % in Palestine, and 75 % in Syria were the results. (Ashkani-Esfahani et al., 2017; Chemaitelly et al., 2015).

The study was done in Iraq's AL-Kadhimiya Teaching Hospital to determine the "seroconversion rate of hepatitis C among HD patients." The study's findings revealed that seroconversion of HCV infection was common among HD patients, with a prevalence of 40.3%. The length of hemodialysis, history of blood transfusion, and number of blood transfusions (s) were revealed to be variables that influence the incidence of HCV seroconversion in patients on regular hemodialysis. (Al-Rubaie and Malik, 2011). Furthermore, a study conducted by Ramzi et al. (2012) on the prevalence and risk factors of hepatitis C virus infection in HD patients in Sulaymaniyah (Iraq) found that HCV is quite common among HD patients, with an overall prevalence (46.7 %) that is significantly related to dialysis length and the number of blood units transplanted.

The outcomes of a research done in AL-Diwaniyah City, Iraq, for the "detection of seropositive anti-hepatitis C Virus (HCV) antibodies" in HD patients indicated that patients receiving hemodialysis are at significant risk of HCV infection (Abdulameer, 2018). Shihab et al. (2014) did another study with 147 persons, including 122 care HD patients and 25 individual staff members at the general Basra hospital (Basrah, Iraq). The findings reveal that HD patients are highly infected with HBV, HCV, or both, implying that nosocomial transmission between patients is a possibility.

In particular, Alsamarai et al., (2016) reported that the prevalence of HCV infection among HD patients in Iraq reached the highest prevalence, which is alarming and should be taken seriously, in a quantitative review of literature titled "Epidemiology and risk factors of HCV infection among HD patients in countries of the Eastern Mediterranean Regional Office of WHO (EMRO)."

Controlling illnesses and avoiding the spread of infection is critical for healthcare professionals to safeguard the people entrusted to their care. Preventive

treatment can help minimize exposure to potentially dangerous pathogenic organisms and lower illness rates. In order to prevent and manage infection, the nurse is essential. Early detection and monitoring procedures are the first steps in this job. (Ricciardi, 2019)

Nurses play a critical role in preventing B or C type hepatitis virus infection in the HD unit, and there aren't many research on the topic in Iraq.

1.2 The Objective of the Study

1. To assess nurses' knowledge toward infection control measures for hepatitis C virus in haemodialysis units.
2. To determine the relationship between nurses' knowledge and their demographic characteristics which include (gender, age, marital status, level of education, No. of years of experiences in hospital, number of years of experiences in hemodialysis unit, sharing in training sessions concerned with hemodialysis which established by the hospital, sharing in training sessions concerned with hemodialysis which have been established by another hospitals, sharing in training sessions concerned with hemodialysis which have been established by another institutions, and duration of training session). with hemodialysis which have been established by another institutions, and duration of training session).

1.3 Hypothesis

H0: Nurses' awareness of Hepatitis C infection and some factors had no association.

H1: There is a link between nurses' Hepatitis C infection awareness and specific factors.

1.4 Limitations

The main limitation of research is the lack of generalization due to the sample (random) and the presence of a weak sample.

1.5 Assumptions

Hepatitis C infection is a blood-borne disease and poses a significant risk for dialysis patients.

2. GENERAL INFORMATION

2.1 An Overview of Hepatitis C Virus

2.1.1 Hepatitis C virus

Infection with the Hepatitis C Virus (HCV) continues to be a global health issue. HCV is an RNA virus that is usually spread through the skin. Acute and chronic hepatitis, cirrhosis, hepatocellular carcinoma (HCC), and liver failure are all signs and consequences linked with it (Bianco et al., 2013). Furthermore, the World Health Organization (WHO) (2014) and the Centers for Disease Control and Prevention (CDC) (2010) found that 75 to 85 percent of newly infected people develop chronic disease, and 60 to 70 percent of chronically infected people develop chronic liver disease, with 5 to 20% developing cirrhosis and 1 to 5% dying of cirrhosis or liver cancer. In 25% of liver cancer cases, hepatitis C is the underlying cause. (Chen and Morgan , 2006).

❖ Risk factors for hepatitis C (High risk group)

- ✓ Healthcare workers: hemodialysis staff, cancer and chemotherapy nurses, personnel at risk of needle sticking, operating room staff, respiratory therapists, surgeons, dentists, and anyone who are frequently exposed to blood and blood products or other bodily fluids.
- ✓ undergoing hemodialysis therapy,
- ✓ Homosexual and bisexual behavior in men.
- ✓ Using drugs through IV or injection,
- ✓ Traveling to or staying in a region with unknown health concerns
- ✓ Having several sexual partners (10 percent of HCV infection case),
- ✓ A history of sexually transmitted illness in the recent past (Smeltzer et al. 2008; Brozenec, 2003),

- ✓ Babies born to moms who are infected, Someone who was born in a country where HCV infection is widespread, such as China or Southeast Asia. (Midgard et al., 2016).

❖ **Transmission of the hepatitis C virus**

- ✓ HCV is spread by percutaneous (i.e. percutaneous puncture) or mucosal contact with infected blood or bodily fluids, according to Previsani and Lavanchy (2002). (e.g. semen, saliva). Parenteral, horizontal, and vertical transmission are other options.
- ✓ Sexual intercourse with an infected partner
- ✓ Injecting drug use involving sharing needles, syringes, or drugs
- ✓ Delivery to an infected mother
- ✓ Contact with the blood or open wounds of an infected person
- ✓ Needle stick or sharp instrument exposure
- ✓ Sharing items such as razors or toothbrushes with an infected person.

Hepatitis C is not transmitted through breast milk, food, water, or everyday contact, such as hugging, kissing, and sharing food or drink with an infected person (Addo ,2015).

Hepatitis C can be spread by unsterilized needles used for body piercing and tattooing, as well as human bites, according to Tohme and Holmberg (2012).

Since outbreaks of the disease drew the attention of the media and medical authorities, hepatitis C virus transmission in medical institutions has become a major problem.

Prior to 1990, HCV was mostly disseminated by iatrogenic means. Blood transfusions, blood products such as coagulation factors, infected endoscopes, and heart surgery all had higher levels of contamination. Today, transmission is more prevalent among drug users, mostly through needle sharing, and less common among medical personnel, primarily through needle stick injuries, vertical transfer from mother to baby, tattoo, piercing, or razor sharing. (Fallahian and Najafi, 2011).

Although the main source of HCV and other blood-borne viruses is blood, various bodily fluids, including peritoneal, synovial, pericardial, cerebrospinal, and amniotic fluids, can be infectious, according to the CDC (2012). Infection can also

be spread through vaginal discharge and sperm. As a result, it is preferable to take conventional measures in all of them.

According to Papadakis and McPhee (2014), HCV was formerly responsible for over 90% of instances of posttransfusion hepatitis, whereas only 4% of cases of hepatitis C were caused by blood transfusions. There hasn't been any evidence of transmission during nursing. Body piercing, tattoos, and hemodialysis (HD) are all risk factors, according to the researchers. According to Mahmoud and Abu-Raddad (2011), the prevalence of HCV infection in groups at high risk is as high as 87.5 percent among adult HD patients.

❖ Symptoms and Signs

According to the Centers for Disease Control and Prevention (CDC), most people with hepatitis C have no symptoms. Chronic hepatitis C can last for ten to thirty years, and cirrhosis or liver failure can occur before patients notice any symptoms. When blood tests for liver function are conducted, signs of liver damage may be identified for the first time..

Initial symptoms, which include fatigue, nausea, lack of appetite, fever, headaches, and stomach discomfort, are usually moderate and mimic the flu. People who develop symptoms generally do so between 2 and 12 weeks after being exposed to the virus. Symptoms may not appear for up to 6 months following exposure in some persons. Even if they don't exhibit symptoms, people with hepatitis C can spread the infection to others. (NIDDK,2018).

Many persons who have acute hepatitis C experience little or no symptoms. If symptoms do emerge, they are usually minor and flu-like and appear 6 weeks to 6 months (most often 3 months) after exposure. Mild fever, nausea, vomiting, lack of appetite, tiredness, and muscular or joint pains are all possible symptoms. Dark urine and jaundice can occur in certain individuals. (yellowish tinge to skin).

While some persons with chronic hepatitis C experience symptoms that are comparable to those of acute hepatitis C, many patients with chronic hepatitis C have no symptoms for decades. When blood tests for liver function are conducted, it may be possible to identify liver damage.

According to the CDC (2013), around 30% of persons show no indications or symptoms. The presence of signs and symptoms vary depending on the individual's

age. The majority of children under the age of five and newly infected immunosuppressed adults are asymptomatic, but 30% to 50% of persons over the age of five show early signs and symptoms. Jaundice, fever, tiredness, lack of appetite, vomiting, stomach discomfort, dark urine, clay-colored bowel movement (clay-colored stool), and joint pain are some of the signs and symptoms that may be present (arthralgias).

Clinical manifestations (signs and symptoms) of HCV patients can be divided into three stages, according to Lewis et al. (2004). (Preicteric, Icteric, and Posticteric phase).

A. Preicteric phase (prodromal phase)

This stage occurs before jaundice and can last anywhere from one to twenty-one days. This is the era of maximum hepatitis infectivity, and people with hepatitis C might be infectious for years. Anorexia (due to cytokines produced by infected liver), nausea and vomiting, right upper quadrant discomfort, constipation or diarrhoea, decreased sense of taste and smell, malaise, headache, fever, arthralgia, urticaria (skin rash), hepatomegaly, lymphadenopathy, and sometimes splenomegaly, weight loss are some of the signs and symptoms that can occur during this phase. (Lewis, et al., 2004). In addition to these signs and symptoms in the preicteric phase, laboratory findings reveal higher serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels, as well as elevated urine bilirubin levels, according to Brozenec (2003). According to Smolen (2001), serum glutamic-oxaloacetic transaminase (SGOT) levels also rise.

B. Icteric phase

When bilirubin diffuses into the tissues, it causes jaundice and lasts for 2 to 4 weeks. Jaundice due to impaired conjugated bilirubin excretion, pruritus (itching) due to bile salt accumulation beneath the skin, dark urine (tea coloured urine), bilirubinuria, light stool or clay coloured stool due to decreased urobilinogen, fatigue due to reduced energy metabolism by the liver, and continued hepatomegaly are some of the signs and symptoms that can occur during this phase. (Lewis, et al., 2004).

Laboratory investigations, according to Brozenec (2003), reveal that increased direct bilirubin levels, as well as gastrointestinal symptoms and tiredness, may persist.

According to Soliman et al., (2013), jaundice may not be clinically detected until the bilirubin level reaches around 3 mg/dl, and when the amount exceeds 20 mg/dl and is elevated for long periods of time, it may suggest serious liver necrosis.

C. Posticteric phase

The posticteric phase's convalescent stage begins with the disappearance of jaundice and lasts for weeks or months, on average 2 to 4 months. Malaise, easy fatigability, and hepatomegaly are the most common complaints during this stage. The absence of jaundice does not imply that the patient has healed completely (Lewis, et al., 2004). According to Brozenec (2003), laboratory results revert to normal.

Jaundice is not seen in all patients with viral hepatitis. Anicteric hepatitis is the medical term for this condition. The emergence of symptoms with HCV is more gradual, and the symptoms are typically more severe. (Lewis et al., 2004).

2.1.2 Diagnosis

❖ Physical assessment

Hepatic discomfort, hepatomegaly, and splenomegaly are all visible. The liver is visible, and the patient's medical history should be taken into consideration.

❖ Liver biopsy

Histologic study of the liver cells and characterisation of the degree of inflammation, fibrosis, or cirrhosis that may be present is possible with a liver biopsy. Because of the danger of bleeding, a patient with a bleeding propensity may not be a good candidate for biopsy.

Liver function tests

- ✓ Aspartate aminotransferase: it is elevated in preicteric phase, decreased as jaundice disappears. It reveals liver cell injury.
- ✓ Alanine aminotransferase: it is elevated in preicteric phase, decreased as jaundice disappears. It reveals liver cell injury.
- ✓ Alkaline phosphatase: it is with some elevation which reveals impaired excretory function of the liver.
- ✓ Total Serum Bilirubin (TSB): it is elevated to about 8- 15 mg/dl (137- 257 $\mu\text{mol/L}$) and reveals liver cell damage.

- ✓ Prothrombin time: it is prolonged and reveals decreased production of the prothrombin by the liver and decreased absorption of vitamin K in the intestine.
- ✓ Serum proteins: they include albumin that remains normal or decreases due to liver damage, and γ -Globulin that remains normal or increases due to impaired

❖ Urinary urobilinogen

elevation 2- 5 days before jaundice and revealed diminished reabsorption of urobilinogen

Urine bilirubin: it is elevated due to conjugated hyperbilirubinemia (Lewis, et al., 2019; Brunner, 2010).

2.1.3 Treatment and Care

Acute infections are treated with supportive care and antivirals. The most serious issue is the extremely high prevalence of chronicity. In order to track the development of liver disease, chronic HCV infection should be tracked. Antiviral medicines are highly efficient and give excellent therapy in a short amount of time.

- ✓ Those with chronic hepatitis C are advised to avoid alcohol and medications toxic to the liver.
- ✓ They should also be vaccinated against hepatitis A and hepatitis B due to the increased risk if also infected.
- ✓ Use of acetaminophen is generally considered safe at reduced doses. Nonsteroidal anti-inflammatory drugs (NSAIDs) are not recommended in those with advanced liver disease due to an increased risk of bleeding.
- ✓ Ultrasound surveillance for hepatocellular carcinoma is recommended in those with accompanying cirrhosis. Coffee consumption has been associated with a slower rate of liver scarring in those infected with HCV (Lewis, et al., 2019; Brunner, 2010).

Furthermore, according to the World Health Organization (2014), a new HCV infection does not necessarily require therapy because the immune response in some persons can eliminate the infection. When HCV infection becomes chronic, however, therapy is required.

The World Health Organization's (WHO) revised guidelines from 2018 advocate treatment with direct-acting antivirals (DAAs). Most people with HCV infection may be cured with DAAs, and therapy is brief (typically 12 to 24 weeks), depending on whether or not cirrhosis is present.

❖ **Complications for Hepatitis C Virus**

In most cases, people with viral hepatitis recover fully in 3 to 6 weeks. Patients with HCV infection are more likely to have problems (Smolen, 2001). Fulminant hepatic failure, chronic hepatitis, liver cirrhosis, and hepatocellular cancer are all possible complications (Lewis, et al., 2004). Hepatitis C virus infection usually progresses to chronicity, which is defined as the presence of HCV RNA for 6 months or more following the beginning of symptoms. Around the world, chronic HCV infection is a leading cause of liver disease and hepatocellular cancer.

Chronic HCV infection causes liver fibrosis and cirrhosis, portal hypertension and liver failure, as well as a significant risk of hepatocellular cancer and even mortality, with roughly one million people dying each year (Andrade et al., 2009). According to WHO data published in 2014, HCV infected persons account for 27% of cirrhosis and 25% of hepatocellular carcinomas (HCC) globally.

According to Andrade et al. (2009), current clinical research suggests that HCV has a direct role in hepatocarcinogenesis, and the prevalence of HCC is predicted to rise in the next two decades, owing to hepatitis C infection and secondary cirrhosis. Furthermore, HCV infection is responsible for more than 100,000 of the more than (500 000) new instances of liver cancer that arise each year. (Daw & Dau, 2012; Lavanchy, 2011).

Furthermore, according to the Centers for Disease Control and Prevention (CDC), (70 %) of chronically infected patients have active liver disease. Because there is no effective vaccine or post-exposure prophylaxis to reduce the burden of HCV infection and disease, primary prevention activities to reduce the risk of infection and secondary prevention activities to reduce the risk of liver disease and other HCV-related chronic diseases among HCV-infected people are required. (WHO, 2014).

2.2 Hepatitis C Infection and Dialysis Patients

Blood transfusions, a lack of attention to infection-prevention procedures, IV drug misuse, and unprotected sex can all contribute to the occurrence of hepatitis in the dialysis population (Lewis, et al., 2004). Accepting HCsAg-positive patients and not treating them with a separate room and machine are two more variables that are considered risk factors for HCV infection (Bernieh, 2015). Injections of

contaminated material, exposure to infective material through the mucosal membrane or breached skin, or dialyzation with contaminated equipment are all possible ways for the patient to get infected. (Nguyen et al., 2019).

In a cross-sectional study conducted at the hemodialysis of University of the East Ramon Magsaysay Memorial Medical Center to determine the prevalence of hepatitis B and hepatitis C infection among hemodialysis patients and the nursing staff, Duong, et al., (2015) found that the prevalence of HBV and HCV was 8.7% among patients and no staff member was positive for either, and also stated that the prevalence of HBV and HCV was 8.7% among patients and no staff member

In a study conducted at the Kano Kidney Center in Dammam Central Hospital in Saudi Arabia, Karkar et al. (2014) discovered that hepatitis B virus (HBV), hepatitis C virus (HCV), and, to a lesser extent, human immunodeficiency virus infection are the most common viral infections encountered in HD units (HIV). Furthermore, the findings of this study revealed that the prevalence of HBV (as well as HCV) is higher in HD (29%) than in peritoneal dialysis (5%).

Dialysis patients have weakened immune systems and are more susceptible to infections. The primary causes of viral hepatitis in hemodialysis patients have been identified as HBV and HCV. (Urbánek, 2012).

2.3 Prevention

In order to be effective, infection prevention and control methods must be founded on an understanding of agent-host-environment interactions. Hand cleaning is the easiest and most efficient technique to avoid transmission, even when gloves are worn. (Ellingson, 2017).

In the 1950s, hospital infection control programs were initially implemented in England, with the primary goal of avoiding and managing hospital-acquired staphylococcal epidemics. The American Hospital Association issued “Infection Control in the Hospital” in 1968, which was the first and only set of criteria for many years. The Joint Commission for Accreditation of Hospitals—later known as the Joint Commission of Accreditation of Healthcare Organizations—was established in 1969. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) originally mandated that hospitals maintain established infection control committees and isolation facilities. In 1972, the Centers for Disease Control and Prevention

created the Hospital Infections Branch and the Association for Practitioners in Infection Control, and the first CDC guidelines were produced to answer commonly asked issues and promote uniform practice. The SENIC experiment (Study of Efficacy of Nosocomial Infection Control) was released in 1985, confirming the cost-benefit of infection control systems.. Infection control in the 1990s was affected by health-care reform, when managed care networks became the favored method of delivering health-care services. (Raka& Mulliqi-Osmani, 2012; Hoffmann, 2008).

Infectious illnesses and the safety of both patients and staff are concerns in any health care environment, but dialysis has its unique set of challenges. The initial recommendations for hepatitis C prevention in dialysis were issued by the CDC in 1977. This was eventually superseded by the current strategy for avoiding infection spread in dialysis centers. (Nguyen et al., 2018).

2.4 Infection Control Measures for Hepatitis C Virus in Hemodialysis Units

In Hemodialysis Units, es for Hepatitis C VirusAccording to Beltrami, et al., (2000), both general precautions and the following hemodialysis-specific infection control procedures established in 1977 should be implemented to avoid transmission of blood-borne infections in hemodialysis settings:

- ✓ A serum specimen from all susceptible patients should be tested monthly for HCsAg and the result should be reviewed promptly.
- ✓ HCsAg- positive patients should be isolated room, machinery, instruments, medications, supplies, and staff.
- ✓ Instruments, medications, and supplies should not be shared between any patients.
- ✓ Cleaning and disinfection processes should be performed on a regular basis, with obvious separation of sections designated for clean and contaminated objects. Handle blood specimens with gloves and keep them in specified places away from medicine preparation and central supply. (Jadoul, 2018)

As a result, viral hepatitis type C can be managed in dialysis centers by using the CDC's recommended control procedures for hepatitis type C (Division of Healthcare Quality Promotion, DHQP). (Hope, 2016). Infection control precautions, which include.

❖ **Surveillance-Serologic Testing:**

- ✓ To establish if transmission is occurring in the unit, routine surveillance of patients and staff for HCV infection is required.
- ✓ Candidates for dialysis and potential workers should be tested for HCsAg and anti-HCS before or upon entering the unit to identify their serologic status for surveillance reasons. (Darvish Moghaddam et al., 2012).

In addition, infection and other adverse events must be monitored to ensure that infection control procedures are successful (Tago and Morikane, 2014).

According to (Zuckerman et al., 2018), the HC disease surveillance method should involve monitoring illness incidence, determining infection sources and modes of transmission, detecting outbreaks, spreading containment, and identifying case-patients' contacts for post-exposure prophylaxis.

❖ **Record Keeping**

The patient's dialysis record should have clearly noted

- ✓ Lot number of all blood and blood product used.
 - ✓ All mishaps, such as blood leaks, blood spills, and dialysis machine malfunctions.
1. A log should be maintained to record all hepatitis serology results, including liver function tests for all patients and staff.
 2. A log should be maintained of all accidental needle punctures and similar incidents by the staff and patients (including time, place, patient, and staff involved) and prophylactic measures, if any, that have been taken (Alhazmi & Noor, 2017).

❖ **Education**

The educational program should include the following:

1. A continuing educational program for hepatitis infection control should be instituted in all dialysis facilities.
2. Appropriate training in infection control should be directed to all dialysis patients and staff.
3. All patients and staff should be instructed in the principles and practice of aseptic techniques.

4. The training program should explain; how hepatitis, once introduced into the dialysis centre, is transmitted to both patients and staff; how to control hepatitis spread in the centre; and for those patients and staff who are HCsAg- positive, how to control hepatitis spread at homes (e.g. Do not share toothbrushes and razors).

Koplan, et al., (2001) have stated that the training and education for all employees at risk for occupational exposure to blood should be provided at least annually, given to new employees before they are being worked in the unit, and documented. At least, they should include information on the following topics:

- ✓ Proper hand hygiene technique
- ✓ Proper use of protective equipment
- ✓ Modes of transmission for blood borne virus, pathogenic bacteria, and other microorganisms as appropriate
- ✓ Infection control practices recommended for hemodialysis units and how they differ from standard precautions recommended for other healthcare setting
- ✓ Rational for segregating HCsAg- positive patients with a separate room, machine, instruments, supplies, medications, and staff members
- ✓ Proper infection control techniques for initiation, care, and maintenance of access site
- ✓ Housekeeping to reduce the spread of germs, including adequate cleaning and disinfection techniques for equipment and environmental surfaces, and Patients (or family members) should receive training and education on infection control practices upon admission to dialysis and at least once a year thereafter. Topics should include personal hygiene and hand washing techniques, patient responsibility for proper access care, and recognition of signs of infection, which should be reviewed each time the patient's access type changes.

❖ **Control and Prevention**

Control and prevention can be achieved through the application of the following:

- ✓ Patients who are hepatitis C virus positive ideally should be isolated in a separate room or unit designated for HCsAg- positive patients only.
- ✓ Dialysis equipment should not be used for both hepatitis C virus positive and seronegative patients.
- ✓ Linen should be used on chairs and beds and should be changed for each patient.

- ✓ Chairs and beds should be cleaned after each use.
- ✓ All patients should be assigned a supply tray (including a tourniquet, marking pencils, antiseptics, and if possible blood pressure cuff) and sharing of these items should be avoided.
- ✓ Clamps, scissors, and other non-disposable items should not be used for more than one patient unless they have been autoclaved or appropriately disinfected.
- ✓ Disposable gloves should be worn by staff for their own protection when handling patients or dialysis equipment and accessories, even when taking blood pressure, injecting saline or heparin, or touching the dialysis machine knobs to adjust flow rates
- ✓ The staff should never touch surfaces with gloved hands that will subsequently be touched with ungloved hands before being disinfected.
- ✓ For the patient's protection, the staff should use a fresh pair of gloves with each patient to prevent cross- contamination.
- ✓ The staff should wear protective eye glasses and surgical-type mask during the dialysis procedure where spurting or splattering of blood may occur, e.g., when cleaning dialyser.
- ✓ After each dialysis, non-disposable equipment used should be appropriately cleaned and disinfected or sterilized.
- ✓ Venous pressure Isolators or in-line filters should be used to prevent blood contamination venous pressure monitors. These isolators or filters should not be reused.
- ✓ Immediately after a blood spill, the staff should thoroughly clean the affected area with an appropriate disinfectant; blood should never be allowed to remain on floors, walls, equipment, or other surfaces.
- ✓ Cleaning equipment and materials used in the dialysis area should not be used in another area.
- ✓ Crowding of patients and overtaxing of staff may increase the likelihood of hepatitis transmission in the dialysis units. To minimize transmission, each patient station with its attendant equipment should be sufficiently separated from the neighboring station to permit easy movement of a staff member completely around the patient without interfering with the neighboring station (Papatheodoridis et al., 2018; FitzSimons et al., 2016; Talbot, 2013; Crovari and Kane, 2003; Schulster and Chinn, 2003).

3. MATERIAL AND METHOD

3.1 Methodology

This section deals with design, administrative arrangements, sample and location, vehicle, pilot, data collection and data analysis.

3.2 Design of the Study

It is a descriptive study.

3.3 Sample and Setting

The simple random sampling technique was used. Nurses without any hearing or hearing impairment who volunteered to participate in the study were included in the study.

3.4 Data Collection Tools

The researcher and consultant created the questionnaire form, and the questions were designed to assess the persons' socio-demographic features as well as the nurses' knowledge of Hepatitis C infection.

3.4.1 Socio-demographic data

The first section contains information about the participants' age, gender, education level, marital status, occupations, income status, primary renal disease and dialysis, and age (The number of years worked in the hospital, the number of jobs in dialysis units, the number of years of experience and the number of attendance at the course)

A descriptive study has been carried out to achieve the early targets. The study was initiated between 1/9/2020 and 1/4/2021.

3.5 Administrative Regulation:

The Behavioural Research and Ethics Committees of Ankr Karatekin University gave their permission before to the start of the study to verify that it followed all ethical guidelines and that the subjects were safe. The researcher submitted a thorough explanation of the study's objective and methods to Thi-Qar Health Directorate, AL-Basra Health Directorate, after getting clearance from the Behavioural Research and Ethics Committees. It was presented to the Iraqi Ministry of Health by the Directorate and Misan Health Directorate in order to assure agreement and collaboration, as well as to gain official approval.

3.6 Setting of the Study

The research was carried out in all hemodialysis units in Iraqi hospitals in the southern provinces. There were three of them in all.

The first hemodialysis facility was in the Al-Republican Teaching Hospital in Al AL-Basra city, AL-Basra Governorate, which included separate rooms for HCV positive (9 machines) and negative (35 machines) patients, as well as acute cases (13 machines). Nearly 1:2, 1:3, or 1:4 nurse-to-patient ratios were seen.

The AL- Hussein Teaching Hospital in Al Nasiriyha, Thi-Qar Governorate, contained the second hemodialysis unit, which included separate rooms for HCV positive (4 machines) and negative (13 machines) patients, as well as acute cases (3 machines). Nearly 1:2, 1:3, or 1:4 nurse-to-patient ratios were seen.

The third hemodialysis unit was located in AL- Sader Teaching Hospital in Amarah, Maysan Governorate, and had separate rooms for HCV positive (5 machines) and negative (14 machines) patients, as well as acute cases (4 machines). Nearly 1:2, 1:3, or 1:4 nurse-to-patient ratios were seen.

3.7 The Sample of the Study

The research comprised 124 nurses who worked in hemodialysis units at hospitals in Iraq's southern regions. The study's sample included all nurses with at least one year of experience working in hemodialysis units.

3.8 Data Collection

Nurses working in hemodialysis units were interviewed using a questionnaire and a face-to-face interview approach (study sample). The interviews were conducted in Arabic, Iraq's official language. The data collecting period was from September 20 through November 8, 2020. The interview took each nurse about 20-25 minutes to complete.

3.8.1 Data Collection Tools:

The researcher and consultant created a sociodemographic data form to evaluate the variable, as well as a second questionnaire to assess the nurses' awareness of hepatitis C infection.

Part A : Demographic Data Form:

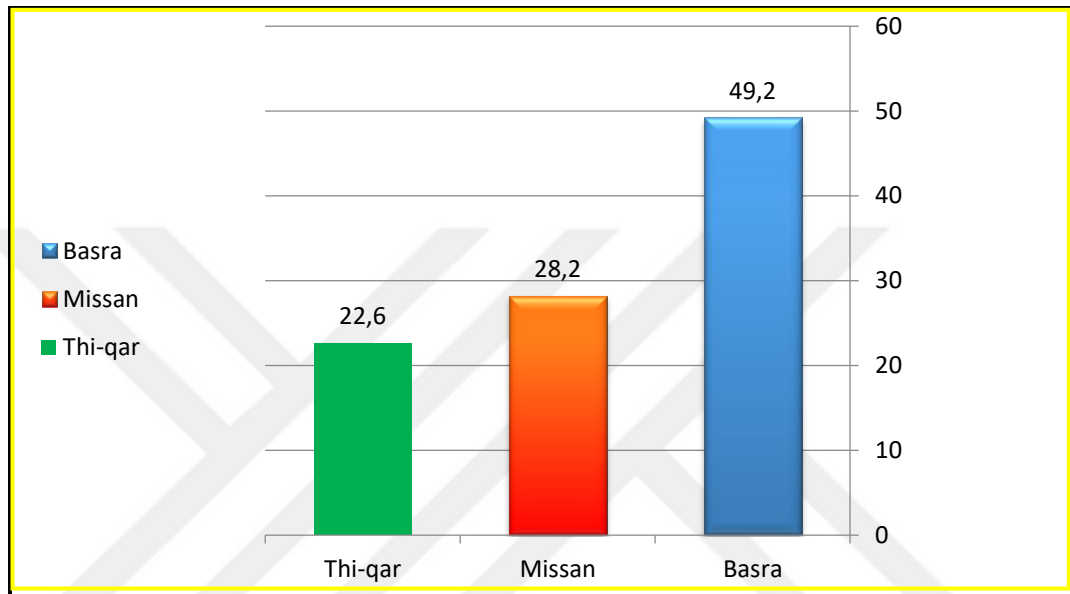
[illegible]

Part B: Knowledge form on Hepatitis C infection for nurses:

A 13-item questionnaire on nurses' awareness of infection control procedures for the hepatitis C virus in hemodialysis units was added in the second phase of the survey.

4. BULGULAR FINDINGS

Figure 4.1 : Percentage Distribution of the Study Population by governorate.



The majority of the study sample individuals (49.2%) are accounted at Al-Basra Hospital and the remaining are distributed at the others Hospitals.

Table 4.1 : The distribution of the studied groups according to (SDCv.) with comparisons significant (n= 124).

Basis Information	Groups	Frequency	Percent
Age Groups (yrs.)	21-25 years	64	51.6
	26-30 years	36	29.0
	31-35 years	19	15.3
	36-40 years	5	4.0
	Total	124	100.0
Gender	Male	75	60.5
	Female	49	39.5
	Total	124	100.0
Education Level	Secondary nursing school graduate	28	22.6
	Nursing institute graduate	49	39.5
	Nursing college graduate	47	37.9
	Total	124	100.0
Marital status	Single	77	62.1
	Married	47	37.9
	Other	0	0.0
	Total	124	100.0
	1-5 years	25	25.0
	6-10 years	29	29.0
	11-15 years	12	12.0

No. of years of experience in hospitals	16-20 years	18	18.0
	21 years & more	16	16.0
	Total	124	100.0
No. of years of experience in hemodialysis Units	1-5 years	93	75.0
	6-10 years	24	19.4
	11-15 years	7	5.6
	16-20 years	0	0.0
	21 years & more	0	0.0
	Total	124	100.0
Sharing in training sessions concerned to hemodialysis, which established by the hospital	Yes	60	48.4
	No	64	51.6
	Total	124	100.0
Sharing in training sessions concerned to hemodialysis, which established by other hospitals	Yes	40	32.3
	No	84	67.7
	Total	124	100.0
Sharing in training sessions concerned to hemodialysis, which established by another institution	Outside the country	3	2.4
	Inside the country	33	26.6
	Not sharing	88	71.0
	Total	124	100.0

Table (4-1) indicated that the majority of the study sample (60.5%) was male and the remaining were female, most of them were (21-25) years old and accounted for (51.6%). In regard to the subject marital status, the majority of the sample was single and they accounted for (62.1%) of the whole sample. Related to their level of education, the greater number of them were nursing institute graduate and they accounted for (39.5%) of the sample and (22.6 %) of them were secondary nursing school graduate. Concerning the number of years of experience, the majority of the sample (29 %) were experienced in hospitals.

having (6-10 years) of experience in hospitals, while (75.0%) having 1-5 years of experience in hemodialysis units. It was seen that (51.6%) of the nurses had no opportunity to be involved in training session which established by the hospital and by other hospitals.



Table 4.2 : Nurses' knowledge toward Infection Control Measures for Hepatitis C Virus in Hemodialysis Units (n=124).

				Percent
1.	Hepatitis C is a liver disease caused by the viral infection	True	89	71.8%
		Fales	8	6.5%
		Don't know	27	21.8%
2.	Hepatitis C is spread through blood transfusions and organ transplants for a patient suffering from renal failure.	True	53	42.7%
		Fales	16	12.9%
		Don't know	55	44.4%
3.	Hepatitis C can be spread through sharing needles, syringes, or any other equipment used to prepare and inject drugs	True	91	73.4 %
		Fales	12	9.7 %
		Don't know	21	16.9 %
4.	Surveillance-serologic testing for HCV should be performed periodically for nursing staff in hemodialysis unit.	True	95	76.6 %
		Fales	3	2.4 %
		Don't know	26	21.0 %
5.	Surveillance-serologic testing for HCV should be performed periodically for hemodialysis patients.	True	92	74.2%
		Fales	6	4.8 %
		Don't know	26	21.0 %
6.	Nursing Staffs' wash their hands with soap or an antiseptic handwash and water, while they are moving from one patient to another.	True	49	39.5 %
		Fales	27	21.8 %
		Don't know	48	38.7 %
7.	Nursing Staffs' in hemodialysis unite should change their gloves as they move from patient to patient.	True	92	74.2%
		Fales	9	7.3%
		Don't know	23	18.2%
8	Staff members should wear gowns, face shields, eye wear, or masks to protect themselves when performing	True	17	13.7%
		Fales	20	16.1%

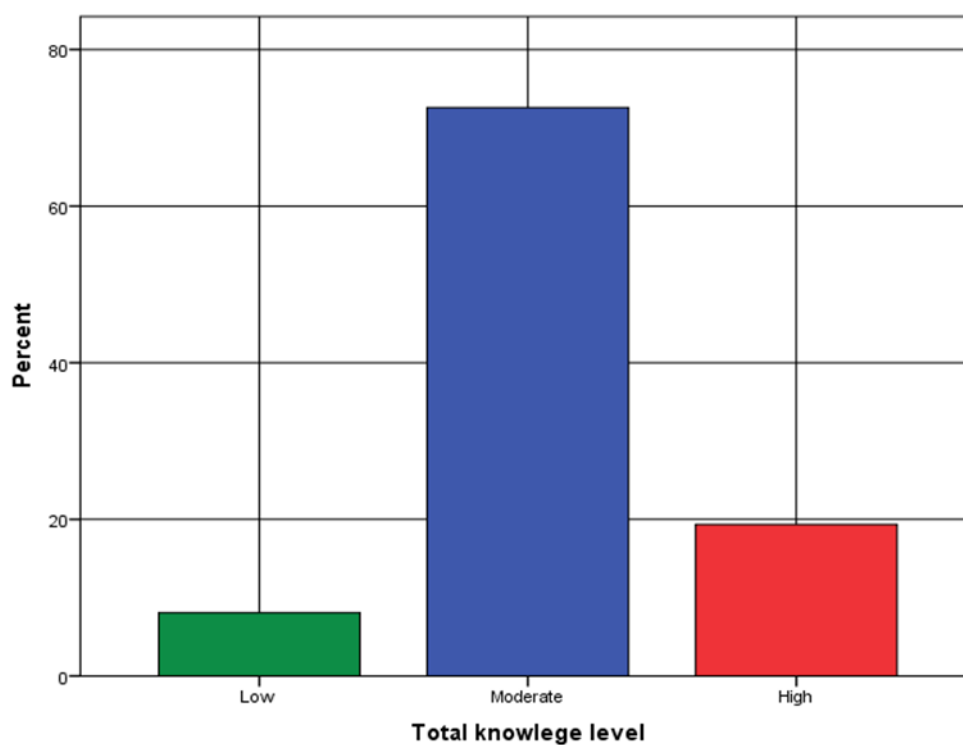
	procedures during which spurting or spattering of blood	Don't know	87	70.2%
9.	Patients diagnosed as positive for hepatitis must be treated in a separate room and the use dedicated dialysis machine for the patient is recommended	True	83	66.9%
		Fales	25	20.2%
		Don't know	16	12.9%
10	Disinfect non-disposable items (as trays, blood pressure cuffs, stethoscopes, thermometer and scissors) and cleaning and disinfecting dialysis apparatus after use on one patient	True	27	21.8%
		Fales	35	28.2%
		Don't know	62	50.0%
11	In cases such as accidental needle sticks for both patients and staff, it is reported to the relevant management of the institution and record that related to (including time, place, patient and staff)	True	5	4.0%
		Fales	20	16.1%
		Don't know	99	79.8%
12	The importance of the institution of educational programs for nursing staffs' about training to control the infection in the dialysis unit	True	33	26.6%
		Fales	30	24.2%
		Don't know	61	49.2%
13	The importance of the institution of educational programs for patients regarding infection control measures	True	32	25.8%
		Fales	23	18.5%
		Don't know	69	55.6%

The knowledge levels of nurses about Hepatitis C infection are given in Table 4.2. It was seen that 71.8% of the nurses did not know that hepatitis C infection was a liver disease, 44.4% did not know that the disease was transmitted by blood and organ transplantation, 73.4% did not know that the disease was transmitted through intravenous drug use, 76.6% did not know that they should have periodic tests, 74.2% did not know that patients need periodic tests, 39.5% did not know that hand washing is important, 74.2% did not know the importance of changing gloves when passing from patient to patient, 70.2% did not know the use of protective equipment in blood or liquid contamination, 66.9% did not know that patients with Hepatitis C infection should use a separate dialysis machine, 50% did not know that non-disposable materials should be disinfected, 79.8% did not know that the accidental injuries should be reported, 49.2%

did not know that training programs should be organized for physicians and nurses on Hepatitis C infection, and 55.6% did not know that training programs should be given for patients.



Figure.4.2 : Percentage Distribution of the Study Population by Total knowledge level toward Infection Control Measures for Hepatitis C Virus in Hemodialysis Units.



5. DISCUSSION

This chapter presents an explanation and discussion of the study results derived from the statistical analysis and its pertinence to the objectives of the study and further discussion will exemplify these objectives supported by literatures and related studies that available.

Part one: Discussion of the nurses' demographic characteristics

Throughout the course of the present study, it has been noticed that approximately half of the study sample (60.5 %) were males. The highest proportion (43.1%) of them was 21-25 years old. This finding comes along with that of Nihmatolla, et al., (2005) who reported that the majority of nurses in the hemodialysis unit were male. However, it was found in the study of Bernal-Sundiang, et al., (1995) that the majority (82%) of the nursing staff in hemodialysis were female, and age range was 21-24 years.

In the study of Nihmatolla et al. (2005) and Bakey et al., It was observed that the total number of nurses was male and the age groups were similar. Bernal-Sunding et al. (1995) found that 82% of the nurse population were female and between the ages of 21-24.

Concerning the level of education, most of them (39.5%) were nursing institute graduates. In a cross sectional study which was conducted in 32 hemodialysis units in the Nile delta, Egypt to evaluate knowledge and practices toward risk of infection by 317 health care workers shows that the majority (81.3%) of health care workers were nurses with diploma in nursing (Kabbash, et al, 2007). In a study conducted at hemodialysis and peritoneal dialysis in Hawler and Duhok Governorate, that more than half of the nurse staff in hemodialysis and peritoneal dialysis had graduated from institute, while in a study which was conducted to investigate knowledge of and practices towards universal precautions among health care workers and medical students

in 2 university hospitals in Mazandaran Province, Islamic Republic of Iran, shows that the majority (64.3%) had bachelor degree in nursing (Motamed , et al., 2006).

Regarding the years of experience in hemodialysis units, it was seen that most of them had (1-5) experience years in the hemodialysis unit who accounted (75.0%). Bakey et al. , Uğur et al. (2007), in their study conducted in Ankara, stated that the nurses' working year experience in the hemodialysis unit was 1-5 years, and our finding is in parallel with the study. Nihmatolla, et al., (2005) reported that (82.5%) of nurses had (1-3) years of experience in hemodialysis and peritoneal dialysis units. Bakey et al. , Uğur et al. (2007), in their study conducted in Ankara, stated that the nurses' working year experience in the hemodialysis unit was 1-5 years, and our finding is in parallel with the study.. Nihmatoolla ve arkadaşlarının çalışmasında ise hemşirelerin hemodiyaliz ünitesinde çalışma yılı 1-3 yıl olarak belirtilmiştir. The findings indicated that more than half of the study sample (51.6%) did not have the opportunity to participate in the hemodialysis-related trainings prepared by the hospital, and the same rate (67.7%) did not have the opportunity to participate in the related trainings. It was observed that the majority of the sample (71.0%) of the hemodialysis training organized by different hospitals did not have the opportunity to participate in the hemodialysis trainings established by other institutions abroad or in the country. Regarding the duration of the training session, the majority of the study sample (49.0%) did not share any training session, so the training session does not have a specific time or duration. Buargub (2005) states that there is not a continuous targeted training program for nursing staff in the hemodialysis unit, but regular training and education of the staff is important. This result is in line with Nihmatolla et al. (2005), who reported that nursing staff (95%) did not receive postgraduate training. From the researcher's point of view, it is envisaged that training sessions will be held for all nursing staff in hemodialysis units to improve their knowledge and skills on infection control measures for HCV. Bianco et al. (2013) evaluated the knowledge and behaviour of professionals working in hemodialysis units regarding the adoption of contact measures to control hepatitis (C) virus transmission. Researchers have suggested the need to implement educational activities to strike a balance between theory and professional practice regarding hepatitis (C) virus transmission prevention measures aimed at improving knowledge and behaviour.

Another study consistent with the findings of the study was conducted by Prodanovska et al. (2010). This study evaluated knowledge about HCV infection among nursing students, Bitola Medical School, Macedonia. The results showed that they know enough about HCV to face future challenges. The researcher noticed that recent studies yielded better results than current study findings, arguing that the reason for this may be regular attendance at theoretical and practical courses. It should be noted that the findings of this study reveal that (74.5%) received in-service training programs, (68.29%) received this program in the last 6 months.

Part two: discussion of nurses' knowledge toward infection control measures for hepatitis C virus in hemodialysis.

The current study findings related to nurses' knowledge were consistent with study done by Çekin et al., (2013) entitled as data from a the level of knowledge of, to investigate the attitudes toward, and to determine the emphasis given to the national prevalence of HBV/HCV infections among healthcare professionals. The study had a total of 206 healthcare professionals (mean age was 37.0 ± 6.3 years and 86.9% were females) including medical laboratory technicians (54) and nurses (152). Results showed that health care workers have a moderate level of knowledge toward HBV/HCV infections and the hepatitis knowledge levels of (51.5%) participants were found to be satisfactory.

Hemşirelerin bilgi birikimine ilişkin mevcut araştırma bulguları, Çekin ve diğerleri (2013) 'nin bilgi düzeyinden veri olarak nitelendirdiği, sağlık çalışanları arasında HBV / HCV enfeksiyonları isimli tıbbi laboratuvar teknisyenleri (54) ve hemşireler (152) dahil olmak üzere toplam 206 sağlık çalışanı (ortalama yaş 37.0 ± 6.3 yıl ve %86.9 kadın) üzerinde yaptıkları çalışmada sağlık çalışanlarının HBV / HCV enfeksiyonlarına karşı orta düzeyde bilgi sahibi olduğunu ve katılımcıların (%51,5) hepatit bilgi düzeylerinin tatmin edici olduğunu belirtmektedir. In a study conducted in Iran that inquired about the knowledge level of nurses about Hepatitis B and C, it was stated that this rate was lower, that is, less than 50% of the participants had information (Joukar et al., 2017). In our study, the rate of those who emphasized that HCV is a viral liver infection is 71.6%.

The vast majority of nurses stated that healthcare personnel and patients should have serological tests associated with Hepatitis C at certain periods. In the study of Uçan et al. (2006), it was stated that the majority of nurses checked serological tests for Hepatitis B and C. The rate of those who wash their hands during the transition from patient to patient was found to be 39.5%. The most important factor held responsible for the transmission of infectious agents is the hands of healthcare professionals. Especially hands that are not decontaminated increase the risk. Hands should be washed after contact with body fluid, mucous membranes, disintegrated skin and wastes that may be sources of contamination and after removing gloves. In the study of Uçan et al., This rate was reported to be 47.9% (Uçan et al., 2006).

It was found that nurses used gloves most frequently, especially among barrier methods. It is stated in the study of Uçan et al. that this rate is high similar to our study. In the study of Parlar et al., it was determined that 97.7% of nurses wore gloves during patient care, but the rate of changing gloves decreased to 46.7% during patient changes (Parlar et al. 2003). In the study of Shlash et al. (2020) which was conducted with 30 nurses and 30 dialysis patients on isolation precautions for Hepatitis B and C, the rate of nurses always using gloves was found to be 53.3%. It was also observed that 70.2% of the nurses did not know the barrier methods such as gowns, face shields, eye masks or masks to protect themselves while performing the procedures in which blood gushes or splashes. In the study of Uçan et al. (2006), it is seen that the number of nurses who know these barrier measures is low. In the study of Shlash et al. (2020), it was stated that 63.3% of the nurses knew the infection control measures mentioned above.

6. CONCLUSIONS AND RECOMMENDATIONS

❖ Conclusions

- ✓ The study showed that the majority of nurses were male, with age group (21-25) years.
- ✓ The majority of the study sample was nursing institute graduate.
- ✓ The majority of the study sample had (6-10 years) years of experience in a hemodialysis unit.
- ✓ Most of the study sample had not shared in any training sessions related to hemodialysis (which established by hospitals, established by other hospital, and/or established by other institutes).
- ✓ The findings generally demonstrated that there was moderate knowledge of the major aspects of the infection control and preventive measures for hepatitis C in hemodialysis units.
- ✓ There was no significant relationship between gender, age, marital status, level of education, and Nurses' knowledge toward infection control measures.
- ✓ The study indicated that there was a significant relationship between age, level of education, years of experience in hemodialysis unit, sharing training sessions which established (by the hospital, by other hospitals, or by other institutions), duration of the training session and nurses' knowledge toward infection control measures.

❖ Recommendations

Based on the findings of the present study, the following recommendations were made:

- ✓ Modification of the ongoing training program regarding infection control to be more applied to hemodialysis units.

- ✓ Emphasis on improving the knowledge level regarding prevention of HCV transmission in HDUs in order to raise awareness and correct misconceptions.
- ✓ A booklet should be designed and distributed to all nurses those work hemodialysis units including standard infection control measures that must be applied and followed in hemodialysis units.
- ✓ Nurses who have the highest educational level should be assigned and worked in hemodialysis units.
- ✓ Further studies are necessary in order to assess nurses' practice toward infection control measures in HD units and to demonstrate the outbreaks that occur in HD units which are responsible for the increasing incidence of hepatitis infection.



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EKLER

EK 1: Etik kurul onayı, Genel Bilgi Formu vb.



Education

- ❑ Diploma in Critical Care Nursing (2017)
Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum
- ❑ Bachelor of Science in nursing (2015)
University of Baghdad.
- ❑ Diploma in TOT (Training of Trainer)
Ministry of Health of Iraq

Occupation:

Place of work : Thi-Qar health \ Al-Hussein hospital
Work Address : intensive care unite (ICU)

Languages

Native Language: Arabic

Foreign language: English (speaking and writing)

Teaching

- ❖ Critical care nursing
- ❖ Adult health nursing
- ❖ Health Assessment
- ❖ Fundamental of nursing