

ASSESSMENT OF THE NURSES KNOWLEDGE ABOUT
HEPATITIS B DISEASE AND VACCINATION AT AL
DIWANIYAH TEACHING HOSPITAL IN IRAQ

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HEPATITIS B DISEASE AND VACCINATION AT AL
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**The Institute of Health Sciences
The Department of Nursing**

The Degree of Master of Science in Nursing

**Supervisor
Asst. Prof. Dr. Yaşar Kemal YAZGAN**

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ACCEPTANCE AND APPROVAL

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ETHICS STATEMENT

The thesis entitled “Assessment Of The Nurses Knowledge About Hepatitis B Disease And Vaccination At Al Diwaniyah Teaching Hospital In Iraq” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and to me. The research pertaining to the thesis was conducted by myself and therefore, all of the used sentences and interpretations within the work belongs to me.

I declare the aforementioned issues to be correct.

29 July 2022

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ABSTRACT

ASSESSMENT OF THE NURSES KNOWLEDGE ABOUT HEPATITIS B DISEASE AND VACCINATION AT AL DIWANIYAH TEACHING HOSPITAL IN IRAQ

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Master of Science in Nursing

Advisor: Asst. Prof. Dr. Yaşar KEMAL YAZGAN

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The hepatitis B virus infects the liver; it can cause a potentially fatal infection (HBV). An enormous public health issue. It can lead to chronic liver disease and illness, increasing the risk of liver cirrhosis and liver cancer. This study aims to assess the knowledge of nurses' about hepatitis B vaccination at Al-Diwaniyah teaching Hospital, to find the relationship between demographic data and nurses' knowledge about hepatitis B disease and vaccination at Al-Diwaniyah teaching Hospital, and to assess the understanding of nurses' about hepatitis B disease at Al-Diwaniyah teaching Hospital. A descriptive design study was conducted at Al-Diwaniyah Teaching Hospital. The study population was selected among nurses of a Diwaniyah teaching hospital. A total of 200 nurses were included in the study. Data was collected by using a self-administered questionnaire. The study included 200 nurses aged 20 to 29 (32%). Male nurses outnumber female nurses by more than half (53%). Nurses were married and comprised most of the study sample (59%). At the same time, only 34% have less than five years of nursing experience. Finally, most participants (60.5%) did not attend training courses. The findings show that 61% of nurses do not know about hepatitis B. Then those who said yes (33%) and those who said no (6%). The findings show that most nurses (78%) did not know the Hepatitis B vaccine, followed by those who said yes (12.5%). And who said no (9.5%). The study confirmed that most nurses do not have sufficient knowledge due to a lack of training courses.

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Keywords: HBV, Knowledge, Vaccination, Assessment, Nurses.

ÖZET

IRAK AL DIWANIYAH EĞİTİM HASTANESİNDE HEMŞİRELERİN HEPATİT B HASTALIĞI VE AŞILARI HAKKINDAKİ BİLGİLERİNİN DEĞERLENDİRİLMESİ.

Azhar AL DELESAT

Hemşirelik, Yüksek Lisans

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Hepatit B virüsü karaciğeri enfekte eder, potansiyel olarak ölümcül bir enfeksiyona (HBV) neden olabilir. Çok büyük bir halk sağlığı sorunu. Karaciğer sirozu ve karaciğer kanseri riskini artıran kronik karaciğer hastalığına ve enfeksiyona yol açabilir. Bu çalışma, Al-Diwaniyah Eğitim Hastanesi'ndeki hemşirelerin hepatit B aşısı hakkındaki bilgilerini değerlendirmeyi amaçlamaktadır. Al-Diwaniyah Eğitim Hastanesinde hemşirelerin demografik veriler ile hepatit B hastalığı ve aşılama bilgileri arasındaki ilişkiyi bulmak ve Al-Diwaniyah Eğitim Hastanesinde hemşirelerin hepatit B hastalığı hakkındaki bilgilerini değerlendirmek. Araştırma: Al-Diwaniyah Eğitim Hastanesinde tanımlayıcı bir tasarım çalışması yapılmıştır. çalışma evreni diwaniye eğitim hastanesinin hemşireleri arasından seçilmiştir. Çalışmaya toplam 200 hemşire dahil edildi. Veriler, kendi kendine uygulanan anket kullanılarak .Çalışmaya yaşları 20 ile 29 arasında değişen 200 hemşire (%32) dahil edildi. Erkek hemşirelerin sayısı kadın hemşirelerin yarısından fazlası (%53). Hemşireler evlidir ve örneklemin çoğunluğunu (%59) oluşturmaktadır. Sadece %34'ü 5 yıldan az hemşirelik deneyimine sahipken . Son olarak, katılımcıların çoğu (%60,5) eğitim kurslarına katılmamıştır. Bulgular, hemşirelerin %61'inin hepatit B hakkında bilgisi olmadığını göstermektedir. Daha sonra evet diyenler (%33) ve hayır diyenler (%6). Bulgular, hemşirelerin çoğunluğunun (%78) Hepatit B aşısı hakkında bilgisinin olmadığını, bunu evet diyenlerin (%12,5) izlediğini göstermektedir. Ve kim hayır dedi (%9,5).Çalışma, hemşirelerin çoğunluğunun eğitim kurslarının olmaması nedeniyle yeterli bilgiye sahip olmadığını doğruladı.

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Anahtar Kelimeler: HBV, Bilgi, Aşılama, Değerlendirilme, Hemşireler.

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LIST OF ABBREVIATIONS

HBV	Hepatitis B Viral
WHO	World Health Organization
CDC	Centers for Disease Control and Prevention
HIV	Human Immunodeficiency Virus
HbsAG	Hepatitis B Surface Antigen
HCPs	Health Care Professional's
CHB	Chronic Hepatitis B
HCWs	Health Care Workers
PEP	Post-Exposure Prophylaxis
HCC	Hepatocellular Carcinoma
ICU	Intensive Care Unit
MS	Mean of scores
SD	Standard Deviation
SPSS	Statistical Package for The Social Science

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1. INTRODUCTION

Infectious hepatitis is accompanied by several clinical, biochemical, and cellular changes, including necrosis and inflammation of liver cells, among other things. Hepatitis (A, B, C, and D) are all contagious diseases, while hepatitis (B, C, and D) share certain characteristics with hepatitis A regarding appearance. Approximately 60 to 90 percent of viral hepatitis infections, according to the most current estimates, go unreported. (CDC 2017).

The hepatitis B virus (HBV) is a DNA virus with an enclosure that is a member of the Hepadnaviridae group and causes hepatitis B. (Rajoriya *et al.* 2017).

Throughout the globe, When it comes to infectious diseases, hepatitis B is one of the most common to affect people, and it is linked with a high incidence of morbidity and death. Around 2 billion people are thought to be infected with the hepatitis B virus (HBV) worldwide, with approximately 257 million people suffering from chronic HBV infections, according to the World Health Organization, according to current estimates of the disease. A total of 887,000 persons died as a consequence of acute or chronic complications of hepatitis B in the United States year 2015. (WHO 2019)

As a result, Hepatitis B, cirrhosis, and hepatocellular carcinoma are all possible results. The non-cytopathic hepatotropic DNA virus Hepatitis B causes all liver disorders (HBV). As many as 240 million individuals around the globe are infected with HBV on a long-term basis, in the world's population, making up about a third of the total. Regarding the cellular processes of HBV infection are concerned, the outcome is unclear. (Singh *et al.* 2018) .

In addition, HBV is a virus that may cause acute and chronic infections when it comes into contact with contaminated blood or bodily fluids. Sexual transmission, especially adult homosexual intercourse, is the primary mode of infection transfer in regions with

low endemicity. Another important transmission mode is parenteral administration, mainly where injectable drugs are often used. (Kim and Kim 2018).

Therefore, it is necessary to find a vaccination to give excellent protection and is a safe and efficient technique for protecting populations from having acute or chronic hepatitis B, according to Marinho *et al.* (2015). More than 90 percent of doses of the current vaccination are effective after three rounds. The vaccination protects against all HBV genotypes and serotypes.

Available since 1982HBV vaccination also protects against infection to 95%. The WHO advises that all babies get an HBV immunization within 24 hours after birth, with the first dose being given immediately after birth. As long as the protection is in place, it may persist for up to 20 years or even longer. It protects against hepatitis B, the leading cause of liver cancer. It is the first "anti-cancer vaccine" ever developed. (Ohlson *et al.* 2015).

According to another study, hepatitis B vaccines are available to people of all ages who need them. After a follow-up investigation, the researchers discovered that the (B) vaccination might protect for up to 30 years after being administered, indicating that the immunization is successful. (Bruce MG *et al.* 2016).

And It was used for the first time in the United States in 1995 and 1981 to reduce the chance of contracting the Hepatitis B virus (HBV). (Shahlaa Ali *et al.* 2021).

According to the results, using barriers such as changing gloves for each patient, using clean needles for each patient, properly sterilizing medical or surgical equipment, and incorporating the hepatitis B vaccine into everyday life may lower the risk of occupational hepatitis. (Hassan and Muhbes 2020).

To stop the spread of hepatitis B, practicing excellent hand hygiene, clean medical equipment, and proper waste management when handling contaminated materials is

essential. There is, however, a significant lack of understanding about the dangers of HBV infection in the workplace among trainees in the health profession. (Rathi *et al.* 2018) .

During a research project in Saudi Arabia, it was found that 16.5 percent of physicians and nurses in Saudi Arabia hadn't received an HBV vaccination and that 31.2 percent of those who hadn't had an HBV vaccine thought it wasn't safe or weren't sure. More than a quarter (26 percent) of those polled said they hadn't been vaccinated because they couldn't afford it or thought it wasn't practical (36.4 percent). If the Ministry of Health does not enforce the provision of free vaccines and illness information, it will not be possible to enhance public health understanding. (Leung JTC *et al.* 2018).

Hepatitis B infection is prevalent due to a fault in equipment sterilizing processes or inadequate hospital waste management. Annually, over 2.1 million healthcare workers are exposed to HBV-infected sharp injuries. It is possible to reduce the transmission of viral hepatitis to all users of alcohol by strictly using universal precautions for all intrusive medical operations and implementing efficient infection prevention approaches. (Gebremeskel *et al.* 2020) .

Furthermore, chronic Hepatitis B virus (HBV) infection is the leading cause of liver disease and hepatocellular carcinoma in low-resource areas in people with the virus. Hepatitis-related mortality and morbidity are enormously reduced when the disease is detected early. Ironically, Africa has the worst laboratory facilities in the world, resulting in a lack of diagnosis of HBV. As a result of previous studies on HBV rapid tests showing wildly unpredictable results and the high cost of these tests making them unaffordable in resource-constrained regions. (Leathers *et al.* 2019).

Health care workers can also become infected with the HBV virus through mucosal-cutaneous exposure to blood or blood products that might be dangerous or through percutaneous contact with contaminated sharp objects (eyes, mouth mucosa, or skin) (needles, blades, etc.). Mucosal-cutaneous exposure makes up 25% of total occupational

exposure, while percutaneous exposure makes up 75% of that exposure. (Elseviers *et al.* 2014).

As a result, nurses employ precaution as one of the essential strategies for preventing anything wrong from occurring at the place of employment. The proper disposal of used disposable syringes, needles, and lancets, cleaning the work area, and wearing gloves and gowns are all critical. Avoid direct contact with bodily fluids, blood, and itchy mucous membranes when practicing infection management. (Mahrous 2016).

1.1. Important of the study

Infection with the Hepatitis B virus (HBV) is a significant public health concern worldwide, especially in developing countries. It is the tenth most common cause of death in the world. And one of the world's most severe infectious infections, especially in developing areas. HB is a bloodborne infection that is 50 to 100 times more contagious than HIV (Centers for Disease Control and Prevention). Globally, HB infection is the most common cause of chronic liver disease and is responsible for 80 percent of all liver cancer deaths. (Balew *et al.* 2014).

In addition, HBV infection is linked to about 54% of all cases of hepatocellular carcinoma (HCC). HBV does not encode a prototype oncogene because it is a noncytopathic virus. Inflammation, apoptosis, and regeneration are consequences of the host immune response, leading to liver damage and gene expression changes caused by genetic and epigenetic changes. Additionally, hepatocarcinogenesis may be exacerbated by genomic instability caused by the Integration of HBV DNA and the ability to repair damaged DNA. In addition, the viral regulatory protein HBx's indirect oncogenic role has been hotly debated. Research has shown that HBx alters epigenetics and signal transduction pathways, inducing oxidative stress, changing DNA repair, altering the dynamics of chromosomal stability, and affecting cellular homeostasis. (Slagle *et al.* 2018)

Thus, Viral hepatitis claimed the lives of 1.34 million people in 2015, which is expected to rise in the years to come. The number of people infected with chronic Hepatitis B has been estimated at 3.5% of the worldwide population. Healthcare workers are still at risk of contracting hepatitis B, even with the availability of effective vaccination. (Chhabra *et al.* 2019).

Early childhood HBV infection has the highest rate of chronic hepatitis and the most significant number of chronic carriers despite a vaccine against the virus. Hepadnaviridae is a family of pararetroviruses that replicate through reverse transcription. HBV is a member of this family. (Hu 2016) .

Although research suggests that primary care providers are generally aware of the current recommendations for CHB management, there is an indication that they are not adhering to these recommendations to a sufficient degree. Several studies conducted in the United States found that treating physicians did not adhere to CHB practice guidelines, monitoring CHB conditions using markers such as HBV DNA and ALT, performing liver biopsies to guide treatment decisions, and starting anti-HBV therapy in patients who were considered eligible for anti-HBV therapy, using proposed agents, and monitoring HCC surveillance were particularly problematic. (Wu *et al.* 2014)

As a result, nurses play a significant role in preventing and controlling surgical site infections since they are in charge of a substantial percentage of the surgical patient's treatment and care. Doctors and healthcare workers such as nurses, theater managers, lab technicians, and hospital cleaning staff may follow infection control rules and uniform procedures for hospitals and surgical operators to reduce cross-contamination. (Hassan *et al.* 2018).

Hepatitis B causes turmoil and distress for individuals, communities, and health care systems because of the spread of the virus Hepatitis-related acute infections and liver cancer are predicted to claim the lives of 1.4 million people each year, and cirrhosis. (WHO 2016).

As a result, Hepatitis B affects around 10% of the world's population, per the Health Organisation (WHO). An estimated 1.4 million individuals yearly die from acute infection, hepatitis-related liver cancer, and cirrhosis. Since there is no cure for hepatitis B, the number of people infected with the virus is expected to climb. (Gebremeskel *et al.* 2020).

And HBV is a virus that primarily affects the liver and can cause acute and long-term health issues. Pregnancy and delivery, sexual contact with an infected partner, improper injections, or exposure to sharable tools are the most common ways it is transmitted. With an annual rate of 1.5 million new HB infections, the WHO predicted that 296 million individuals would be chronically infected in 2019. The primary causes of death are cirrhosis and hepatocellular carcinoma from HB in 2019. HB may be prevented through safe, accessible, and effective vaccines. According to the WHO, vaccination is the best approach to avoid HB, and it is safe for people of all ages (WHO 2019).

According to recent research, nursing students and staff are at risk of contracting the hepatitis B virus through exposure to body fluids. In addition to skin injury, mucous membrane or unsuitable skin in contact with potentially infectious fluids such as blood or other body fluids poses an infectious risk. HBV is a highly contagious virus that may live on surfaces for up to seven days, even if no blood is present. (Haider Mohammed and Widad 2021) .

According to the CDC, chronic hepatitis B infection affects Asians, mainly Arabs from the Arabian Peninsula, at a higher rate than any other ethnic group. Among the side effects are liver cirrhosis, liver cancer, and even liver failure. According to screening programs, approximately 10–15% of healthcare workers in the United States are chronically unwell. In contrast, just 0.5% of the overall population is infected with HBV. (Alshammari *et al.* 2019).

In addition, Patients and other health care providers rely on nurses to teach them how to protect themselves and each other from damage and the dangers of unnecessary needlesticks and other forms of hepatitis-related medical interventions. Healthcare

workers educate patients or their families about hepatitis prevention activities such as vaccination and education about the disease's spread, as well as encourage them to participate in virus screening, treatment, and education about the outcome, all of which promote effective communication and teamwork in practice. (Hassan and Muhbes 2020) .

So, Healthcare employees throughout the globe are affected by a range of factors that include a lack of knowledge and awareness, misperceptions, and distrust of the healthcare system. In addition to The cost and availability of vaccines (Abidi *et al.*2018).

1.2. Problem description

Hepatitis B is a severe occupational disease. Nursing staff who handle blood are at risk. HBV is highly contagious due to its high prevalence amongst those in the medical profession and the frequency with which they are exposed to blood and other bodily fluids. Contact with an infected person's body fluids, particularly contaminated blood, is one of the effective methods of transmission of the hepatitis B virus. The HCWs (41%) are the most susceptible to infection. Various techniques and therapies can help reduce HBV transmission among HCWs. There are three ways to vaccinate against HBV: at 0 months, one month, and six months..(Muzyin *et al.* 2015).

1.3. Objectives of the study

- Bla To assess the knowledge of nurses about hepatitis B vaccination at Al-Diwaniyah teaching Hospital.
- To find the relationship between demographic data and nurses' knowledge about hepatitis B disease and vaccination at Al-Diwaniyah teaching Hospital.

- To assess the ability of nurses with hepatitis B disease at Al-Diwaniyah teaching Hospital.

1.4. Hypotheses

- Is vaccination status related to knowledge of viral hepatitis B?
- There is no relationship between nurses' knowledge of viral hepatitis B and their workplace
- There is a relationship between nurses' understanding of the hepatitis B vaccine and their educational level.

1.5. Definition of terms

1.5.1. Assessment

Theoretical Definition

That is the initial stage of nursing practice. It entails an organized gathering of the individual's physical, mental, spiritual, social, and cultural status that enables the nurse to aid the patient. (Hassan and Muhbes 2020)

Operational Definition

Is a system or process for acquiring commonality facts on a status or individual, as well as work judgments regarding knowledge, ability, and skills

1.5.2. Nurses

Theoretical Definition: Is a health care professional who helps individuals and families achieve optimal health and disease-free communities. The nurses' approach to getting close to patients, analyzing their needs, and providing health care sets them apart from other members of the healthcare team (Shahlaa Ali *et al.* 2021)

Operational Definition:

A nurse is a person who offers optimal health care to patients or improves their health condition. Nurses also play a vital role in educating the public about various health-related issues.

1.5.3. Knowledge

Theoretical Definition

Truth, skills, and knowledge gained from experiment or teaching; theoretical or work understanding of the topic (Skaf *et al.* 2021).

Operational Definition

Is the facts or concepts that an individual may know as a result of studies, inquiries, observations, or experiences

1.5.4. Hepatitis B

Theoretical Definition: An infected blood, sperm, or saliva spreads a DNA virus. Hepatitis B infection can cause chronic liver disease, cancer, and fibrosis. (Hilal and Juma Jabur 2021).

Operational Definition: is liver irritation and swelling caused by hepatitis B virus infection (HBV)

1.5.5. Vaccination

Theoretical Definition It is a biological treatment that gives acquired immunity against a particular infectious disease. (Sultana and Janet 2020) .

Operational Definition: protect humans from infections caused by bacteria and viruses.

1.6. Limitations

Lack of accurate statistics on the number of nurses vaccinated with hepatitis B virus in Al-Diwaniyah Teaching Hospital

2. LITERATURE REVIEW

2.1. Historical Background Of Hepatitis B Virus

It is a member of the Hepadnaviridae family, including viruses found in certain species of primates, rodents, and bats. It is also a member of the avihepadnavirus family, found in certain bird species. this virus family is distinguished by a distinct viral replication cycle that includes a reverse transcriptase (rt) step late in the genomic replication process, which is unique among viruses. (Revill et al., 2020) .

Thus, some bird species recognize endogenous hepadnaviral species (hepadnaviral species that have become integrated into the germline) (Lauber et al., 2017). and some reptile species have revealed a much more ancient ancestry of Hepadnaviridaethan could be inferred from the coalescence times of modern Hepadnaviridae. according to comparative phylogenetic analysis, the Hepadnaviridae have an extremely ancient origin (>200 million years ago)⁴⁰ due to the presence of endogenous viruses. (Geoghegan et al., 2017) .

According to Bloomberg and colleagues, in 1965, the antigen of HBV was first detected in an Australian aborigine, which is now known as surface antigen but was initially referred to as "Australia antigen." (Tsukuba et al., 2020)

In another study, jaundice epidemics were documented by the Romans in ancient china and Mesopotamia, indicating the presence of viral hepatitis outbreaks. There are two Greek words for this disease: Hepar (liver) and itis (infection) (inflammation). It first appeared in print in the 1700s. During wars such as the American civil war and world war II, hepatitis a and b were common. Hundreds of thousands of hepatitis c cases were reported during the first world war, and approximately 16 million infections were reported during the second world war. Serum hepatitis (type b) has a relatively short incubation period compared to hepatitis a (infectious), which has a lengthy incubation period. discouraging hepatitis-infected donors has been in place since the late 1950s,

long before the discovery of hepatitis viruses or the development of screening technologies. (Ali naheed, 2018) .

Viral DNA causes liver damage six weeks to 6 months after infection with the hepatitis b virus (HBV). Dr discovered it. Baruch Blumberg in 1967. also, in 1969, a vaccine to control the development of the hepatitis b virus wasn't available. There are several ways to prevent and treat the disease that depends on the patient being infected. active immunization is accomplished through vaccination, which became open to the public in 1981. (Hassan And Muhbes, 2020).

So, hepatitis b vaccination was first made available in iraq in 1993 as part of the expanded program of immunization (EPI), administered to children under five. individuals over the age of 30 were not vaccinated under the epi, which was implemented by international standards. (Starkey et al., 2013).

2.2. Epidemiology Of hepatitis B

According to Stanford university's Asian liver center, HBV is present in the bodies of 400 million people worldwide. with a global prevalence of 10%; the Asian community has the highest prevalence. per the disease control and prevention centers, 260,000 people live with chronic hepatitis b infection in Asia. (CDC, 2015).

Thus, HBV infection was discovered in 3.5 percent of a 2015 estimate of the worldwide people before the advent of the hepatitis b vaccination. The proportion of people living with hepatitis b was much higher. There is still an increased incidence of chronic HBV. Approximately 2.7 million people live with hiv/aids, and an estimated 257 million have HBV. . (WHO 2017).

So, there are an estimated 3.5–5.3 million people in the united states who are infected with chronic viral hepatitis. Even though viral hepatitis can cause significant liver damage before the patient experiences any symptoms, it is often an undetected infection. Many people go undiagnosed and untreated for hepatitis because symptoms can take decades to appear. as a result, between 2010 and 2020, an estimated 150,000

Americans will die from liver disease caused by hepatitis or cancer. (Hilal And Juma Jabber, 2021).

There was a study in Brazil indicated that 1433 healthcare workers and 872 administrative personnel from a selected hospital, as well as 2,583 blood donor candidates from blood, took part in a prospective prevalence study to assess the prevalence of hepatitis B virus (HBV); the majority of hepatitis B virus (HBV) was observed to be higher among healthcare workers. (0.8 percent) than in the general population. When it came to the occupations of potential blood donors (0.2 percent), the length of time spent on the job mattered most. (Huseyin et al., 2015).

The failure to follow universal precautions or a lack of vaccination may have caused 2.5% of Nigerian midwives to contract HBV while on the job, according to a recent study there. (Ella et al., 2016) .

When Ibrahim looked at the prevalence of hepatitis B virus (HBV) among healthcare workers, he found that 26.3% of them were infected, which was higher than the study's comparator group's (14.5%) 14.5 percent prevalence rate. (Ibrahim C, 2019).

In Iraq, pre-surgical patients have a viral hepatitis carrier rate of 5.9 percent, which is among the highest in the eastern Mediterranean (er) countries. Studying Basrah blood donors from 2013, it was discovered that 2.3 percent of the population had evidence of hepatitis B virus infection. While learning about Babylon governorate blood donors, researchers found that 2.3 percent of the population had evidence of hepatitis B virus infection in 2008 (0.7 percent). Basrah and Babylon both had a seroprevalence of anti-HCV of 2.1 percent and 0.5 percent, respectively, higher than previous research and (2.8 percent) of the population in Iraq. (Al-Asadi & Abdul-Jalil, 2016) .

So, the transmission of viral hepatitis through blood contact carries the risk of contracting other bloodborne diseases, such as HBV. According to research conducted in 2011 at the Wasit governorate thalassemia center, 24.2 percent of thalassemia patients who received blood transfusion were found to be anti-HCV positive, compared to 0.6

percent of patients with HBV older than 25 years who were found to be anti-HCV negative. (Muslim, 2014).

In addition, infected blood and bodily fluids can spread HBV and HCV, making them highly contagious. about 0.7 percent of the population of Babylon and Najaf tested positive for HBV, but the blood supply of the city of Kerbala was heavily contaminated by blood donors (3.5 percent). (Hussein And Taher, 2015).

2.3. Hepatitis B virus

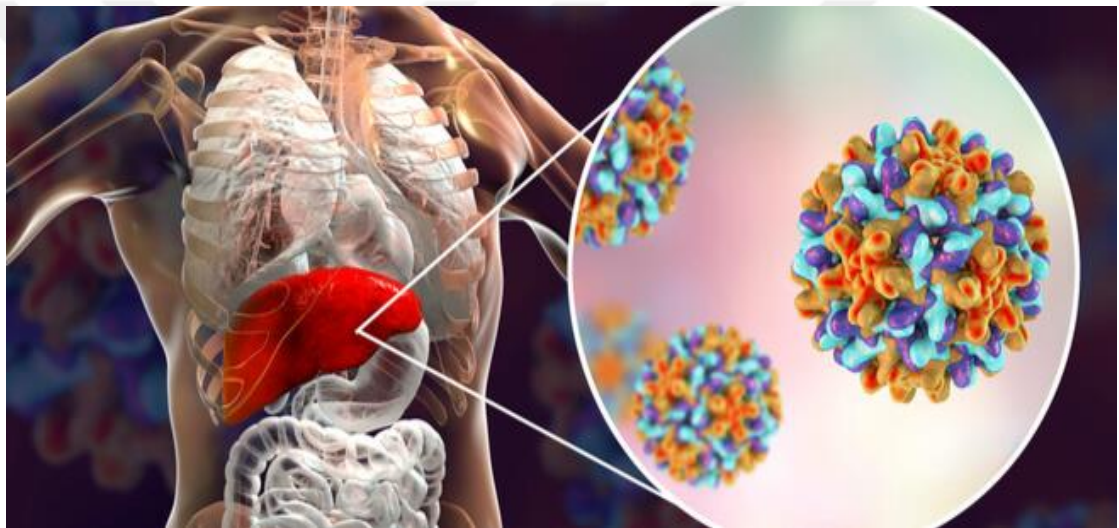


Figure 2.1 Hepatitis B virus. (Hatchet Shaher, 2020)

It belongs to the genus Hepadnaviridae and has a 3.2 kb genome that is partly double-stranded (Seeger et al., 2015). Perna, the template for HBV DNA replication, is generated by reverse transcription of pre-genomic RNA (pgRNA) derived from circular DNA that has been covalently closed (cccDNA) throughout the HBV life cycle (Seeger et al., 2018 Nassal et al., 2015). The HBV genome changes at a pace of 10^{-3} to 10^{-6} nucleotide substitutions each replication cycle because viral polymerase lacks a proof-reading function (Tong et al., 2016). As with retroviruses the HBV genome replication process includes a reverse transcription phase, but the genome's complex structure with overlapping open reading frames and regulatory regions seems to restrict the number and variety of mutations (Glebe et al., 2013). Due to HBV's unusual replication method,

the virus' genomes have a wide range of genotypic and subtypes variation as well as mutations, recombinants, and even viral quasi-species during its evolutionary history (lin et al., 2015). Hepatitis B viral (HBV) formation variations may play a critical role in the advancement of liver disease caused by HBV, according to many reports (Zhang et al., 2016).

It is considered so; one of the most dangerous liver diseases known to man is hepatitis b, caused by the hepatitis b viral (HBV). It's crucial to point out that this is a worldwide health concern. There is a risk of cirrhosis and liver cancer death due to long-term liver damage and infection. According to the who, hepatitis b is the most prevalent liver illness caused by a DNA virus (who). Compared to HIV, the virus exhibits a 50–100-fold increase in contagiousness worldwide; HBV is one of the primary causes of illness and mortality and a leading cause of death. (Mustafa Wahab,2016).

Thus, in most cases, blood tests are used to detect HBV antibodies. Acute or chronic infection can be determined through testing; in most cases, recovery occurs in adulthood. Chronic liver disease and inflammation occur in approximately 5% of cases. Chronic HBV is more likely to develop if a person is infected at a young age. when HBV is transmitted through breast milk, newborns' risk of persistent infection is as high as 90. (Public Health Authority Of Sweden, 2015)

A Blood test is typically used to detect HIV antibodies in the blood. Tests can determine whether an infection is acute or chronic; in most cases, recovery occurs in adulthood. About 5% of people with liver disease have long-term infections or inflammation. If a person is infected with HBV at a young age, chronic HBV infection is more likely to occur in these individuals. when HBV is transmitted through breast milk, newborns' risk of persistent disease is as high as 90%. (Mohebbi et al., 2018).

2.4. Mechanism of action about HBV in the body

In humans, HBV enters hepatocytes through the sodium taurocholate transporting polypeptide (TCP) and the epidermal growth factor receptor (EGF-R) proteins (Iwamoto et al., 2019).

A genomic RNA is the molecular basis for viral infection establishment and maintenance (pagina). An immature viral capsid is formed by homomultimers of the viral core protein in the cytoplasm, which incorporates pgRNA and viral polymerase as a specific ribonucleoprotein complex to replicate (HBC). Others use the covalent attachment to the minus-strand DNA to start reverse transcription, but HBV polymerase attaches to the five ' ends (protein priming). (Hu et al., 2016) .

Proteins are now ready to be used. The HBV polymerase converts pgRNA to ssDNA, then cDNA, while the RNase H activity of the HBV polymerase degrades the remaining RNA in the presence of RNase. (Hu et al., 2019).

Encapsulated rcDNA could be released from the body in the form of virions. If delivered to the host cell's nucleus, DNA from an intracellularly mature capsid may help promote viral persistence by triggering the synthesis of additional circular DNA molecules (Nassal And Michael, 2015).

There may be other host or viral proteins, as well as histones, in the host cell nucleus, which form a minichromosome where the CCCDNA can be found. (Tropberger et al., 2015.).

2.5. Acute viral hepatitis B

All but a few patients experience no symptoms during this period. On the other hand, some patients are afflicted by severe illnesses, and their symptoms can last for weeks. Skin and eye yellowing, black urine, and pale feces are signs of jaundice—discomfort in

the right upper abdomen and fatigue, nausea, and vomiting. Acute liver failure can result from immediate hepatitis, which can be fatal. (Kapungumberi et al., 2018).

So, acute hepatitis b infection can lead to chronic hepatitis B if the patient is of a certain age. Regarding chronic disease, only 5% of adults are infected. Compared to 90% of children, if HBV is transmitted before the age of five, chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC) are all possible outcomes. If the disease is transmitted during adulthood, acute infections, such as fulminant hepatitis, would account for most of the disease burden. Acute hepatic failure occurs in approximately one percent of HBV-infected individuals. only 0.9 percent of the 53,312 people studied had an acute hepatic failure due to HBV. (Kim et al., 2018)

2.6. Chronic viral hepatitis

Most patients with CHB in western countries are from high or moderate endemic areas (Asia, Africa, Australia, central and south America, and the Mediterranean), accounting for 50 percent to 95 percent of all patients with CHB in western countries. (Lefevre MI; 2014)

Thus, it's hard to escape the impact of chronic liver disease's four primary sources of social stigma: rejection from loved ones, the threat to one's job security, humiliation due to the fear of the illness being revealed, and social isolation (feeling isolated from others). Nearly two-thirds of those polled said to protect themselves and others from the dangers posed by HBV carriers. More than a third of HBV sufferers reported feeling guilty and humiliated because of their disease. asymptomatic infected people prefer anonymity and social injustice because of the long-term adverse effects of HBV infection. (Valizadeh et al., 2017).

In addition, chronic hepatitis B (CHB) can lead to cirrhosis, hepatic decompensation, and hepatocellular carcinoma (HCC), among other conditions (HCC). Human papillomavirus (HBV) infection is quite common in China. HBV affects 93 million

people, whereas chb affects 30 million. Patients, families, and society in china are all impacted by illnesses linked to the cholera pandemic (CHB). In china. The therapy is intended to prevent long-term complications. although long-term off-treatment responses and infection eradication are rare with antiviral therapy for CHB, it is necessary to continue treatment to maintain clinical improvements. (Kong et al., 2018).

To diagnose chronic hepatitis b, HBsAg positivity for more than six months is considered a symptom (CHB). A person's ability to progress from acute to chronic infection depends partly on how old they are when they become infected with the chb virus. 80 to 90 percent of infants infected in the first year of life develop chronic infections, and 30 to 50 percent of children infected before age six recover from chronic diseases, according to a study published in pediatrics. (Kapungumberi et al, 2018).

In contrast to regions in western and North America, where less than 1% of the adult population is chronically infected, many epidemiological studies have revealed different levels of hepatitis b endemicity worldwide. according to the world health organization, places with high endemicity include sub-Saharan Africa and East Asia, where 5-10% of the adult population is chronically infected (WHO). (Ofori-Asenso,2016) .

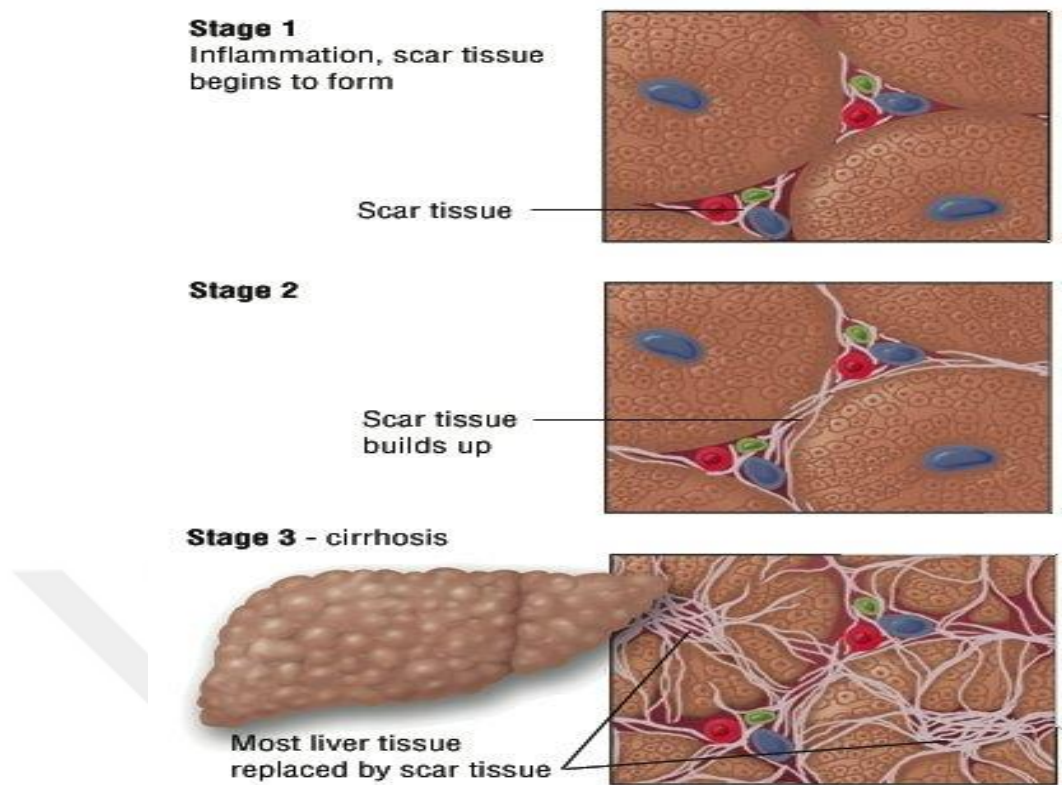


Figure 2.2 Stages of development with chronic hepatitis (cirrhosis) (Anderson et al., 2018).

2.7. Anatomy and physiology of the liver

The liver is the body's largest solid organ, largest gland, and most vital organ. inhibits the flow of digestive chemicals into the systemic circulatory system to maintain optimal liver function. A complete liver failure causes death in minutes, this study evaluated liver physiology. About 2.5 percent of a person's body weight is in the liver. The liver has a smooth, dome-shaped surface on the inferior surface of the diaphragm concavity. The thoracic cage and diaphragm protect the liver from harm. Left nipple liver crosses midline between ribs 7–11. right, left, caudate, and quadrate lobes of the liver. They are followed by smaller caudate and quadrate lobes. Anteriorly, there are two ligaments. The falciform ligament divides the brain's right and left lobes (Ozougwu, 2017).

In other words, the liver is the body's primary metabolic organ. As well as essential proteins like albumins, transferrin, and coagulation factors, the liver produces lipids and lipoproteins and stores them there. examples of non-tumorous and tumorous liver diseases resulting from ros and runs formation include nonalcoholic liver cancer and fatty liver disease (hepatocellular carcinoma). (Klieser et al.,2019)

Small, bloodborne, and complex, the hepatitis virus cycle is spread through the bloodstream by an initial infection stage. It is believed that hepatitis b viruses attach to liver cells, known as hepatocytes, and then move through the cytoplasm of these cells into the nucleus, where they change DNA into a covalent closed circular form (CCCDNA). On the other hand, the highly stable covalent closed circular DNA can remain in the nucleus of a chronically ill host for several months. after invading a new hepatocyte or repeating the copying process, viruses produce copies of themselves, which allow them to be transformed into new viruses and released into circulation. (Oakes, 2014).

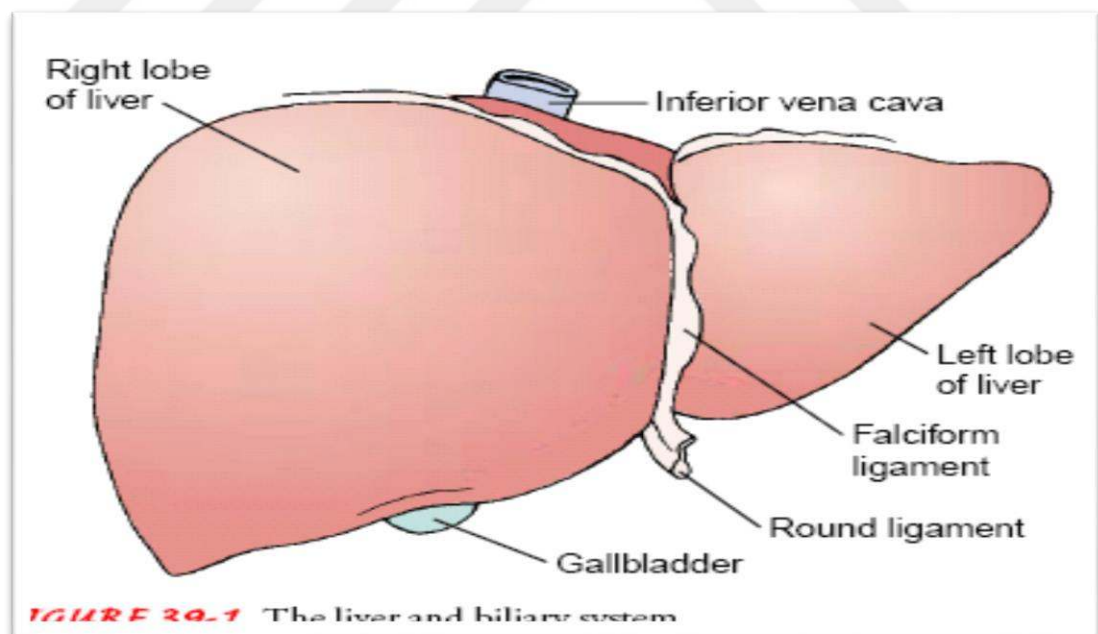


Figure 2.3 Anatomy Of The Liver (Hinkle et al.,2018).

2.8. Signs and symptoms of the diseases

Hepatitis viruses can cause various symptoms, ranging from anorexia and malnutrition to fatigue and anaphylaxis. The most common symptoms of viral hepatitis include anorexia, nausea, vomiting, fever, fatigue, and an allergic reaction. Other signs that emerge in the later stages of the disease include black urine, light feces, an abnormally high body temperature, and jaundice (Davis And Marks, 2018).

Hepatitis B has a 45–160-day incubation period and is more common in adults than children. In the early stages of hepatitis b infection, the most common early prodromal symptom is jaundice, lasting anywhere from three to ten days. Several symptoms begin 1-2 days before the onset of yellowing of the skin and eyes, such as anorexia, nausea, and stomach discomfort (especially in the right quadrant). Dark urine, jaundice, hepatitis discomfort, and hepatomegaly are symptoms of this stage of the disease. The healing process begins when the absence of symptoms and the restoration of normal urination and feces in cases of hepatitis six to eight weeks after exposure. (Hamborsky et al., 2015).

All these viral hepatitis and hepatitis b share several symptoms, including but not limited to: some of the symptoms include fever, abdominal discomfort, nausea and vomiting, diarrhea, gray-colored bowel problems, muscle pain, and jaundice. (CDC, 2017).

2.9. Transmission of viral hepatitis

Infected blood or bodily fluids, such as those from a hepatitis b patient, can be transmitted to healthy individuals through skin puncture or mucosal contact. The HBV virus must survive for at least seven days on surfaces before it can be shared, making it highly contagious and dangerous to the public's health. the primary reservoir for HBV transmission is a chronic infection, which facilitates the spread of the disease (e.g.,

those with recurrent hepatitis b surface antigen [hbsag] in the serum for at least six months following acute infection). (Schillie et al., 2018).

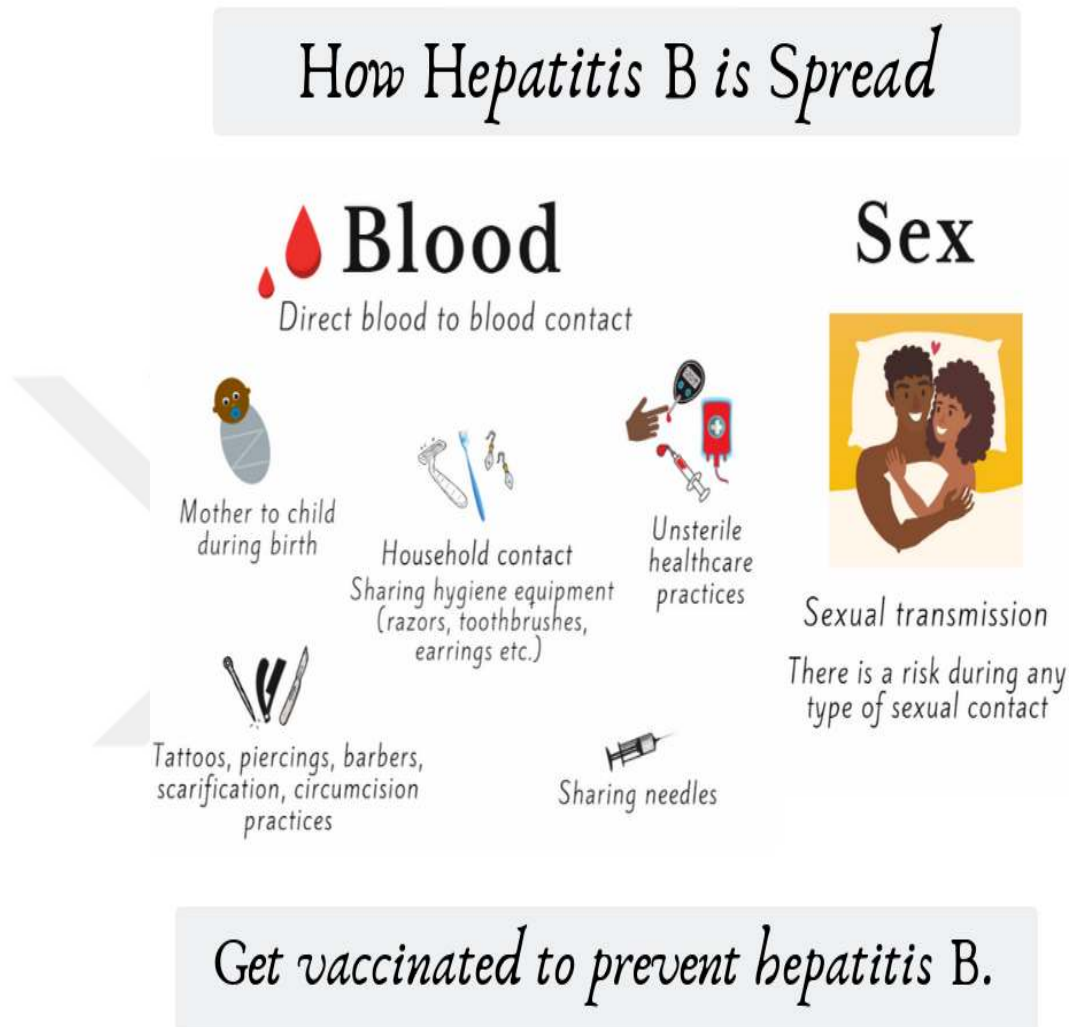


Figure 2.4 Hepatitis B transmission (2020).

Climate tolerance is a significant factor in the virus's rapid spread worldwide (about one week at room temperature). The spread of the disease was significantly reduced after the vaccine's introduction. HBV surface antigen (HBsAg) and hepatitis b core antigen (HBCAG) antibodies are essential in diagnosing and treating hepatitis b. (Anti-HBC).

due to the availability of HBV nucleic acid testing for blood donor screening, the prevalence of HBV has decreased. (Stasi et al., 2017).

In developing countries, sharps injuries account for 40% to 60% of occupational HBV infections. An ns1 can infect up to 100 people with HBV in a single blood vial. Transmission of HBV is influenced by two factors: the individual's level of exposure to infected material and the presence of HBeAg in the source. When both HBsAg and HBeAg antibodies are detected in the blood, the risk of HBV transmission increases significantly (32–67 percent). individuals who test negative for HBeAg has a transmission risk of less than 6%. (Kashyap et al., 2018) .

Regarding HBV can be spread from patient to patient or hospital employee to patient in a hospital setting. For the transmission of hepatitis b, direct contact with an infected person and indirect contact with a contaminated surface is possible. Multiple medication vials and capillary blood collection were the most common means of transmitting the hepatitis b virus.(kapungumber et al., 2018).

And the most prevalent way that how is transmitted to a patient is through injuries caused by infected needles. More than 385,000 nsis were reported in the united states per year between 1997 and 1998. (maccannell, laramie, gomaa & perz 2010:24). injuries from ns1 injuries occurred to 37% of nurses in the UK throughout their careers. (Muljono et al., 2018).

Thus, blood-stained surfaces act as reservoirs for HIV transmission without regular cleaning and sterilization. When nurses use infected devices or materials, they risk spreading the virus to patients. hepatitis b typically goes undetected for 40–180 days before symptoms appear. (Haider Mohammed And Widad , 2021) .

So, Asians are more likely to contract the disease through different means. According to (The Hepatitis B Foundation 2015), unprotected intercourse with adolescents is the most common method of infection among Asians (2015).

In addition, each pregnant woman in Ethiopia was screened during antenatal care for viruses, especially hepatitis b, and risk factors for infection were blood transfusions, body tattooing and surgery, a history of sharps, and risk factors for abortion or unsafe injections. the prevention of the spread of infection with the hepatitis b virus was also made possible through education about the risks and transmissions. (Zenebe et al., 2014).

So hepatitis b is the most common form of hepatitis. Congenital and postnatal transmission of viral infections is possible, as is a message from sick children or nearby relatives. Between 2000 and 2010, researchers in Bahrain discovered hepatitis infection risk factors in patients who received hepatitis b virus-infected blood. Twenty-six percent. intravenous drug users had a low risk of HBV infection, as did sexual contact. (Janahi, 2014) .

Transfusion of blood products, pregnancy, healthcare workers, tattoos, drug abuse, and sexual behavior were significant transmission routes of the hepatitis B virus in Iraq. for these reasons, public health programs should focus on educating the public about safe and protective sex practices to prevent the virus from spreading further. (Hussein, 2018).

2.10. Diagnosis of viral hepatitis B

A diagnosis is made using the results of tests in laboratory and epidemiological studies. Serologic testing is required for a conclusive diagnosis of HBV infection, as clinical symptoms alone are insufficient. since its discovery, HBsAg has been used to diagnose HBV infection as a biomarker. Symptoms may appear as early as 1–3 weeks after the onset of symptoms. more than six months' presence of this marker indicates chronic infection (24 weeks). (Köse et al., 2018).

HBsAg, signs and elevated serum aminotransferases are all signs of acute hepatitis b. HBV DNA and anti-HBc 1gm antibodies are frequently found together. HBeAg can

also be detected in the early stages of infections, but it has no clinical significance. Chronic illness can be diagnosed if HBsAg has been present for more than six months. Clinical signs and symptoms may not always be enough to diagnose long-term HBV infection. The presence of anti-HBs and anti-HBc IgG antibodies in the blood indicates prior HBV infection. (Song And Jeong Eun, 2016) .

HBsAg is detected through electron microscopy, radioimmunoassays, and enzyme immunoassays. HBeAg acts as a marker before the onset of symptoms and indicates the presence of viral replication regardless of the infection process. In part, because the pre-core and core region mutations do not produce the protein, some anti-HBe subjects appear to exhibit active viral replication and liver disease. an anti-HBe neutralizing antibody is a neutralizing antibody that is resistant to HBV infection. (köse, & dal, 2018)

Immunoglobulin testing is a blood test that measures IgM and IgG antibodies, which indicate the presence of hepatitis and the body's production of antibodies to fight the virus. ct scans, mris, ultrasounds, and liver biopsies are a few examples of new imaging techniques that have improved the diagnostic process. (Daniel, 2018).

ALT is the best liver enzyme test to detect viral hepatitis. The acute viral hepatitis panel is used to help detect or diagnose one of the three most common hepatitis viruses. In addition, viral hepatitis can be diagnosed by a blood test.

hemoglobin, hematocrit, RBC, WBC, and platelet count (CBC) are all examples of laboratory tests that can help determine anemia. (Doenges et al., 2016).

2.11. Complication of viral hepatitis B

A Person's exposure to the hepatitis B virus has been shown to increase their risk of developing HCC or cirrhosis (HBV). People at intermediate to high risk of HBV infection are most likely to have had prior exposure to the virus. people who test negative for the

anti-hbs antibody have low HBV-DNA levels (20-200 iu/ml), indicating that they were born in an area where HBV, hiv, or both were common. (gounder et al , 2016 and nathanson, et al , 2016) .

In general, viral hepatitis complications include liver cell death (necrosis) with acute hepatic, fibrous thickening of liver tissue (cirrhosis) with chronic hepatitis, liver insufficiency, and hepatocarcinoma. (Samji , 2020) .

So, patients with chronic diseases, particularly those at risk of damage to the liver's normal function, including inflammation of the liver's cells (cirrhosis) and cancer of the liver, may experience complications such as bleeding disorders, ascites in the abdomen, portal hypertension, damage to kidney functions, encephalopathy of the liver, which affects brain function including fatigue, amnesia, and reduced intellectual capability because of the intensification of the disease. (Marcin, et al , 2017) .

2.12. Treatment of viral hepatitis B

Despite recent advances in our understanding of the HBV life cycle and new treatments that effectively suppress viral replication, such as prophylactic vaccines and antivirals, HBV is still a significant public health issue. nuc therapy has been shown to reduce the risk of developing hepatocellular carcinoma (hcc). However, there is still a risk of severe side effects and viral drug resistance when nucs are used for a long time in patients with chronic liver disease. To combat HIV's nucleocapsid DNA, researchers have focused their efforts on developing specific therapies. understanding Cccdna biology, including biogenesis, turnover, epigenetic regulation, and template activity, is essential to achieving this goal. (seeger et al , 2014).

Cccdna-targeted antiviral therapies and tests are urgently required to guide existing antiviral treatment and develop new antiviral drugs, which are also fundamentally important to combat the virus. (liu , et al , 2019) .

Drugs such as lamivudine, entecavir, adefovir dipivoxil, telbivudine, and ifn are expensive, toxic, and short-lived. Our modern medication regimen also causes the evolution of drug-resistant bacteria. Pre-existing drug-resistant alterations in the HBV polymerase have also been discovered. To minimize side effects, new HBV treatments target the host immune system. Interferon-dependent anti-HBV efficacy has been demonstrated in preclinical studies of the-7 agonist Vesatolimod (gs-9620). In a double-blind placebo-controlled study, patients with Chb were safe and well-tolerated.

On the other hand, HBsAg seroconversion is a functional cure. Anti-HBV drugs currently on the market slow viral replication but have little effect on blood HBsAg levels. HBsAg-containing steps may be more effective at eliciting anti-HBV immune responses. we looked into the most effective methods of Hbsag-targeting drugs, their activities, and potential benefits and downsides in future therapeutic combinations. (Mohebbi,et al, 2018).

Oral nucleotide agents, interferons, or a combination of the two are currently used to treat chronic hepatitis b patients. In most patients, however, existing methods fall short of predicted viral clearance and disease resolution. This is primarily due to a lack of knowledge about the HBV-host relationship at various levels of infection and disease. HBV can regulate host micro RNAs (miRNAs) to promote viral replication in hepatocytes and establish a microenvironment conducive to viral persistence and liver disease. (Singh,et al 2018).

2.13. Prevention of hepatitis B

2.13.1. Hepatitis B vaccination

It was first hypothesized in the 1950s, then discovered in the 1960s as an Australian antigen, and finally found using an electron microscope in the 1970s. In the 1980s, the hepatitis b vaccine was introduced. One-third of the world's population is infected with hepatitis b, the most common hepatitis (HBV). Nations are classified as high (8%),

moderate (2%)–7%, or low (2%)–2% endemic based on the prevalence of HBV surface antigen (HBsAg). serum levels among healthcare workers (HCWS) are anywhere from two to four times higher than those in the general population. (Rathi et al., 2018) .

Maurice Hilleman's improved recombinant hepatitis b vaccine, approved by the food and drug administration on July 23, 1986, replaced the hepatitis b vaccine obtained by using blood, which was removed from the market in 1986 and supplanted. (Huzair et al,2017) . It was the first human vaccine to be developed through recombinant DNA techniques. They worked on this project in collaboration with William j. rutter and colleagues from the University of California, San Francisco, as well as benjamin hall from the University of Washington, both of whom are located in the state of California. in 1981, edward penhoet and william j. Rutter (both of UC Berkeley) formed the Emeryville, California-based Chiron corporation as a joint venture with Merck to develop a new class of antibiotics. The recombinant vaccine based on the hepatitis b surface antigen is made using *saccharomyces cerevisiae* cells, free of any concerns associated with human blood products. *Saccharomyces cerevisiae* cells are free of any problems related to human blood products (HBsAg). Consequently, there is no danger that actual viral DNA will be incorporated into the final product due to using this production method to manufacture it. the vaccine contains an adjuvant consisting of aluminum Hydroxyphosphate Sulfate. (Tulchinsky,et al , 2018) .

Based on data provided by the who, a vaccine like that is considered the world's first to be developed using recombinant DNA technology. When a transient, acute infection of HBV occurs in adults, chronic disease is caused by the virus's persistence, mainly infection occurs when the virus is passed from a newborn or a toddler to an adult. HBV infection affects approximately 2 billion people worldwide. (Lavanchy, et al , 2016) .

Only one formulation or a combination vaccine is available to prevent HBV. The single antigen vaccines should be administered to infants as soon as possible. as a general rule, combination vaccines are not recommended for babies. ('pediatric is for children six weeks to 6 years old, and 'twinrix' is for those over the age of 18). the recommended hepatitis b vaccine doses for each age group and type of vaccine are listed here.

There are three intramuscular doses of the hepatitis b vaccine for primary immunization. after the first dose, 30–55 percent of healthy adults aged 40–49 years develop protective antibodies. by the second dose, 75 percent of adults in this age group had protective antibodies. by the third dose, >90 percent of healthy adults had protective antibodies. (Muzeyin et al., 2015).

The widespread use of the hepatitis b vaccine is essential in the fight against the virus. As the world health organization recommended, all newborns should be immunized against hepatitis b within 24 hours of birth, followed by two or three doses at least four weeks apart, respectively. The risk of transmission from mother to child can be reduced with administering a birth dose in good time before the baby is born. around five percent of children under the age of five were chronically infected with HBV in the 1980s, according to the most recent estimates. (WHO, 2020).

According to a study conducted in india, even though an effective vaccine for the prevention of hepatitis b infection is available, it is nevertheless an acknowledged occupational risk for healthcare workers (HCWS). Hepatitis b immunization rates among healthcare workers in india range from 16 to 60 percent, according to indian estimates. Paramedics are more likely than surgeons to develop hepatitis b since they are not routinely immunized. An unvaccinated person has a 6-to-30 percent chance of getting hep b following a single exposure to shows, compared to the general population's 6-to-30 percent risk. The hepatitis b infection rate among healthcare workers (HCWS) is 14.4%. The vast majority of these healthcare employees do not know they may be exposed to polluting sources. even if they are aware of the exposure, post-exposure prophylactic care is rarely pursued by HCWS. as a result of hepatitis b; 40% to 66% of percutaneous injuries occur in impoverished nations, whereas only 10% occur in developed countries.(Chhabra et al, 2019).

A significant proportion of healthcare workers who received two doses of the vaccination reported feeling better afterward, and even a more substantial proportion of those who had only one amount is at risk of contracting the disease. this information

must be communicated effectively to him because part of the blame for insufficient immunization might be attributed to carelessness or forgetfulness. (Aaron, et al , 2017) .

The reasons for these differences may be the countries' health care systems, vaccine costs, and most importantly, participant professions, which only included nurses as participants. Concerning the reasons for not being vaccinated against HB the cost of the vaccine was mentioned by 72 (35.1%) and unavailability by 61 (29%).35 (17.1%) said they didn't feel the vaccine was protective. 31 (15.1%) did not know about vaccines, and 6 (2.9%) were new. non-vaccination due to employment, negligence, or fear of side effects. (Pathak , et al , 2013)

Regarding HBV, the general population is vaccinated against the virus. At the same time, those with recurring HBV infections are given antiviral medication, and those who have successfully treated their liver illness get antiviral therapy to prevent it from returning. (Chang, 2015).

Significant progress has been made in reducing HBV-associated liver diseases due to the development of preventative hepatitis b vaccines. Despite all this, chronic hepatitis b remains difficult for doctors to treat because of the persistence of the virus in the nuclei of hepatocytes, making it nearly impossible to eradicate. novel approaches to developing vaccines based on structurally modified subunits to enhance immunogenicity are required to combat chronic viral infections. (Ho et al., 2020)

2.13.2. Infection control of hepatitis B

Infection control is the most essential component of infection prevention in healthcare settings because it provides defenses to prevent or reduce pathogen spread to patients, healthcare workers, and the general public, as well as protection from infectious agents contaminated surfaces in the healthcare facility itself. a high-quality care environment for inpatients is essential to preventing complications and illnesses. (lemass et al , 2014, and CPB , 2018).

Thus, preventing mortality and morbidity is the goal of post-exposure prophylaxis (pep). Getting clinical hepatitis after contacting blood that contains both HBsAg and HBeAg is increased by 22%–31% when exposed to the blood directly. Infection rates among hospital staff were 14.4% for HBV. In the operating room, emergency department, or outpatient clinic, surgeons are more vulnerable to needle stick injuries than other healthcare workers because of their increased sensitivity to sharps. Over two-thirds of doctors have had an ns1 at some point in their career. Stress/overloading was the most prevalent cause of ns1 among doctors and nurses (38 percent) and (41 percent). Senior doctors (59 percent) were more likely to be exposed to bf in the operating room. Cutting was used only 16% of the time, while suturing was used 41% of the time. Junior doctors are three times more likely to suffer from BBC than their elders. pre-and post-exposure therapy may be used as part of specific preventative strategies. (Eltahir, et al, 2014)

So, it is vital to deliver health care that allows blood transfusions when it comes to patient management. HBV can be prevented from spreading from person to person through quality-assured screening of all donated blood and blood components used in transfusions is mandatory in the United States. There are still some holes in the system that need to be filled even though blood donations were screened and certified as safe worldwide in 2013. (WHO, 2017).

The goal of prevention is to break the transmission chain and provide an effective vaccine for those most at risk. However, blood donors continue to be tested for hepatitis b antigens. Using syringes, needles, and lancet disposables are essential to fight infection. Eating and smoking are prohibited in the laboratory and other settings where contamination and blood contact is a concern. (Hinkle and Cheever, 2018).

In another study, it was demonstrated that the purpose of preventive medicine is to reduce the severity of existing diseases and injuries rather than prevent their occurrence. Preventing and treating illness and injury as quickly as possible and helping individuals develop personalized strategies to prevent a recurrence may help reduce their adverse effects. Second, secondary infection prevention can be achieved by using personal

protective equipment (PPE) and appropriate vaccination, which are easy to understand. (chitimwango, 2017).

In a hospital, the operating room is a high-risk area. injury and patient mortality are common occurrences in the or. Most surgical problems occur in hospitals, and just half are preventable. Surgeons, anesthesiologists, nurses, and technicians work in operating rooms. Counting surgical equipment, including sponges, needles, and tools, during and after treatment is part of the job. A circulating nurse ensures that all items are transported aseptically outside the sterile surgery field. many studies have been conducted to improve operating room team performance. (sonoda, et al, 2018).

2.14. Precaution of hepatitis B

Generally speaking, "infection control precaution" refers to the lower preventive actions implemented for each patient in the event of a confirmed or suspected infection stratum. These procedures are critical for ensuring safety. HCWS are responsible for preventing the spread of diseases among patients. It consists of hand hygiene, using protective gear for the individual (e.g., gloves, gowns, face masks), breathing, medical waste management, and safe injection techniques .Cleaning, disinfection, and sterilization of devices and equipment are often included. (WHO, 2019 b) .

It is common practice for nurses to handle sharp tools such as scalpels and needles, which puts them in danger of harm when providing health care to patients. Despite extensive training, healthcare workers are still at risk of sharp injuries. The ways of enhancing protection and increasing the availability of safety are discussed in detail. sharps, on the other hand, must be handled with the utmost attention to avoid infection. (ngipchf, 2020).

The incorrect disposal of abandoned needles and other sharps can be hazardous to the health of garbage employees and the general public. additionally, because of the use of hands and the possibility that stray sharps will enter plastic garbage bags, folding health

care professionals and waste employees may become infected with hepatitis. (CDC, 2019 a) .

So, hand hygiene has been consistently cited as a vital element of infection control measures and as the single most significant practice for Preventing infectious agent transmission in healthcare environments. hand hygiene refers to the use of products containing alcohol that do not need to use Water, as well as handwashing with antimicrobial or plain soap and water. a sustained reduction in MRSA and VRE infections depends on optimal Hand hygiene practices (CDC, 2019 b) .

As an additional measure, some hospitals have implemented standard precautions for all staff and all patients, which include each aspect of the use of barriers, such as hand washing, use of personal protection, such as gloves, equipment policies, and face protective goggles, gowns, and protective clothing, as well as the patient, 's necessary precautions mode when working with laboratory models. (nadu and arinze-onyia., 2017).

Thus, precautions are required in iraq to reduce the spread of HBV among medical professionals and ensure the security of healthcare facilities. Preventing the spread of hepatitis via immunizations and basic hygienic measures, as well as having a thorough understanding of the disease and how to avoid it, should be a priority for all healthcare workers. patients and contaminated instruments are considered the initial points of interaction between patients and health care workers across the globe, which puts iraqi nurses at risk for infection. (othman et al., 2013).

Careful adherence to sterile procedure guidelines is necessary to ensure the patient's and nurses' safety. infection control and clean technique ideas may reduce nosocomial infections in hospitals, leading to a shorter hospital stay for patients and cheaper expenditures for medical assistance and hospitals. The sterile surgical team and non-sterile members must follow clean procedures to avoid nosocomial infection and wound contamination. violation of one of the following rules may contaminate the surgical

wound nurses who do not follow sterile technique principles and may also transfer nosocomial diseases to patients. (Hilal And Juma Jabber , 2021).

Additionally, all clinical waste must be stored in orange clinical waste bags with a swan neck and a capacity of no more than three-quarters full to ensure a tight seal. Spoiled waste should be kept in an orange leak-proof container with an audit mark on the lid. A red leak-proof lid and an audit mark should be attached to containers containing human body parts to ensure they are safe. The use of grey alert boxes is required due to mental deterioration. all suction devices, including liners, must be replaced between patients to prevent cross-contamination and maintain proper fluid volume management in the container. (von Vogelsang, 2020).

2.15. Nursing role in prevention and precautions of viral hepatitis B

An approach to patient care grounded in research helps nurses make better decisions and improve the accuracy of their plans. During the planning phase of the nursing process, each activity is evaluated based on the qualifications of the person who will perform the intervention. Viral hepatitis is more challenging to prevent and treat, even though there are many areas where certain aspects, such as the development and implementation of local hepatitis prevention plans, increased awareness about the disease, testing, vaccination, and treatment plans, can be standardized. As part of their job, nurses thoroughly evaluate the patient's situation, devise a treatment plan, implement it, and monitor the disease's progress and the patient's difficulties. nurses also need various clinical skills and practices to ensure correct assessment and planning of patients, counseling to recognize and manage undesirable effects, and organizational abilities to organize patient care arrangements. (naccho, 2014).

Thus, nurses who come into contact with a hepatitis patient must adhere to conventional infection control procedures, such as washing their hands between patients and using a fresh glove for each patient, to prevent the spread of the disease. As a result, using gowns and masks is often unnecessary, and needles and other infected objects must be carefully stored or discarded. (perkins, 2019).

So, nurses can help foster a patient safety culture by using their infection prevention training. Nurses will be the first to educate patients on infection prevention. According to research and presentation tasks, clinical nurse specialists can help implement evidence-based quality improvement actions that reduce health care costs. A trained nurse can help prevent infections picked up in the Hospital. The nurse is a medical staff member who implements infection-prevention strategies for the patient. Nurses in all positions and contexts can take the lead in infection prevention and control by using their skills and experience and making quick decisions. Healthcare workers must be aware of their protections. Organize jobs, enforce precautions, and properly dispose of biomedical waste to avoid occupational exposure. The infection control committee should be notified if a staff member is accidentally exposed to an infectious sample and is not vaccinated against hepatitis b. infection control, patient care, and business profitability depend on nurses.(chitimwango, 2017).

In addition, the usage of gloves at all times and the prohibition of any direct contact between patients are strongly encouraged. Even if gloves are used, you must wash your hands quickly when working with potentially infectious substances such as blood, bodily fluids, secretions, or non-intact skin. protect your eyes and face with a face shield or a face mask. (broussard, & kahwaji , 2021).

And all healthcare personnel should be educated on how to prevent HBV infection. HBV prevalence among healthcare workers in india has been reduced from 10 percent to 1 percent with the introduction of the hepatitis b vaccine and health education programs. (aaron , et al , 2017) .

HBV-infected patients need to know that lifestyle changes and transmission prevention are necessary, as well as the necessity of ongoing monitoring throughout their lives. The metabolic syndrome and fatty liver, on the other hand, both contribute to liver-related morbidity and mortality. although no particular dietary interventions have been found to influence the course of the. (wong, et al , 2014 and chan, et al , 2017) .

So, he has a higher risk of cirrhosis, and he is associated with weekly alcohol consumption of at least seven drinks for women and at least 14 for men, according to the American cancer society. however, since there have been few studies addressing the risks associated with lower levels of alcohol use, the cautious approach is to advocate abstention or just moderate alcohol consumption.(Terrault, et al , 2018) .



3. MATERIAL AND METHODS

This chapter describes the main characteristics of the study methodology: operational procedure and response. The research design used in this study, administrative arrangements, study sample, sample selection criteria, study tool, validity and questionnaire reliability, collection data, and statistical data.

3.1. Study design

A descriptive design study was conducted at Al-Diwaniyah Teaching Hospital. The study will be shown on groups of nurses in different hospital areas (Department of Neurological Diseases, Gastroenterology Department, Operations Department, intensive care unit, and Emergency Department) to determine their knowledge of this disease. The interview method will be face-to-face with the nurses to fill out the questionnaire.

3.2. Approval arrangement

The approval was obtained from the institute of health sciences, Cankiri Karatekin University, department of Graduate Studies, to conduct this study after explaining the objectives of the research and its significance, and also the approval of the questionnaire was obtained from an ethical committee in December 28th, 2021(Appendix B). On December 8th, 2021(Appendix C), official approval was received from AL-Diwaniya Health Directorate/The Centre for Training and Development (Scientific Ethics Committee)

3.3. Ethical consideration

The following ethical considerations were made depending on the study's goals and findings to protect subjects' rights in connection with the data collected, preserve the confidentiality, and promote professional study conduct:

- Participation is entirely up to the individual.

Respect for the participants' right to privacy is essential during the interview process.

Participants are encouraged to express themselves openly and honestly to show respect for their feelings, and nurses' responses about health issues are carefully listened to.

- The nurses' questions are understandably intelligible based on the nurse's educational level, cultural background, and language competence.

3.4. Setting of the Study

The sample setting: The study will be conducted in AL-Diwaniya City/AL-Diwaniya Health Directorate/ Diwaniya Teaching hospital (Department of Neurological Diseases, Gastroenterology Department, Operations Department, intensive care unit, and Emergency Department).

3.5. Sample of Research

Sampling method that does not rely on probability (appropriate sample). The formula for Calculating Sample Size In addition to Cochran's formula, Yamane (1967) introduced another more straightforward procedure for measuring sample size from a population. Yamane According to him, for a 95% confidence level and $p = 0.5$, the size of the sample should be Where (N) is the population size of nurses staff at the Department of (Neurological Diseases, Gastroenterology Department, Operations Department, intensive care unit and Emergency Department) in Diwaniya Teaching hospital and (e) is the level of precision (Kasiulevičius, et al , 2006).

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{403}{1 + 403(0.05^2)}$$

$$n = 200$$

This number represents the representative sample of the present study for all nurses staff at (the Department of Neurological Diseases, Gastroenterology Department, Operations Department, intensive care unit, and Emergency Department) in Diwaniya Teaching hospital.

3.5.1. Inclusion criteria

The number of nurses chosen according to the following criteria: -All nurses were selected from the (Department of Neurological Diseases, Gastroenterology Department, Operations Department, Intensive Care Unit, and Emergency Department).-All nurses who work both the day and night shifts are also included.

Nurses with varying levels of educational attainment

Nurses who were approved to participate in the study at the time of its inception were included nurses with one year or more of experience, both male and female.

3.5.2. Exclusion criteria of the sample

The following individuals were not included in the study:

Nurses who failed to complete the survey in its entirety.

Nurses with less than a year of experience are not permitted to practice.

Nurses who refused to participate in the experiment.

3.6. Study instrument

The questionnaire was applied in Iraq by researchers (Hassan and Muhbes, 2020), and modifications were made to it to suit a research topic by supervisor Dr. Yashar Kamal Yazkin and eleven experts from Iraq who have at least ten years of experience in the fields of community health nursing and adult nursing(Appendix D), and permission was obtained from the researcher to use this questionnaire.

Part I: Demographic data

There are seven elements in this section, including information about the nurse (age, gender, marital status, level of education, number of years of nursing experience, current working, and training courses).

Part II: Nurses' Knowledge of Hepatitis B Virus

This section included 20 questions divided into four sections, each of which had questions about the following :

Five items are included in a questionnaire measuring knowledge about the nature of hepatitis B.

Nurses' knowledge concerning the prevention and precaution of hepatitis B, which contain(5) items

Nurses' knowledge concerning the transmission of hepatitis B, which contain(5) items

The following five items are included in nurses' knowledge about managing and treating patients with hepatitis B.

The questionnaire with multiple choice answers; each question had three possible solutions; points were awarded for selecting the best response from among the three options: YES(3), NO(2), and I don't know (1).

Part III: Nurse's Knowledge about Hepatitis B Vaccine

This part consisted of (15) questions. The questionnaire has multiple choices, each question has (3) options and was scored by giving the better answer (3) I know, Uncertain(2), and I don't know (1). (A)

3.7. Pilot study

A purposive sample of (20) nurses is selected among those who worked at AL-Diwaniya Teaching Hospital (Department of Neurological Diseases, Gastroenterology Department, Operations Department, Intensive Care Unit, and Emergency Department) and carried out from (1th October 2021) to (10th October) which includes (20) nurses male and female participants in this study to assess levels of knowledge nurses about prevention and precautions. The sample from the pilot study is not included in the selection for the primary research.

➤ The Objectives of the Pilot Study

- To establish the stability and credibility of the study tool.
- To determine the reliability and validity of the study tool
- The clarity of the interview, its efficiency, and the standard amount of time required to collect data for each character can be calculated throughout the interview.

- To identify the constraints that may arise throughout the data collection process.

➤ **The results of the Pilot Study**

The participants filled out the questionnaire and distributed the results to each nursing staff member. According to the nurses who took part in the study, it took an average of (15-20) minutes to complete the questionnaire, according to their responses.

3.8. The Validity of the Questionnaire

Validity is the degree obtained by the instrument and represents its measurement (Polit and Beck, 2014). The validity of the questionnaire was obtained by reviewing the opinions of eleven experts. Three have professor degrees, six have assistant professor degrees, and two have doctoral degrees. They all specialize in community health nursing and adult nursing to estimate its clarity and relevancy, with a combined experience of not less than ten (10) years in their fields. A deep revision took place on the questionnaire, and changes were made to their opinion. Adjustments are made to some of the items relatively, with experts' suggestions. (Appendix C).

3.9. Reliability of the Questionnaire

A questionnaire's reliability is defined by its ability to consistently yield the same results when given to different groups of people. Scores that are stable over time or between other raters might be described as "reliable." (Bolarinwa, 2015).

The Alpha Cronbach's test (Alpha Correlation Coefficient) was used to determine the instrument's reliability, and the internal consistency method was used to assess the device's dependability. The Statistical Package for Social Science Program (SPSS) was utilized. (IBM SPSS) version 24.0, the Alpha Correlation Coefficient was calculated to establish whether or not the present study instrument was reliable. Statistically good

results were obtained for the reliability of the questionnaire (Table 3-3), indicating that the questionnaires had an appropriate level of internal consistency and equivalent measurability.

Table 3.1. Questionnaire of Reliability Coefficients

No. of items	Alpha Cronbach	Value acceptable	Assessment
(35) items	0.81	0.70	Pass

It was formed to show a statistically significant coefficient of reliability study tool. The calculated result shows that the questionnaire was reliable for assessing the nurses' knowledge of Hepatitis B disease and its vaccination at Al-Diwaniyah Teaching Hospital Hospital (Department of Neurological Diseases, Gastroenterology Department, Operations Department, Intensive Care Unit, and Emergency Department).

3.10. Data collection methods

Permission has been obtained from the institution(16/12/2021, Appendix D). The information was gathered through a questionnaire form, which the nurses completed. The researcher obtained each nurse's consent for the study participant and displayed the study form. Data was collected from (1 January 2022) to (20 March 2022). Each interview lasts around (15-20 min)

3.11. The approach of statistics

The Statistical Package for Social Sciences (SPSS) is used to evaluate the statistics gathered throughout this investigation. When it came time to analyze and assess the study's findings, the researcher used the statistical data analysis approaches listed below.

3.12. Methods of statistic

The study's data were analyzed using the SPSS (Statistical Package of Social Sciences) version 20 and Microsoft Excel (2010) programs.

3.12.1. Descriptive approach

Statistical tables "Frequencies and percent" which are:

$$\% = \frac{\text{Frequency}}{\text{Sample Size}} \times 100$$

Mean of scores "M.s.."

The average score can be calculated by using the following:

$$M. S = \frac{\sum r_i = 1F_i \times S_i}{\sum r_i = 1F_i} \times 100$$

The test of standard deviation "S.d.."

$$\text{Standard deviation} = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

It uses a correlational coefficient "Cronbach alpha" used in estimating the internal consistency of the study tool, which can be calculated by using the following:

$$\alpha = \frac{K}{K-1} \left[1 - \frac{\sum_{i=1}^K \sigma_{ii}}{\sum_{i=1}^K \sum_{j=1}^K \sigma_{ij}} \right]$$

"K is the items number questions."

" σ_{ij} is the investigate covariance between the items"

"i and j. Note the σ_{ii} is the variance not the standard deviation of item I"

3.12.2. Inferential approach

t-test

Independent t-test

To assess the significant difference between overall Family health nurses' services and nurses' demographic characteristics

One Way ANOVA

"Analysis of variance (ANOVA) for equality of Means (testing for coincidence when the mean's parameter is different)."

Source of variance	Sum of square	d.f	Mean square	F
Between Groups	$SS_B = \sum \frac{(\sum xPl)^2}{n} - \frac{(\sum xP)^2}{n}$	$df_B = K-1$	$\frac{MS_B}{MS_W}$	$\frac{MS_B}{MS_W}$
Within Groups	$SS_W = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$	$df_w = N-k$	$\frac{SS_W}{DF_w}$	
Total	$SS_T = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$	$df_t = N-1$		

The following are examples of shortcuts for measuring something important in comparison to the level:

NS: Probability is not significant in this case. $\text{-value} > 0.05$.

S: Significantly at probability-value < 0.05 .



4. RESULTS

This chapter contains tables that summarize the research's findings and relate them to the study's objectives.

By using frequency and percentage, this table 4.1 shows the socio-demographic information of nurses in terms of frequency and rate. There were 200 nurses involved in this study, with an average age of 20 to 29 years old, making up 32% of the total. Regarding gender, male nurses comprised more than half of the workforce, while female nurses made up 47%. According to the findings, 59 percent of the study participants were married, and the majority (45.5 percent) were educated to a diploma level, 34% of nurses with less than or equal to 5 years of experience. Researchers looked at where nurses worked and found that nearly a quarter of them (24 percent) worked in an emergency department. Finally, the vast majority of participants in this study (60.5 percent) had never attended a training course.

Table 4.1 Descriptive Statistic of Socio-Demographic Characteristic of the Study Sample

Demographic Data	Groups	Freq.	%
Age in years	20-29	64	32.0
	30-39	55	27.5
	40-49	39	19.5
	50-59	42	21.0
	Total	200	100.0
Gender	Male	106	53.0
	Female	94	47.0
	Total	200	100.0
Marital Status	Single	82	41.0
	Married	118	59.0
	Total	200	100.0
educational level	Primary school	23	11.5
	Diploma	91	45.5
	Bachelors	86	43.0
	Total	200	100.0
Number of years of experience in nursing	Less than or equal five year	69	34.5
	6-10	49	24.5
	11-15	37	18.5
	16-20	16	8.0
	More than 21 year	29	14.5
	Total	200	200

Table 4.1 (Continue): Descriptive Statistic of Socio-Demographic Characteristic of the Study Sample

work place	Emergency Department	48	24.0
	intensive care unit	44	22.0
	Gastroenterology Department	32	16.0
	Department of Neurological Diseases	41	20.5
	Operations Department	35	17.5
	Total	200	100.0
training courses	Yes	79	39.5
	No	121	60.5
	Total	200	100.0

(Freq.): Frequency, (%): percentage,

In table 4.2 shows the light of the statistical analysis cut-off point, this table illustrated that the nurses.

Knowledge of the nature of hepatitis, the table shows that the majority of the study sample (75%) Don't Know

Table 4.2 Nurses responses regarding the nature of the hepatitis knowledge

Items	Rating	Frequency	Percent	m.s	Std.
Hepatitis B is a virus disease	NO	20	10.0	2.79	.609
	I Don't Know	3	1.5		
	Yes	177	88.5		
	Total	200	100.0		
Jaundice is one common symptom of hepatitis B.	NO	99	49.5	1.86	.910
	I Don't Know	31	15.5		
	Yes	70	35.0		
	Total	200	100.0		
Hepatitis B may occur with or without symptoms.	NO	80	40.0	2.02	.908
	I Don't Know	36	18.0		
	Yes	84	42.0		
	Total	200	100.0		
Patients with hepatitis B are measured the amount of liver damage by a test of liver enzymes.	NO	81	40.5	1.96	.879
	I Don't Know	46	23.0		
	Yes	73	36.5		
	Total	200	100.0		
HBV causes liver cirrhosis and liver cancer.	NO	91	45.5	1.93	.916
	I Don't Know	32	16.0		
	Yes	77	38.5		
	Total	200	100.0		
Total the nature of the hepatitis	NO	10	5.0	2.15	.478
	I Don't Know	150	75.0		
	Yes	40	20.0		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

In table 4.3 shows that the light of the statistical analysis cut-off point, this table illustrated that the nurses' knowledge of transmission of hepatitis B, the table shows that the majority of the study sample (50 %) Don't Know

Table 4.3 Nurses responses regarding the transmission of hepatitis B knowledge

Items	Rating	Frequency	Percent	m.s	Std.
Direct personal contact like kissing or talking can spread hepatitis, typically the B virus	NO	64	32.0	2.28	.920
	I Don't Know	16	8.0		
	Yes	120	60.0		
	Total	200	100.0		
Blood transfusion can be infected some people with hepatitis B	NO	50	25.0	2.33	.850
	I Don't Know	35	17.5		
	Yes	115	57.5		
	Total	200	100.0		
Sexual transmission is a common way for hepatitis B is spread	NO	59	29.5	2.29	.893
	I Don't Know	25	12.5		
	Yes	116	58.0		
	Total	200	100.0		
Hepatitis B virus can be spread through contact with open wounds	NO	60	30.0	2.30	.901
	I Don't Know	21	10.5		
	Yes	119	59.5		
	Total	200	100.0		
Unsterile tattooing can spread hepatitis, typically B virus	NO	54	27.0	2.31	.869
	I Don't Know	31	15.5		
	Yes	115	57.5		
	Total	200	100.0		
Total transmission of hepatitis B	NO	17	8.5	2.33	.627
	I Don't Know	100	50.0		
	Yes	83	41.5		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

Table 4.4 the light of the statistical analysis cut-off point, this table illustrates the nurse's knowledge of the prevention and precaution of hepatitis B; the table shows that majority of the study sample (52.5%) Know

Table 4.4. Nurses responses regarding prevention and precaution of hepatitis B knowledge.

Items	Rating	Frequency	Percent	m.s	Std.
To prevent hepatitis, should put a bandage on sores if found or on any open wound	NO	52	26.0	2.29	.853
	I Don't Know	39	19.5		
	Yes	109	54.5		
	Total	200	100.0		
The patient with hepatitis B should not share tools with others, typically razor, nail clipper, toothbrush, or else	NO	50	25.0	2.30	.845
	I Don't Know	40	20.0		
	Yes	110	55.0		
	Total	200	100.0		
Encourage personal hygiene for patients with viral hepatitis B	NO	56	28.0	2.27	.872
	I Don't Know	34	17.0		
	Yes	110	55.0		
	Total	200	100.0		
Using barrier precautions in situations of contact with blood or body fluids can prevent hepatitis B	NO	52	26.0	2.32	.861
	I Don't Know	32	16.0		
	Yes	116	58.0		
	Total	200	100.0		
HBV can be prevented by using a condom	NO	63	31.5	2.24	.904
	I Don't Know	26	13.0		
	Yes	111	55.5		
	Total	200	100.0		
Total prevention and precaution of hepatitis B	NO	36	18.0	2.28	.546
	I Don't Know	59	29.5		
	Yes	105	52.5		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

Table 4-5 In the light of the statistical analysis cut-off point, this table illustrates the nurse's knowledge of the management and treatment of patients with hepatitis B; the table shows that majority of the study sample (50 %) Don't Know.

Table 4.5 Nurses responses regarding management and treatment of patients with hepatitis B knowledge

Items	Rating	Frequency	Percent	m.s	Std.
The nurse should advise patients with hepatitis to avoid alcohol, illicit drugs, medication, herpes, and toxins that may affect liver function.	NO	86	43.0	1.98	.919
	I Don't Know	32	16.0		
	Yes	82	41.0		
	Total	200	100.0		
Bed rest is recommended during the acute stage of hepatitis B.	NO	71	35.5	2.12	.903
	I Don't Know	35	17.5		
	Yes	94	47.0		
	Total	200	100.0		
Small and frequent meals in high calories and protein diet may benefit patients with viral hepatitis B.	NO	78	39.0	1.96	.861
	I Don't Know	52	26.0		
	Yes	70	35.0		
	Total	200	100.0		
The nurse should carefully monitor fluid balance.	NO	81	40.5	1.97	.882
	I Don't Know	45	22.5		
	Yes	74	37.0		
	Total	200	100.0		
Certain medications such as aspirin, sleeping pills, and nonsteroidal anti-inflammatory drugs should be avoided in chronic hepatitis	NO	66	33.0	2.09	.861
	I Don't Know	51	25.5		
	Yes	83	41.5		
	Total	200	100.0		
Total management and treatment of patients with hepatitis B	NO	46	23.0	2.02	.447
	I Don't Know	100	50.0		
	Yes	54	27.0		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

Table 4-6 Overall, the findings indicate that the (61 %) of nurses were Don't Know knowledge related to Hepatitis B Disease, followed by those who are yes response (33 %) and followed by those who are no knowledge response (6%).

Table 4.6 Nurses responses regarding overall hepatitis B knowledge

Items	Rating	Frequency	Percent	m.s	Std.
Overall nurses assessment	NO	12	6.0	2.19	.348
	I Don't Know	122	61.0		
	Yes	66	33.0		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

Table 4.7 The findings assessed the study sample's knowledge of Hepatitis B Vaccine responses. There is a lack of knowledge about hepatitis B vaccination for health care workers in the study sample.

Table 4.7 Nurses responses regarding Hepatitis B vaccine knowledge

Items	Rating	Frequency	Percent	m.s	Std.
There is an effective vaccine to prevent hepatitis B infection	NO	78	39.0	2.09	.931
	I Don't Know	26	13.0		
	Yes	96	48.0		
	Total	200	100.0		
Hepatitis B vaccine can be given as post-exposure prophylaxis?	NO	85	42.5	1.95	.892
	I Don't Know	41	20.5		
	Yes	74	37.0		
	Total	200	100.0		
Hepatitis B vaccine is contra-indicated for immune-compromised patients?	NO	73	36.5	1.98	.844
	I Don't Know	58	29.0		
	Yes	69	34.5		
	Total	200	100.0		
Hepatitis B vaccine is effective in treating patients with acute hepatitis B infection?	NO	76	38.0	1.97	.853
	I Don't Know	55	27.5		
	Yes	69	34.5		
	Total	200	100.0		
The Hepatitis B vaccine is highly effective in preventing hepatitis B infection if given within 48 hours after exposure?	NO	64	32.0	2.06	.834
	I Don't Know	61	30.5		
	Yes	75	37.5		
	Total	200	100.0		
Hepatitis B vaccine should be given to health care workers as part of workplace safety?	NO	39	19.5	2.51	.802
	I Don't Know	21	10.5		
	Yes	140	70.0		
	Total	200	100.0		

Table 4.1 (Continue): Nurses responses regarding Hepatitis B vaccine knowledge

Full dose hepatitis B vaccine provides 100% protection for 90% of adults	NO	64	32	2.14	.868
	I Don't Know	46	23.0		
	Yes	90	45.0		
	Total	200	100.0		
Some individuals will not produce antibodies to HBV after complete vaccination	NO	75	37.5	1.98	.853
	I Don't Know	55	27.5		
	Yes	70	35.0		
	Total	200	100.0		
The vaccine caused mild side effects?	NO	81	40.5	1.99	.897
	I Don't Know	40	20.0		
	Yes	79	39.5		
	Total	200	100.0		
Intramuscular injection is the method of administering the vaccine	NO	87	43.5	2.02	.946
	I Don't Know	22	11.0		
	Yes	91	45.5		
	Total	200	100.0		
The vaccine is given to adults in the form of three doses	NO	78	39.0	1.97	.865
	I Don't Know	51	25.5		
	Yes	71	35.5		
	Total	200	100.0		
The hepatitis B vaccine is made by taking the part of the virus that causes surface protein (surface protein gene) and putting it into yeast cells	NO	48	24.0	2.12	.765
	I Don't Know	81	40.5		
	Yes	71	35.5		
	Total	200	100.0		
The vaccine works by causing your body to produce its protection (antibodies) against the disease	NO	81	40.5	1.96	.876
	I Don't Know	47	23.5		
	Yes	72	36.0		
	Total	200	100.0		
The vaccine should not be used in people with allergies to yeast	NO	37	18.5	2.20	.730
	I Don't Know	86	43.0		
	Yes	77	38.5		
	Total	200	100.0		
Have you received the hepatitis B vaccine?	NO	117	58.5	1.83	.984
	I Don't Know	1	.5		
	Yes	82	41.0		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

Table 4.8 Overall, the findings indicate that the (78 %) of nurses were Don't Know knowledge related to Hepatitis B Vaccine, followed by those who are yes response (12.5 %) and followed by those who are no knowledge response (9.5%)

Table 4.8 Nurses responses regarding overall Hepatitis B vaccine knowledge

Items	Rating	Frequency	Percent	m.s	Std.
Overall nurses assessment	NO	19	9.5	2.04	.2666068
	I Don't Know	156	78.0		
	Yes	25	12.5		
	Total	200	100.0		

N (200), cut-off point (0.66), Yes (mean of score from 2.34 to 3), NO (mean of score from 1 to 1.66), I Don't Know (mean of scores (from 1.67 to 2.33)).

In the table 4.9, education level, number of years of experience in nursing, age, and place of employment are all statistically insignificant when assessing the overall knowledge of nurses about hepatitis B diseases at a p-value equal to or less than 0.05.

Table 4.9 Mean differences (ANOVA) between overall nurses' knowledge about hepatitis B and their demographic characteristics

Demographic Data	Groups	Overall assessment			F	Sig.
		NO	I Don't Know	Yes		
Age in years	20-29	1	32	22	1.200	.212
	30-39	3	39	22		
	40-49	3	29	7		
	50-59	5	22	15		
	Total	12	122	66		
educational level	Primary school	0	15	8	.907	.635
	Diploma	6	53	32		
	Bachelors	6	54	26		
	Total	12	122	66		
Number of years of experience in nursing	Less than or equal five year	2	38	29	.892	.659
	6-10	3	29	17		
	11-15	2	28	7		
	16-20	2	9	5		
	More than 21 year	3	18	8		
	Total	12	122	66		
work place	Emergency Department	2	32	14	1.069	.375
	intensive care unit	6	25	13		
	Gastroenterology Department	1	23	8		
	Department of Neurological Diseases	2	19	20		
	Operations Department	1	23	11		
	Total	12	122	66		

This table 4.10 shows statistical significance between nurses' gender and their overall assessment of nurses' knowledge regarding hepatitis B diseases at a p-value equal to or less than 0.05.

Table 4.10 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B and nurses' gender

Gender		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Male	106	2.1552	.32337	-1.969-	198	.048
	Female	94	2.2420	.37087			

(n) number, (Std) stander deviation, (Ns): Non-significant, (S): significant, (T value): independent t-test, (df): degree of freedom value): independent t-test, (df): degree of freedom

This table 4.11 shows that there is no statistically significant between nurses' Marital status and their overall assessment of nurses' knowledge regarding hepatitis B diseases at a p-value equal to or less than 0.05.

Table 4.11 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B and nurses' Marital status

Marital status		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Married	82	2.2067	.33071	.362	198	.718
	Single	118	2.1886	.36129			

(n) number, (Std) stander deviation, (Ns): Non-significant (S): significant , (T value):independent t-test, (df): degree of freedom

This table 4.12 shows no statistical significance between nurses' training courses and their overall assessment of nurses' knowledge regarding hepatitis B diseases at a p-value equal to or less than 0.05.

Table 4.12 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B and nurses participated in training courses

training courses		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Yes	79	2.1753	.35974	-.678-	198	.499
	No	121	2.2095	.34152			

(n) number , (Std) stander deviation , (Ns): Non-significant (S): significant , (T value):independent t-test, (df): degree of freedom

This table 4.13 shows statistical significance between nurses' workplace and overall assessment of nurses' knowledge regarding hepatitis B Vaccines at a p-value equal to or less than 0.05. and there is no statistical significance between nurses' age, education level, and years of experience in nursing with an overall assessment of nurses' knowledge regarding hepatitis B Vaccine at a p-value equal to or less than 0.05.

Table 4.13 Mean differences (ANOVA) between overall nurses' knowledge about hepatitis B vaccine and their demographic characteristics

Demographic Data	Groups	Overall assessment			F	Sig.
		NO	I Don't Know	Yes		
Age in years	20-29	5	41	9	1.333	.155
	30-39	5	49	10		
	40-49	7	30	2		
	50-59	2	36	4		
	Total	19	156	25		
educational level	Primary school	1	21	1	1.174	.276
	Diploma	7	71	13		
	Bachelors	11	64	11		
	Total	19	156	25		
Number of years of experience in nursing	Less than or equal five year	7	51	11	1.255	.209
	6-10	2	41	6		
	11-15	6	29	2		
	16-20	4	10	2		
	More than 21 year	0	25	4		
	Total	19	156	25		
work place work place	Emergency Department	4	37	7	1.856	.015
	intensive care unit	5	34	5		
	Gastroenterology Department	5	26	1		
	Department of Neurological Diseases	3	32	6		
	Operations Department	2	27	6		
	Total	19	156	25		

This table 4.14 shows no statistically significant difference between nurses' gender and overall assessment of nurses' knowledge regarding the hepatitis B vaccine at a p-value equal to or less than 0.05.

Table 4.14 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B vaccine and nurses' gender

Gender		N	Mean	Std. Deviation	T	Df	Sig.
Overall assessment	Male	106	2.023270	.2677822	-1.395-	198	.165
	female	94	2.075836	.2639207			

(n) number , (Std) stander deviation , (Ns): Non-significant (S): significant , (T value):independent t-test, (df): degree of freedom

This table 4.15 shows no statistical significance between nurses' marital status and overall assessment of nurses' knowledge regarding the hepatitis B vaccine at a p-value equal to or less than 0.05.

Table 4.15 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B vaccine and nurses' marital status

Marital status		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Married	82	2.050407	.2645100	.107	198	.915
	Single	118	2.046287	.2691666			

(n) number , (Std) stander deviation , (Ns): Non-significant (S): significant , (T value):independent t-test, (df): degree of freedom

This table 4.16 shows statistical significance between nurses' training courses and their overall assessment of nurses' knowledge regarding the hepatitis B vaccine at a p-value equal to or less than 0.05.

Table 4.16 Mean differences (t-test) between the overall nurse's knowledge assessment regarding hepatitis B vaccine and nurses participated in training courses

Training courses		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Yes	79	2.005063	.2507589	-1.9 50	198	.049
	No	121	2.075994	.2738560			

(n) number , (Std) stander deviation , (Ns): Non-significant (S): significant , (T value):independent t-test, (df): degree of freedom

5. DISCUSSION

5.1. Discussion of the sociodemographic characteristics of the study sample

Table (4.1) reviewed the socio-demographic characteristics of the study sample, where the study found that the proportions of the age groups of the study participants were close and that the most significant proportion of the age groups was (20-29) years old. (Mustafa and Taha , 2016) found in their study that the highest proportion (57%) of the study sample was within the age group of (20-29) years old.

Regarding gender, the study showed that more than half (53%) of nurses participating in the study were male. This result is consistent with the study conducted by (Akibu et al., 2018), who found in their research that the percentage of males in the study sample was (51.2%). In addition, (Mohammed and Hassan, 2014) found that more than half (56.7%) of the study sample were male.

Concerning marital status, According to the study's findings, more than half (59%) of nurses in the research sample were married. This result aligns with the development of (Hassan & Muhbes, 2020) study which found that the number of married nurses in the study sample was more significant than the number of single nurses. Adekanle et al. (2015) also found that the proportion of the married in the study sample was more than the single one.

Regarding the level of education, the study revealed that (45.5%) of the nurses in the study sample were Diploma graduates, while (43%) of them had Bachelor's degrees. This result consisted of (Mustafa and Taha, 2016) study where they found that the highest percentage of nurses in the survey were holders of a diploma in nursing in equal parts with holders of a secondary certificate in nursing.

The study found that more than two-thirds of the study participants had years of experience and had less than or equal to five years of experience in nursing. Alrowaily

et al. (2016) found in their study that the highest proportion of The study participants had between one and five years of experience in the workplace. The finding also agrees with the study of (Abdulla & Abdulla, 2014), where they found that more than half (58%) of nurses had experience of 1-5 years in nursing.

In addition, the current study also revealed The highest percentage of participants in the study was 24% working in the emergency unit, followed by the intensive care unit, where 22% of the participants in the study were intensive care unit (ICU) staff, while (20%) of them were working in the neurology department, and(17.5 %) were in the operations department and finally (16%) of them were working in the department of gastroenterology.

Finally, more than half (60%) of the study sample did not participate in training courses on viral hepatitis. This result

is similar to the effect found in the study of (Hang Pham et al., 2019), where they found that more than half (54.1%) of the sample no received a course of training regarding HBV in the past two years

5.2. Discussion of the nurse's knowledge regarding the nature of the hepatitis B knowledge

Regarding nurses' knowledge about the nature of hepatitis, the study revealed, as shown in Table (4.2), that three-quarters of the study participants did not know the nature of hepatitis disease, where the statistical mean was equal to (2.15). A similar study was done in Iran, and this result is consistent with it. By (Joukar et al., 2017) found in their study that more than half of the study samples had insufficient knowledge about the nature of hepatitis. Another study conducted in Iraq in 2014 in the city of Erbil by (Abdulla and Zhian) agrees with the current research, as it revealed that nurses' knowledge about viral hepatitis in pretest was insufficient.

In contrast, this result disagrees with two Sudanese maternity hospitals that were the sites of this research, which was carried out in 2019 by (Mursy and Mohammed) where the nurses who participated in this study had good knowledge about hepatitis disease. In addition, the current result contradicts the study's (Khan et al., 2017) finding that most of the respondents' nurses had good knowledge of hepatitis.

5.3. Discussion of the nurse's responses regarding the transmission of hepatitis B knowledge

Table (4.3) showed that nearly half of the participants in the study had no idea that the hepatitis B virus can be transmitted through sexual contact, as the statistical mean of their knowledge was equal to (2.33), where the answer of (50%) of them was "I don't know." In comparison (8.5 %) of them answered incorrectly.

This result is supported by the study (Hilal and Reda, 2021), where they found that the knowledge of the nursing staff about the transmission of hepatitis B before implementing the educational program was insufficient.

In addition, (Goncalves and Goncalves, 2013) found in their study that the knowledge about the transmission method of hepatitis was poor among the study sample, which consists of nurses and physicians.

On the contrary, (Elsheikh et al. 2016) found in their study about the knowledge, attitudes, and practices of health workers about transmission and prevention of viral infection that the nurses in the study sample had adequate knowledge about the transmission method of hepatitis. (Setia et al., 2013) mentioned in their study that a large proportion of the study sample showed a good knowledge regarding the modes of transmission of hepatitis B and C virus.

5.4. Discussion of the nurse's responses regarding prevention and precaution of hepatitis B knowledge

The study showed, as in Table (4.4), that half of the study sample had knowledge about the prevention of viral hepatitis, as 105 of the study sample of 200 nurses correctly responded to the questions about the prevention of hepatitis. This result is consistent with a study conducted by (Umuhoza et al., 2021), who reported that the participants have good knowledge and practices toward HBV prevention, where less than two-thirds of the study sample had adequate knowledge. Another study by (Kapungumberi, 2018) revealed that approximately half (53.0%) of the respondents had good knowledge regarding HBV prevention and control.

In contrast, the study conducted in Nineveh Governorate hospitals by (Mustafa and Taha, 2016) disagrees with the current study, where they found that the knowledge of nurses participating in the study was inadequate before conducting the educational program. This result also disagrees with the analysis of (Abdullah and Abdullah, 2014), who found in their research that nurses' knowledge about hepatitis B and the uses of its preventive measures were insufficient before the educational program for nursing staff was implemented.

5.5. Discussion of the nurse's responses regarding management and treatment of patients with hepatitis B knowledge

Concerning nurses' knowledge regarding management and treatment of patients with hepatitis B, the study revealed that approximately three-quarters of the study sample had inadequate knowledge regarding management and treatment of patients with hepatitis B virus, as the statistical mean of their understanding was equal to (2.02), where the answer of (50%) of them was "I don't know." In comparison (23 %) of them answered incorrectly, as in Table (4.5).

This result is in line with the study conducted in Northern Vietnam by (Hang Pham et al., 2019). They discovered in their research that the treatment and management of the hepatitis B virus are lacking in knowledge. (Joukar et al., 2017) mentioned in their study that a small percentage of the study sample already knew the treatment strategies for HBV. This study contradicts studies conducted by (Hassan & Muhbes, 2020) and (Thabit, Ali, & AL-Bahadeli, 2017). They found in their studies that the study sample had adequate knowledge regarding HBV treatment.

5.6. Discussion of the nurse's responses regarding hepatitis B vaccine knowledge

Table (4.7) shows the majority of nurse participants in the study had poor knowledge, where (78%) of them answered "don't know," while (9.5%) of them responded incorrectly. The current result disagrees with (Aniaku, Amedonu, and Fusheini's, 2019) study, which found their research that the nurses' knowledge and the status of the hepatitis B vaccine were satisfactory. The study agrees with (Muzeyin, 2015) found that half (51.8) of nurses who participated in the study had poor knowledge. On the other hand, the study conducted by (Abeje & Azage, 2015) in Bahir Dar city administration to determine whether or not health care workers have been vaccinated against the HBV virus. Contradicts the current study result, where less than two-thirds (62%) of the study participants were knowledgeable about the vaccine.

5.7. Discussion of the nurse's responses regarding overall hepatitis B knowledge

The overall assessment of nurses' knowledge about hepatitis B, as revealed in Table (4.6), was that two-thirds (67%) of the study sample had a poor understanding of hepatitis B. This result line with the studies of (Mustafa and Taha), (Abdulla and Zhian) and (Abou Shady) in Iraq and Egypt in 2016, 2014, and 2001, respectively, where they found in their studies that the nurse's knowledge about HBV was poor.

Contritely, the study conducted by (Roien et al., 2021) was found that the majority of the study sample had good knowledge about HBV infection. in addition, other studies

performed in Nigeria, 2016 and Ethiopia, 2016 by (Hassan et al.) and (Ayalew et al.) respectively, where they found that the majority of the study sample had good knowledge about HBV disease.

5.8. Analyzing the link between nurses' hepatitis B knowledge and their characteristics.

Tables (4.9), (4.10), (4.11), and (4.12) revealed that there are statistically significant differences only between the nurses' gender with their level of knowledge about hepatitis B. At the same time, there is no statistically significant difference between the nurses' knowledge about hepatitis B virus and their other demographic characteristics, including age, education level, years of experience in nursing, workplace, marital status, and participation in training courses.

Regarding the gender, this result indicates that the female nurses have a success rate than the male ones, where the mean score was (0.37087) (0.32337) respectively, despite the males who participated in the study being more than the females. This result may be attributable to the fact that the large number of nurses participating in the study may have a higher educational qualifications than the male nurses in the study, or the female nurses may be more involved in the training courses than the males. This result is in line with the study of (Hilal and Reda, 2021), who said that the control group had a significant correlation between nurses' knowledge and gender. at (p-value= 0.036). (Paul & Arumugam, 2015) reported that the female in the study sample was more knowledgeable than the males regarding the awareness of hepatitis B infection.

Concerning the other demographic data (age, education level, years of experience in nursing, workplace, marital status, and participation in training courses), which has no statistically significant difference with the nurses' knowledge, this result may be related to inadequate training for the nurses or the curriculum about HBV in that course has not been implemented effectively.

This result is consistent with the study (Mursy and Mohammed, 2019), where they found that "the level of knowledge was not significantly associated with age, occupation, marital status, educational level, or working experience in this study." The results of (Al-Salih, Muhbes, and Hindi's, 2018) study agreed with the current research regarding that there is no relationship between the nurses' knowledge and their ages, educational level, years of nursing experience, and participation in training courses, while disagreed with the current study regarding gender, as they found that there is no relationship between the nurses' gender and their knowledge. Al-Jubouri (2014) found in his research in Baghdad hospitals on nurses' knowledge about nosocomial infections that nurses' knowledge and demographic data are not statistically linked. (age, Years of experience in the hospital, and training courses)at $P > 0.05$.

5.9. Discussion of nurses' hepatitis B vaccine knowledge about their personal information

The current study showed, as shown in tables (4.13) and (4.16), essential differences in the knowledge of nurses participating in the survey, their place of work, and their participation in training courses at a p-value equal to or less than (0.05)

Regarding the workplace, the researcher believes that most of the nurses in the study occupy workplaces requiring doses of the hepatitis vaccine, so they are more informed about the importance and how this vaccine works. This opinion agrees with the idea of (Mustafa and Taha, 2016), who conducted a study on the knowledge of nurses about hepatitis B, where they stated that the workplace has an impact on increasing wisdom.

Concerning the training course, the researcher believes that it may be that A few of the study samples have participated in courses related to vaccines, the hepatitis virus vaccine. These training courses are often conducted in health institutions in Iraq, and they differ from the training courses for viral hepatitis. This result is agreed with the studies conducted by (Al-Salih, Muhbes, and Hindi, 2018) in Iraq's teaching hospitals in the Middle Euphrates region, and the study (AL-Hraishawi,2015) in Iraq's AL-Amara

Town found a significant correlation among nurse knowledge and the number of nosocomial infection training courses. at p-value (< 0.05).

Concerning the other demographic data, the Tables (4.14) and (4.15) revealed there were no statistically significant differences between the nurses' knowledge and their other demographic data, including (age, gender, marital status, level of education, and several years' experience in nursing) at p-value equal or less than (0.05).

This result was consistent with the study of (Hassan & Muhbes, 2020), who found no statistically significant relationship between the nurses' knowledge about hepatitis prevention and their demographic data. In the same context, Rajih (2020) conducted an educational program on nurses' knowledge about infection control at Al-Diwaniya Teaching Hospital. Iraq found no statistical relationship between nursing staff's knowledge and their knowledge about infection control, including using the prudent method to prevent hepatitis, such as a vaccine. Faltas (2018) also agreed with the current study that there is no statistical relationship between the knowledge of the nurses and selected demographic characteristics.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

Female nurses have a higher success rate than male ones with their knowledge about hepatitis B, despite the males who participated in the study being more knowledgeable than the females. Other demographic data (age, education level, years of experience in nursing, workplace, marital status, and participation in training courses) had no statistically significant difference with the nurses' knowledge of HB.

Nurses' knowledge of the HB vaccine, where they work, and whether or not they took a training course are all statistically significant at p values equal to or less than 0. (0.05). The researcher thinks that most of the nurses in the study work in places where they need to get hepatitis B vaccines. Concerning the training course, the researcher believes that it is only a few people attend. For the study, samples have taken part in vaccination courses, which have included the hepatitis virus vaccine B. According to the overall assessment of nurses' knowledge about hepatitis B, two-thirds (67 percent) of the study sample had inadequate knowledge about hepatitis B. In addition, It was discovered that the vast majority of nurse participants in the study had insufficient knowledge about the HB vaccine. Because of the lack of training courses for the hepatitis B vaccine, as well as poor education,

6.2. Recommendations

- Conducting training courses on the hepatitis B virus and its vaccines,
- The Hospitals organize educational seminars on the hepatitis B virus and its vaccines, through which introductory posters about the seriousness of this disease are published and distributed.
- Issuing directives from the hospital administration on the necessity of taking the vaccine for every nurse who has started their job, and publishing the vaccine schedule in all sections of the hospital.

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APPENDIX

APPENDIX 1. Questionnaire

APPENDIX 2. Ethical approval from Çankiri Karatekin Üniversitesi

APPENDIX 3. Ethical approval from Iraq

APPENDIX 4. Expert committee



APPENDIX 1. Questionnaire

Assessment of Nurses' Knowledge About Hepatitis B Disease and Vaccination at Al-Diwaniyah Teaching Hospital in Iraq .

Part One: Socio-demographic characteristics

1. Age: years

2. Gender:

2.1. Male 2.2. Female

3. Marital status:

3.1. Single 3.2. Married

4. Educational level :

4.1 Nursing secondary school

4.1. Diploma in Nursing

4.2. Bachelors' in Nursing

4.3. Master degree in Nursing

5. Years of experience in nursing: years

6. Where are you working now? _____

7. Do you have training courses on hepatitis B and vaccination?

7.1 Yes 7.2 NO

Part Two: Nurses Knowledge toward Hepatitis B Virus

No.	Domain I : Measurement of knowledge related to the nature of the hepatitis	YES	NO	I don't know
1	Hepatitis B is a virus disease .			
2	Jaundice is one common symptom of hepatitis B .			
3	Hepatitis B may occur with or without symptoms.			
4	Patients with hepatitis B are measured the amount of liver damage by a test of liver enzymes .			
5	HBV cause liver cirrhosis and liver cancer .			

No.	Domain II: Nurses knowledge concerning the transmission of hepatitis B	YES	NO	I don't know
1	Direct personal contact like kissing or talking can spread hepatitis typically B virus			
2	Blood transfusion can be infected some people with hepatitis B			
3	Sexual transmission is a common way of hepatitis B is spread			
4	Hepatitis B virus can be spread through contact with open wounds			
5	Unsterile tattooing can spread hepatitis typically B virus			

No.	Domain III: Nurses Knowledge Concerning The Prevention And Precaution Of Hepatitis B	YES	NO	I DONT KNOW
1	To prevent hepatitis should put a bandage on sores if found or on any wound is open			
2	The patient with hepatitis B should not share tools with others typically razor, nail clipper, toothbrush, or else			
3	Encourage personal hygiene to patients with viral hepatitis B			
4	Using barrier precautions in situations of contact with blood or body fluids that can prevent hepatitis B			
5	HBV can be prevented by using a condom			
No.	Domain IV: Nurses Knowledge Concerning Management And Treatment Of Patients With Hepatitis B	YES	NO	I DONT KNOW
1	The nurse should be advice patient with hepatitis to avoid alcohol, illicit drugs, medication, herpes, and toxins that may affect liver function.			
2	Bed rest recommended during the acute stage from hepatitis B.			
3	Small and frequent meals in high calories and protein diet may be beneficial in patients with viral hepatitis B.			
4	The nurse should be carefully monitor fluid balance.			
5	Certain medications such as aspirin, sleeping pills and nonsteroidal anti-inflammatory drugs should be avoided in chronic hepatitis			

Part Three: Nurses Knowledge about Hepatitis B Vaccine

No.	Nurses Knowledge about Hepatitis B Vaccine	YES	NO	I don't know
1	There is effective vaccine to prevent hepatitis B infection			
2	Hepatitis B vaccine can be given as post-exposure prophylaxis?			
3	Hepatitis B vaccine is contra indicated for immune compromised patients?			
4	Hepatitis B vaccine is effective to treat patients with acute hepatitis B infection?			
5	Hepatitis B vaccine is highly effective in preventing hepatitis B infection if given within 48 hours after exposure?			
6	Hepatitis B vaccine should be given to health care workers as part of work place safety?			
7	Full dose hepatitis B vaccine provides 100% protection for 90% of adults			
8	Some individuals will not produce antibodies to HBV after complete vaccination			
9	The vaccine caused mild side effects?			
10	Intramuscular injection is the method of administering the vaccine			
11	The vaccine is given to adults in the form of three doses			
12	The hepatitis B vaccine is made by taking the part of the virus that makes surface protein (surface protein gene) and putting it into yeast cells			
13	The vaccine works by causing your body to produce its own protection (antibodies) against the disease			
14	The vaccine should not be used in people with allergy to yeast			
15	Have you received the hepatitis B vaccine?			

APPENDIX 2. Ethical approval from Çankiri Karatekin Üniversitesi



T.C.
ÇANKIRI KARATEKİN ÜNİVERSİTESİ
ETİK KURUL DEĞERLENDİRME FORMU



Toplantı No:	24
Araştırmanın Yürütücüsü:	AZHAR-ABBAS DAWOOD AL-DELFAT
Araştırmanın Başlığı:	Hakk Al Diwan-yah Eğitim Hastanesinde Hemşirelerin Hissatı B Hissatı B ve Ağız Hakkındaki Bilgilerinin Değerlendirilmesi
Karar Tarihi:	28-12-2021
Kurul Görüşü:	Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

SONUÇ: Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

Başkan
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Dr. Öğr. Üyesi Süheyla BOZKURT
İMZA

Üye
Avukat Mehmet ÇAKMAK
İMZA

APPENDIX 3. Ethical approval from Iraq

IRAK CUMHURİYETİ
SAĞLIK BAKANLIĞI
DİVANIYE SAĞLIK DEPARTMANI
UYGULAMA VE İNSAN GELİŞİMİ BİRİMİ
ARAŞTIRMA VE BİLGİ YÖNETİMİ MERKEZİ

FORM NO: 02/2021
SAYI: 16
TARİH: 08.12.2021

ARAŞTIRMA KURULU KARARI

Divaniye Sağlık Departmanı Kurulu, Çankırı Üniversitesi / Sağlık Bilimleri Enstitüsü yüksek lisans öğrencisi (AZHAR JABBAR DAWOOD AL-DELESAT) tarafından sunulan aşağıda başlığı yazılı olan araştırma tezini inceledi:

Irak Al-Diwaniyah Eğitim Hastanesinde Hemşirelerin Hepatit B Hastalığı ve Aşıları Hakkındaki Bilgilerinin Değerlendirilmesi

Araştırmacı tarafından 08.12.2021 tarihinde Divaniye Sağlık Departmanında Eğitim ve İnsan Gelişimi Birimi / Bilgi Yönetimi ve Araştırma Bölümü, Araştırma Komitesine sunulmuş olup Komite, yukarıdaki araştırma projesinin Sağlık Bakanlığı tarafından araştırma yapmak için tanınan kriterlere uyduğu ve araştırma görevini kolaylaştırmaya hiçbir sakıncası olmadığı için kabul etmeye karar vermiştir.

Araştırma, bilimsel koşulları karşılıyor olup bilimsel araştırma etiğine uygun olduğundan araştırmayı DİVANIYE BİRİNCİ SAĞLIK BİRİMİ /DİVANIYE İKİNCİ SAĞLIK BİRİMİ' nde yürütmekte hiçbir sakınca yoktur.

Araştırma Kurulu Genel Başkanı ///İmza///Mühür///
08.12.2021

APPENDIX 4. Expert committee

NO	EXPERT'S NAME	THE SCIENTIFIC TITLE	WORKPLACE	Specialization	YEARS OF SERVICE
1	Dr. Amean A Yasir	Professor	College of Nursing / University of Babylon	Community Health Nursing	38Years
2	Dr. Hala Saadi Abdel Wahed	Professor	College of Nursing / University of Baghdad	Community Health Nursing	26 years
3	Durgham Majid Hamid	Professor	College of Nursing / University of AL-Muthanna	Adult Nursing	21 years
4	Kareem Ghadhbhan Sajem	Assistant Professor	Middle Technical University/ Balad Technical Institute	Community Health Nursing	21 years
5	Raad Karim Faraj	Assistant Professor	College of Nursing / University of Baghdad	Community Health Nursing	18 years
6	Dr. Mansour Abdulla Falah	Assistant Professor	College of Nursing / University of Kufa	Community Health Nursing	17 Years
7	Dr. Diaa Kareem Abd Ali Albiaty	Assistant Professor	College of Nursing \ Al-Ameed University	Adult Nursing	15 years
8	Dr. Mortada Ghanem Addai Al-Jubou	Assistant Professor	College of Nursing \University of Warith Al-Anbiya	Community Health Nursing	14years
9	Sadiq Abdul Hussein Al-Fayyad	Assistant Professor	College of Nursing / University of Baghdad	Adult Nursing	11 years
10	Dr. Alaa Muhaibes Tuama	Lecture	College of Nursing \ University of Thi-Qar	Community Health Nursing	17 Years
11	Dr. Aysen Kemal Mohammed kervanci	Lecture	College of Nursing / University of Baghdad	Community Health Nursing	14 Years