



Republic of Iraq
Ministry of Higher Education and Scientific Research
University of Middle Euphrates Technical Institute
Medical Technical Institute / Kufa
Community Health Department

Evaluating the general health level of people infected with viral hepatitis B

**Graduation research submitted to the University of Middle
Eastern Technical Medical Laboratory Department
Institute of Kufa to meet the requirements of obtaining a diploma.**

Done by

Murtadha Sadeq Zaid	Nergis Hazem Hadi	Sajad Abbas Hussein	Murtadha Shmkhay Abshir
Fatima Ahmed Hussein	Zaid Mohammed Habib	Zahra Abbas Raheef	Ali Abdulzahra Talib
Habib Shaheen Mohammed	Aya Abdulmir Kazem	Iqbal Abdulmir Hamid	Mariam Ali Abdul
Sajad Abdullah Abdul-Hur	Esraa Ibrahim Mazher	Youssef Hatim Aani	

Supervised by

Dr. Sarah Hasan Kadhum

Acknowledgements

**First of all, praise be to Allah for giving me health and insistences to proceed
up to complete this work**

**and get this degree.I would like to express my deep gratitude and
appreciation to my supervisor Dr. Sarah hasan kadhum for support,
.advice, guidance, and encouragement throughout preparation of this study**

**I would like to thank Department of community health, and University of
.alfurat alawst for providing me facilitation to complete this thesis**

**I am extremely thankful to my family for the encouragement, support, and
.patience throughout the period of study**

Also, my deepest thanks to all my friends and colleagues

Dedication

To Dr. Sarah Hassan Kadhum

With all love and appreciation, I extend to you the highest expressions of thanks and gratitude for your continuous support and guidance that .were the cornerstone of this research

You were a role model for me In knowledge and dedication, as every word I learned and every piece of advice you gave had a great impact in developing my abilities

achieving this accomplishment

Thank you for your constant concern for our success, and for your belief

In our abilities that gave us the motivation to continue and progress.

This dedication is a simple expression of my great gratitude to you and

.for everything you have provided me In my scientific career

اقرار المشرف

اني (د. سارة حسن) المشرف على
البحث

**Evaluating the general health level of people infected with viral
hepatitis B**

المعد من قبل الطلبة اعلاه في قسم تقنيات صحة مجتمع في المعهد التقني
كوفة جامعة الفرات الاوسط التقنية قد اطلعت على البحث والذي اجري
تحت اشرافي وهو جزء من متطلبات نيل شهادة الدبلوم التقني في تقنيات
صحة مجتمع

التوقيع:

المشرف د. سارة

حسن المرتبة

العلمية: مدرس

التاريخ ٢٠٢٥/٥

توصية القسم

بناء على توصيه المقدمة من قبل المشرف ارشح هذا
البحث

**Evaluating the general health level of people infected with
viral hepatitis B**

الى لجنة المناقشة وبيان الرأي فيه

التوقيع:

رئيس القسم: د. احمد عبد

الحسن محسن

المرتبة العملية: مدرس

التاريخ ٢٠٢٥/٥

Abstract

Background: Hepatitis B is a viral infection that damages your liver. The acute form of the virus often goes away without treatment. But chronic hepatitis B is an incurable illness. **Aim of study:** Evaluating the general health level of people infected with viral hepatitis B. **Patients and Methods :** Demographic and clinical data were obtained by medical analysis data to patients attended into Specialized Hospital for Gastrointestinal and Liver Diseases and Surgery in AL- Najaf Province from Province from October 2023 to January 2025. **Results:** A total of 60 patients were included in the current study. The majority of patients were male, accounting for 44 cases (73.33%), Females represented a smaller proportion, with 16 cases (26.66%). This distribution highlights that the problem is more prevalent among individuals in their 20s and 30s, with a notable presence in the older age group (50-69). All patients were from Najaf. A small percentage of patients are students and the largest proportion of patients are gainers and most patients have high levels of (AST,ALT,ALP) that there are problems in the livers functions. Also patients with Hepatitis B not appear any infections with others viruses and the diagnosed with hepatitis b by HBs-Ag test which appear with all patients .when the patients doing CBC test most patients appear increases in CBC and Platelet and little patients have increases in RBC and Hb. Finally the most methods using in diagnoses the disease is by serological test and the latest is by PCR. **Conclusions:** The higher proportion of Hepatitis b , resulted in a greater need for health care resources in this cohort, such as biological treatment, hospitalization, and surgery. We believe that this result can indirectly raise consciousness about the importance of investing in disease awareness access to diagnostic exams, and therapy within the window of opportunity to avoid/prevent complications and disability.

.

List of Contents	
Title	Page
Acknowledgment	I
Dedication	II
Supervisor approval	III
Department recommendation	IV
Abstract	V
List of Contents	VI
List of Tables	VII
List of Figures	VII
	VIII
Chapter one	
Introduction	1-4
Aim of study	4
Chapter two	
2. patients and methods	6
2.1 participants	6
2.2 data sources	6
2.3 covariates	6
2.4 data analysis	6
Chapter three	
3.results and discussion	7
3.1demographic characterstics	7-9
3.2 clinical profile of crohn's disease patients	10
3.2.1 extra intestinal manifestation tests	10
3.2.1.1 CBC	11
3.2.1.2 biochemistry	11
3.2.1.3 virology test	11
3.2.1.4 renal fuction analysis	12
3.2.1.5 liver fuction test	12
3.2.2 pharmacological treatment	13
3.3 diagnosis methods	14-15
Chapter four	
Conclusion and recommendations	16
4. conclusion	16

5. recommendations	16
6.references	17-24

List of Tables

Table No.	Title	Page
Table (3.1)	Distribution of patients according to Sex group	7
Table (3.2)	Distribution of patients according to Age group	8
Table (3.3)	Distribution of patients according to Residence	9
Table (3.4)	Distribution of patients according to Education	9
Table (3.5)	Liver functions results in HBV patients	13
Table (3.6)	Another Virology test results to HBV patients	13
Table (3.7)	Results of Diagnostic Hepatitis B test In serum of HBV patients	14
Table (3.8)	CBC results in HBV patients	
Table (3.9)	Diagnostic methods to HBV patients	

List of Figures

Figure No.	Title	Page
Figure (1.1)	Diagram of Hepatitis B virus particle structures	

CHAPTER ONE : INTRODUCTION

1. Introduction

Hepatitis B virus (HBV) infection represents a significant global health burden, affecting millions of individuals worldwide. The World Health Organization (WHO) estimates that in 2019, approximately 296 million people were living with chronic HBV infection, with an annual incidence of 1.5 million new cases. HBV is primarily hepatotropic, leading to a broad spectrum of clinical outcomes ranging from acute self-limiting infection to chronic liver disease, cirrhosis, and hepatocellular carcinoma (HCC). The progression of HBV-related complications is influenced by several factors, including viral load, host immune response, and access to antiviral therapy (Hsu *et al.*,2023).

Additionally, HBV infection remains a major cause of liver-related mortality, contributing to nearly 820,000 deaths annually, mostly due to cirrhosis and liver cancer. Despite advancements in vaccination and antiviral therapy, HBV continues to pose a significant challenge, particularly in low- and middle-income countries where healthcare resources are limited. One of the key barriers to controlling HBV is the asymptomatic nature of the disease in its early stages, leading to delayed diagnosis and treatment. Many infected individuals remain unaware of their condition until they develop severe liver complications, further increasing the burden on healthcare systems (Al-Busafi and Alwassief, 2024).

Moreover, HBV is highly infectious, with transmission occurring through exposure to infected blood, unprotected sexual contact, and from mother to child during childbirth. Unlike hepatitis C, HBV can integrate into the host genome, making it difficult to completely eradicate with current antiviral therapies. Although antiviral treatments can effectively suppress viral replication and reduce disease progression, they do not offer a definitive cure. This highlights the urgent need for continued research into novel treatment strategies, including immune-based therapies and curative approaches such as gene editing (di Filippo

et al.,2023).

Public health strategies aimed at eliminating HBV include universal newborn vaccination, blood screening, safe injection practices, and increased awareness about transmission risks. Despite these efforts, gaps in vaccination coverage and healthcare disparities in some regions hinder progress in reducing HBV prevalence. Without effective intervention, the global burden of HBV is expected to persist, underscoring the importance of continued surveillance, early detection, and improved therapeutic options to mitigate its impact on public health (Nelson *et al.*,2016).

1.2 Impact of Hepatitis B on General Health

The overall health status of individuals with HBV infection is multifaceted, as it is affected by both hepatic and extrahepatic manifestations of the disease. Chronic hepatitis B (CHB) leads to progressive liver damage, which may culminate in liver fibrosis, cirrhosis, or hepatocellular carcinoma. Additionally, patients with CHB often report non-specific symptoms such as fatigue, malaise, and abdominal discomfort, which can significantly impair their quality of life (Rizzo *et al.*,2022). The disease is also associated with extrahepatic complications, including glomerulonephritis and polyarteritis nodosa, further impacting systemic health outcomes. Recent studies suggest that CHB can also contribute to metabolic disorders, such as insulin resistance and dyslipidemia, which may further exacerbate disease progression and cardiovascular risk. Furthermore, chronic inflammation induced by HBV can alter immune function, increasing susceptibility to secondary infections and autoimmune conditions (Amponsah *et al.*, 2020).

1.3 Health-Related Quality of Life in HBV-Infected Individuals

Studies indicate that HBV infection significantly impacts patients' health-related quality of life (HRQoL), particularly in individuals with advanced liver disease. Patients with CHB often experience psychological distress due to the chronic nature of the disease, social stigma, and uncertainty regarding disease progression. Mental health disorders, including depression and anxiety, are commonly reported among HBV-infected individuals, further exacerbating their overall disease burden (Fu *et al.*,2025). Moreover, limitations in physical activity and social interactions contribute to a lower HRQoL in affected individuals. Research also highlights that individuals with HBV face employment challenges due to workplace discrimination and concerns over disease transmission, which further affects their socioeconomic stability and mental well-being. Despite the availability of antiviral treatments that effectively suppress viral replication, the persistent need for long-term monitoring and potential side effects of therapy contribute to ongoing stress and reduced HRQoL (Tu *et al.*,2020).

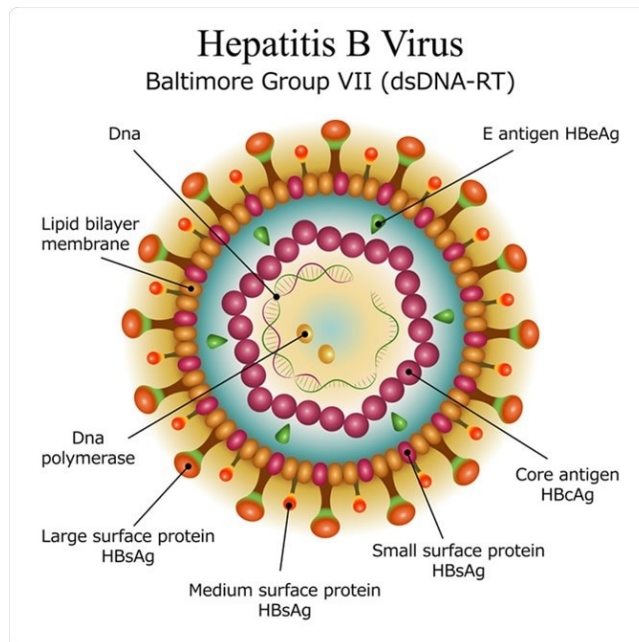


Figure 1 : Diagram of Hepatitis B virus particle structures

1.4 The Role of Early Diagnosis and Management in Improving Health Outcomes

Early detection and appropriate management of HBV infection play a crucial role in mitigating disease progression and improving overall health outcomes. Screening programs, particularly in high-risk populations, enable early intervention through antiviral therapy, which can prevent liver-related complications and enhance life expectancy. Moreover, lifestyle modifications, including a balanced diet, regular physical activity, and avoiding hepatotoxic substances such as alcohol, can significantly improve liver health and overall well-being (Nguyen et al.,2020).

Emerging therapeutic approaches, including novel antiviral agents and potential curative strategies targeting HBV replication and immune modulation, offer hope for better disease control in the future. The integration of comprehensive healthcare services, including psychological support and patient education, is essential for optimizing the quality of life in HBV-infected individuals and reducing the societal burden of the disease (Singh *et al.*, 2023).

CHAPTER TWO : PATIENTS AND METHODS

2. Patients and Methods

2.1. Participants

Study Setting and Patient Enrollment

Hospital Description: The study was conducted at the Specialized Hospital for Gastrointestinal and Liver Diseases and Surgery in AL-Najaf Province from October 2023 to January 2025 for Sixty patients with Hepatitis B disease . This hospital is well-equipped with advanced facilities, including:

- A library.
- Intensive care lounges.
- A biological treatment lounge.
- Hospital consulting departments.
- Ultrasound and radiology services.
- Three lobbies with single rooms for patient care.

2.2. Data sources

Data Collection: The data for this study were collected directly from patients admitted to the hospital. The information included:

- **Demographic characteristics:** Age, gender, residence, and education level.
- **Laboratory data:** Results from blood tests, virology tests, biochemistry tests, PCR tests, and liver function tests.
- **Medications:** Details of the medications prescribed to the patients.

Diagnostic Methods

- **Primary Diagnosis:** All patients were diagnosed using a serology test, which detects Hepatitis B surface antigen (HBsAg) and antibodies.
- **Additional Diagnostic Tools:** Some patients also underwent PCR testing (to measure viral load) and liver ultrasonography (to assess liver damage or complications).

2.3. Covariates

- The study analyzed several covariates (factors that could influence the outcomes) to understand their potential impact on HBV. These covariates included:
 - **Age:** To determine if certain age groups are more affected by HBV.
 - **Gender:** To assess if there are differences in HBV prevalence or severity between males and females.
 - **Residence:** To evaluate if geographic location (e.g., kufa vs. al ndaa) plays a role in HBV infection.
 - **Education:** To explore the relationship between education level and HBV awareness, prevention, or access to healthcare.

2.4. Data analysis

The study relied on descriptive statistics to analyze the data. Specifically the number and percentage of patients in different categories (e.g., age groups, education levels, residence) were calculated. This approach helped in understanding the distribution of HBV patients .

CHAPTER THREE : RESULTS AND DISCUSSION

3. Results and Discussion

3.1. Demographic Characteristics

Table (1): Distribution of patients according to Sex group

Sex	No.60	Percentage (%)
Female	16	(26.66%)
Male	44	(73.33%)

A total of 60 patients were included in the current study. The majority of patients were male, accounting for 44 cases (73.33%). Females represented a smaller proportion, with 16 cases (26.66%). This indicates that the condition under study is more prevalent among males than females in this sample as shown in table(1). This distribution highlights that the problem is more prevalent among individuals in their 20s and 30s, with a notable presence in the older age group (50-69) as shown in table (2). Addressing health concerns in these age brackets should be a priority to mitigate the issue effectively.

Sex, defined as the biological characteristics that differ between males and females , accounts for significant immunological differences leading to disparities in outcomes for a variety of infectious diseases , termed 'sexual dimorphism'(Gay *et al.*,2021). The effect of host sex on outcomes of infection is complex and multifactorial, influenced by genetics, hormones, and environmental exposures , with trade-offs between protective immune responses (leading to clearance or control of infection) and immunopathology (associated with increased severity and duration of disease) (Berry *et al.*,2024). Gender, as a societal and behavioural construct, also plays a role through its influence on perceptions, behavior, and access to healthcare (Fleming *et al.*,2015).

Table (2): Distribution of patients according to Age group

Mean of age	No.60	Percentage (%)
10-19	4	(6.66%)
20-29	16	(26.66%)
30-39	16	(26.66%)
40-49	10	(16.66%)
50-69	14	(23.33%)

Patients were categorized into five different age groups:

- The largest proportion of patients was in the age ranges 20-29 years and 30-39 years, each comprising 16 cases (26.66%).
- The second largest group was 50-69 years, with 14 cases (23.33%), showing a significant number of older patients.
- The 40-49 age group included 10 cases (16.66%), indicating a moderate prevalence in this middle-aged category.
- The youngest age group (10-19 years) had the fewest cases, with only 4 patients (6.66%), suggesting a lower prevalence among teenagers.

Age-related disorders arise over the course of a person's life as a result of genetic features that are no longer as advantageous as they were. Optimal natural immunity and longevity are connected. Chronic antigenic stimulation, such as infections, continuously affects immunological senescence (the aging of the immune system). This explains why a

lower pathogen burden environment increases the likelihood of living a long life. One can anticipate a balanced state of immune responses and change the likelihood of having advanced inflammatory responses in the context of low pathogen burden (Saavedra et al.,2023). Studies on aging have found that as people age, their ability to handle different infections declines. This condition was called "inflamm-aging." The longevity of inflammatory stimuli acts as a "first hit," making people more susceptible to age-related disorders. Advanced organ-specific age-related disorders are largely caused by a "second hit," which is the absence of strong protective gene variations (Badal et al.,2020).

Table (3): Distribution of patients according to Residence

Residence:	No.60	Percentage (%)
Najaf	60	(100%)

All 60 patients (100%) were from Najaf, meaning the study is regionally focused on this city. Since there are no patients from other locations, the findings may be more relevant to the local population rather than being generalized to other regions. The incidence of Hepatitis B varies considerably geographically. The highest incidence of Hepatitis B has been described in westernized countries . However, recent epidemiological studies have also described increasing incidence trends of Hepatitis B in areas that previously reported low rates of the disease (Osei *et al.*,2021). It is more common in developed, more industrialized countries and Provinces, pointing at urbanization as a potential risk factor. The rise in incidence began in the early 1990s, in parallel with changes in governing systems and social environment (Lakatos *et al.*,2006).

Table(4): Distribution of patients according to Education

Education	No.60	Percentage (%)
Student	4	(6.66%)
Employee	16	(26.66%)
Gainer	26	(43.33%)
Housewife	14	(23.33%)

1. Students (6.66%): A small percentage of patients are students, which might indicate that younger individuals are less affected or have better access to preventive measures like vaccination.

2. Employees (26.66%): About a quarter of the patients are employed. This group may have been exposed to the virus through workplace activities or lack of awareness about HBV transmission.

3. Gainers (43.33%): This group represents the largest proportion of patients. The term "gainer" likely refers to self-employed individuals or those working in informal sectors, where access to healthcare and awareness about HBV might be limited.

4. Housewives (23.33%): Nearly a quarter of the patients are housewives. This group may have been exposed to the virus through household contact with infected individuals or lack of access to healthcare information.

The majority of patients are gainers (43.33%), followed by employees (26.66%) and housewives (23.33%). This indicates that working-age individuals and those in informal or domestic settings are the most affected by HBV in this population.

The quality of life of such patients in school, as measured by both patients' and teachers' perceptions, indicates that, despite the difficulties that students face in terms of missed school

time and physical inconveniences, teachers are generally perceived by students to have favorable attitudes toward helping them. Even though earlier work in the area of employment has suggested that the occurrence of Hepatitis B is clustered among people in white-collar positions, recent data have suggested that certain environmental risks for Hepatitis B (i.e., sedentary or indoor jobs) may be associated with jobs classified as being white-collar, and therefore having a white-collar job may in itself not be a risk factor for the development of Hepatitis B.

Patients with Hepatitis B have a higher rate of nonparticipation in the labor force, and the participation rate seems to maintain steady levels over time (Emerson et al.,2016). A majority of patients with Hepatitis B continue in the same employment positions over a period of years. Patients with Hepatitis B, especially those who have undergone surgery, took more sick leave than their counterparts without Hepatitis B. A majority of patients with Hepatitis B favored the disclosure of their diagnosis to their employers and perceived little discrimination in the workplace. Furthermore, most employers were perceived by their employees with Hepatitis B as having fair attitudes toward the compensation provided for their employees with Hepatitis B (Gordon et al.,2023).

3.2. Biochemistry tests:

Table (5) : Liver functions results in HBV patients

Liver function (High)	No. 60	Percentage (%)
AST	18	(30 %)
ALT	37	(61.66%)
ALP	29	(48.33%)

- Elevated AST (30%):

AST (aspartate aminotransferase) is an enzyme that rises when there is liver inflammation or damage. This percentage indicates that 30% of patients have some degree of liver damage, which could be due to active hepatitis B infection or other liver-related issues.

- Elevated ALT (61.66%):

ALT (alanine aminotransferase) is a more specific indicator of liver cell injury. The high percentage here (61.66%) suggests that a significant majority of patients are experiencing liver cell damage, which is a common consequence of HBV infection.

- Elevated ALP (48.33%)

ALP (alkaline phosphatase) is often elevated in cases of bile duct obstruction or liver damage. Nearly half of the patients show elevated ALP, indicating potential issues with bile flow or liver inflammation.

Problem Size: The liver function results reveal that a large proportion of patients (especially with elevated ALT and ALP) are experiencing liver damage or dysfunction. This is a serious concern as it can lead to chronic liver disease, cirrhosis, or liver failure if not managed properly.

Hepatitis is an inflammation in the liver. The hepatitis can be self-limiting or can progress to fibrosis, cirrhosis or liver cancer. Hepatitis viruses are the most common cause of hepatitis in the world but other infections, toxic substances (e.g., alcohol, certain drugs), bacteria and autoimmune diseases can also cause hepatitis (Mehta *et al.*,2024). Liver function tests are useful in determining the severity and prognosis of some liver illnesses, such as viral hepatitis. HBV infection can alter blood levels of various hepatic enzymes and chemicals, such as ALT, AST, and a rise in these enzymes above normal. It is considered that their top reference limits are unusual(Kalas *et al.*,2021). Once there is a hepatitis infection, the enzymes AST and ALT are often released into the circulation. ALT serum level elevation corresponds more with hepatic damage, hence ALT serum level elevation correlates more with hepatic damage (Abulude *et al.*,2017) .

3.3. Virology tests

Table (6): Another Virology test results to HBV patients

Virology (Positive)	CD No. 60	Percentage (%)
HCV	0	(17.19%)
HIV	0	(10.94%)

- **HCV (0% positive):** None of the patients tested positive for Hepatitis C virus (HCV), which is good news as co-infection with HCV could complicate the management of HBV.

- **HIV (0% positive):** Similarly, none of the patients tested positive for HIV, which is also positive as HIV co-infection can weaken the immune system and worsen HBV outcomes.

Problem Size : The absence of HCV and HIV co-infections simplifies the management of HBV in these patients, as there are no additional viral burdens to address.

The global burden of hepatitis B virus (HBV) and hepatitis C virus (HCV) infections and confection represents a major public health concern, particularly in resource-limited settings. Elimination of HCV by 2030 has become foreseeable, with effective direct-acting antiviral oral therapies and the availability of affordable generics in low-and-middle-income countries (LMICs) (Said *et al.*,2022). However, access to oral nucleus (t)ide therapy for HBV remains critical and is limited outside the existing global HIV program platforms despite affordable prices. Prevention of mother-to-child transmission of HBV through scaling up of birth dose implementation in LMICs is essential to achieve the 2030 elimination goal. Most individuals living with HBV and/or HCV in resource-limited settings are unaware of their infection, and with improved access to medications, the most significant barrier remains access to affordable diagnostics and preventive strategies (Howell *et al.*,2023) . The results suggested

that prior HBV infection adversely affects liver health despite apparent clearance. The risk of developing hepatocellular carcinoma (HCC) was also reported to be higher in patients with dual chronic HCV/HBV infection than that with mono-infection. It was also shown that dual/triple infection by HIV/HBV/HCV increases the risk of HBV/HCV-associated HCC(Maqsood *et al.*,2023) . Thus, it is important to recognize confection, where viral interaction has implications for disease severity, clinical picture, and management strategy. The current success in treating HCV infection highlights the need for proper selection of antiviral regimens for long-term suppression of any concurrent viral confection (Mavilia and Wu , 2018).

**Table (7):Results of Diagnostic Hepatitis B test
In serum of HBV patients**

Diagnostic Hepatitis B test In serum	CD No. 60	Percentage (%)
HBs-Ag positive	60	(100%)
HBs-Ab positive	20	(33.33%)
HBe-Ag positive	0	(0%)
HBe-Ab positive	0	(0%)
HBc-Ab positive	0	(0%)

HBs-Ag (100% positive): All patients tested positive for Hepatitis B surface antigen (HBs-Ag), confirming that they are currently infected with HBV.

- **HBs-Ab (33.33% positive):** About one-third of patients have developed Hepatitis B surface antibodies (HBs-Ab), indicating some level of immune response. This could be due to vaccination or natural immune response.

- **HBe-Ag and HBe-Ab (0% positive):** None of the patients tested positive for Hepatitis B

e-antigen (HBe-Ag) or e-antibodies (HBe-Ab), suggesting that there is no active viral replication at the time of testing.

Problem Size: While all patients are confirmed to have HBV, the absence of active viral replication (HBe-Ag negative) is a positive sign. However, the presence of HBs-Ag indicates chronic infection, which requires long-term management.

In chronic hepatitis B (CHB), the persistence of hepatitis B surface antigen (HBs Ag) is sometimes associated with antibodies (Ab) to HBs (anti-HBs). To assess the hypothesis of the selection of HBs Ag immune escape variants in CHB patients, the variability of the HBV S gene was determined for patients persistently carrying both HBs Ag and anti-HBs antibodies and patients solely positive for HBs Ag. More than 350 million people, or 5% of the world's population, are chronic carriers of hepatitis B virus (HBV), and this infection represents a worldwide public health problem (Lazarevic *et al.*,2024). Many patients chronically infected with HBV, as defined by the persistence over >6 months of hepatitis B surface antigen (HBs Ag), will develop life-threatening diseases such as liver cirrhosis and hepatocellular carcinoma. It has been estimated that up to 30% of them will die from the consequences of their infection (Lampertico and Pietro,2017).

In the natural course of HBV infection, virus clearance likely results from the intimate coordination of both humoral and cellular immune systems. Overall, the antibody-mediated immune response to HBV proteins aims at the clearance of circulating HBV particles, whereas the cellular effectors contribute to eliminating infected hepatocytes (Khanam *et al.*,2021). Biologically, virus clearance is classically characterized by the emergence of anti-HBs antibody (Ab) in the serological profile.

During chronic hepatitis B infection, two clinically important phases can be defined. While the immune tolerance phase is usually characterized by little liver damage and the presence of hepatitis B e antigen (HBe Ag) in the serum, the second phase can be described

as more aggressive for the liver, with selection of HBe Ag-negative variants and detection of anti-HBe antibody. Ultimately, chronic carriers can be classified as inactive carriers, with little viral replication and anti-HBe antibody and normal liver biochemical markers, or as chronic hepatitis patients, with abnormal liver enzyme levels and higher viral loads (Milich ,2016).

Notably, several reports have described the persistence of HBs Ag associated with anti-HBs antibodies in 10 to 25% of chronic hepatitis B (CHB) patients (Connors *et al.*,2023). The mechanism underlying the presence of both HBs Ag and anti-HBs antibodies remains unknown, but one possibility could be the selection of immune escape mutants.

In contrast to what is usually described as a favorable outcome for CHB, the acquisition of anti-HBs antibody is not systematically associated with the loss of HBs Ag. Indeed, the coexistence of HBs Ag and anti-HBs in chronic hepatitis B virus carriers has been described for 10 to 25% of patients by several authors (Wang *et al.*,2022). In accordance with these studies, the presence of both HBs Ag and antibody was documented in almost 9% of 864 chronic hepatitis B virus carriers followed in our hospital. The mechanism underlying the presence of both HBs Ag and anti-HBs despite viral replication is unknown, but one reason might be the selection of HBs Ag immune variants. Indeed, an accumulation of residue changes in the MHR of the S protein, the main target of anti-HBs, could lead to escape from recognition by the host immune system. Several studies have described point mutations resulting in amino acid changes in the S protein antigenic loops in vaccines and hepatitis B immune globulin recipients (Jiang *et al.*,2021)

3.4. CBC tests

Table (8): CBC results in HBV patients

CBC Results (High rate)	CD No. 60	Percentage (%)
RBC	9	(15%)
PLT	38	(63.33%)
Hb	14	(23.33%)
WBC	40	(66.66%)

- **RBC (15% high):** A slightly elevated red blood cell (RBC) count could indicate dehydration or other underlying conditions, but it is not a major concern in this context.

- **PLT (63.33% high):** A high platelet (PLT) count is often seen in inflammatory conditions or infections, which aligns with the chronic inflammation caused by HBV.

- **Hb (23.33% high):** Elevated hemoglobin (Hb) levels could be due to dehydration or other factors, but it is not a significant issue in this group.

- **WBC (66.66% high):** A high white blood cell (WBC) count suggests an ongoing immune response, which is common in chronic infections like HBV.

Problem Size: The elevated WBC and PLT counts indicate a significant immune response and possible chronic inflammation, which is expected in HBV patients. However, these findings are not directly harmful but reflect the body's attempt to fight the infection.

Hepatitis B virus (HBV) can replicate within hepatocytes without causing direct cell damage. The host immune response is, therefore, not only essential to control the spread of virus infection, but it is also responsible for the inflammatory events causing liver pathologies. In this review, we discuss how HBV deals with host immunity and how we can harness it to achieve virus control and suppress liver damage (Tan *et al.*,2015).

The hepatitis B virus exhibits several unique features with respect to how it deals with host immunity (e.g., it delays amplification). Understanding these features is necessary to achieve virus control and suppress liver damage (Wang *et al.*,2021).

Innate and adaptive immunity have evolved different tasks to control infections. Through recognition of viral nucleic acids, viral proteins or tissue-damage innate immunity is triggered during the early phases of viral infections. Activation of different families of cellular receptors (toll-like receptors [TLRs], RIG-1) leads to rapid production of antiviral cytokines, such as interferon (IFN)- α , and, in concert with activation of natural killer (NK) cells, limits the initial spread of hepatitis B virus (HBV). The activation of innate immunity is also necessary for the efficient recruitment of the adaptive immune system (Enya and Rose ,2025) which acts through functional maturation and expansion of distinct B- and T-cell clones that specifically recognize and kill infected hepatocytes.

As different pathogens target different organs and cause a variety of clinical conditions, they also evolved distinct strategies to escape host immunity. HBV infection of hepatocytes is characterized by several unique features (Groth *et al.*,2024)). Although many virus infections are characterized by an initial logarithmic phase of virus production, HBV infections show delayed virus amplification and spread through the liver. Similarly, febrile symptoms occur immediately in many acute viral infections, whereas acute HBV infections are mostly asymptomatic.

3.5.Diagnostic methods

Table (9): Diagnostic methods to HBV patients

Type of diagnosis	CD No. 60	Percentage (%)
Serology test	100	(100%)
Liver ultra-sonography	45	(75%)
PCR	12	(20 %)

Serology Test (100%): All patients were diagnosed using serology tests, which are the standard for detecting HBV infection.

- **Liver Ultrasonography (75%):** Three-quarters of the patients underwent liver imaging, which is crucial for assessing liver damage, fibrosis, or cirrhosis.

- **PCR (20%):** Only 20% of patients had PCR testing, which is the most sensitive method for detecting HBV DNA and measuring viral load.

Problem Size: While serology and ultrasonography are widely used, the limited use of PCR (20%) means that many patients may not have accurate viral load measurements, which are critical for treatment decisions.

Serological markers of viral hepatitis infection allow the detection of the virus and the stratification of the disease phases. Infection phases produce various immunological responses, which result in varying serological markers . Serological screening is suitable for initial evaluation. The enzyme immunoassays and the automated chemiluminescence assay

(CLIA) have been developed to target these markers and used as a first line of screening for viral hepatitis (Shi *et al.*,2023). Several ELISA tests have recently been commercialized. ELISAs are antigen/antibody sandwich assays, which do not require well-trained laboratory personnel, advanced technologies, or high cost to be implemented in resource-limited countries. These techniques target viral antigens and antibodies for instance hepatitis B surface (HBsAg), hepatitis B core-related (HBcrAg), and hepatitis B core antibodies (HBcAb), HBeAg) for HBV detection (Alhajj *et al.*,2023)

Quantification of HBV DNA and HDV RNA in blood has become a critical tool in the assessment and management of chronic coinfection. Historically, hybridization assays were used to estimate viral loads in serum or plasma samples, but their level of sensitivity was suboptimal. This was followed by the application of a polymerase chain reaction (PCR) test, a highly sensitive test for nucleic acids to HBV DNA and HDV RNA detection. For decades, several laboratory evaluations of real-time PCR assays for hepatitis B and delta nucleic acid quantification have shown the importance of these techniques for diagnosis and prognosis of HBV/HDV coinfection (Ricco *et al.*,2018).

The HBV genomic DNA is a relaxed-circular DNA (rcDNA) of approximately 3.2 kb in length with a complete minus strand and an incomplete plus strand. The viral genome encodes four overlapping open reading frames (ORFs), C, P, S, and X, from which functional viral proteins are produced. rcDNA is converted into covalently closed circular DNA (cccDNA) in infected cells. Its replication triggers immune responses, which leads to liver damage (Wei and Ploss,2021). It is important to determine the amount of HBV DNA for a better understanding of the natural course of the disease. It can be used to determine different phases of chronic HBV infection. Viremia, ALT, and histological outcome constitute major components in management and decision to initiate treatment in HBV chronic carriers. The monitoring of HBV DNA in serum is as important as serological markers in predicting the clinical outcome of the infection (Boonstra and Sani ,2025).

CHAPTER FOUR : CONCLUSION AND RECOMMENDATIONS

4. Conclusions

In conclusion, this is the first study addressing clinical and demographic profile in the population of Iraqi People especially in AL-Najaf Province. The higher proportion of Hepatitis B patients , resulted in a greater need for health care resources in this cohort, such as biological treatment, hospitalization, and surgery. We believe that this result can indirectly raise consciousness about the importance of investing in disease awareness access to diagnostic exams, and therapy within the window of opportunity to avoid/prevent complications and disability.

5. Recommendations

- 1- **Antiviral Treatment:** Patients should continue or start antiviral therapy to suppress the virus and prevent liver damage.
- 2- **Vaccination for Contacts:** Close contacts of HBV patients should be vaccinated to prevent the spread of the virus.
- 3- **Regular Monitoring:** Patients should be monitored for viral load (HBV DNA) and liver function to assess disease progression and treatment efficacy.
- 4- **Continue Routine Screening:** Although no co-infections were detected, regular screening for HCV, HIV, and other blood-borne infections should continue to ensure early detection if they occur.
- 5 - **Patient Education:** Educate patients about the risks of co-infections and the importance of safe practices to prevent exposure to other viruses.

References

1. Gay, L., Melenotte, C., Lakbar, I., Mezouar, S., Devaux, C., Raoult, D., Bendiane, M. K., Leone, M., & Mège, J. L. (2021). Sexual Dimorphism and Gender in Infectious Diseases. *Frontiers in immunology*, 12, 698121. <https://doi.org/10.3389/fimmu.2021.698121>.
2. Berry, N., Mee, E. T., Almond, N., & Rose, N. J. (2024). The Impact and Effects of Host Immunogenetics on Infectious Disease Studies Using Non-Human Primates in Biomedical Research. *Microorganisms*, 12(1), 155. <https://doi.org/10.3390/microorganisms12010155>
3. Fleming, P. J., & Agnew-Brune, C. (2015). Current Trends in the study of Gender Norms and Health Behaviors. *Current opinion in psychology*, 5, 72–77. <https://doi.org/10.1016/j.copsyc.2015.05.001>
4. Saavedra, D., Añé-Kourí, A.L., Barzilai, N. Aging and chronic inflammation: highlights from a multidisciplinary workshop. *Immun Ageing* 20, 25 (2023). <https://doi.org/10.1186/s12979-023-00352-w>
5. Badal VD, Vaccariello ED, Murray ER, Yu KE, Knight R, Jeste DV, Nguyen TT. The Gut Microbiome, Aging, and Longevity: A Systematic Review. *Nutrients*. 2020;12. Osei JA, Peña-Sánchez JN, Fowler SA, Muhajarine N, Kaplan GG, Lix LM. Population-Based Evidence From a Western Canadian Province of the Decreasing Incidence Rates and Trends of Inflammatory Bowel Disease Among Adults. *J Can Assoc Gastroenterol*. 2020 Aug 21;4(4):186-193. doi: 10.1093/jcag/gwaa028. PMID: 34337319; PMCID: PMC8320288.
Lakatos PL. Recent trends in the epidemiology of inflammatory bowel diseases: up or down? *World J Gastroenterol*. 2006 Oct 14;12(38):6102-8. doi: 10.3748/wjg.v12.i38.6102. PMID: 17036379; PMCID: PMC4088101.
Emerson ND, Distelberg B, Morrell HE, Williams-Reade J, Tapanes D, Montgomery S. Quality of Life and School Absenteeism in Children With Chronic Illness. *J Sch Nurs*. 2016 Aug;32(4):258-66. doi: 10.1177/1059840515615401. Epub 2015 Nov 15. PMID: 26572160; PMCID: PMC4867299.
Gordon M, Sinopoulou V, Ibrahim U, Abdulshafea M, Bracewell K, Akobeng AK. Patient education interventions for the management of inflammatory bowel disease. *Cochrane Database Syst Rev*. 2023 May 4;5(5):CD013854. doi: 10.1002/14651858.CD013854.pub2. PMID: 37172140; PMCID: PMC10162698.
Mehta P, Grant LM, Reddivari AKR. Viral Hepatitis. [Updated 2024 Mar 10]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK554549/>

6. Kalas, M. A., Chavez, L., Leon, M., Taweeseedt, P. T., & Surani, S. (2021). Abnormal liver enzymes: A review for clinicians. *World journal of hepatology*, 13(11), 1688–1698. <https://doi.org/10.4254/wjh.v13.i11.1688>
7. Abulude, O. A., Ahmed, I., & Sadiyu, F. U. (2017). Assessment of Hepatitis B Viral Infection as a Predictor of Hepatic Enzymes and Compounds Alteration among Antenatal Patients. *Medical sciences (Basel, Switzerland)*, 5(4), 24. <https://doi.org/10.3390/medsci5040024>.
8. Said, Z. N. A., & El-Sayed, M. H. (2022). Challenge of managing hepatitis B virus and hepatitis C virus infections in resource-limited settings. *World journal of hepatology*, 14(7), 1333–1343. <https://doi.org/10.4254/wjh.v14.i7.1333>
9. Howell, J., Seaman, C., Wallace, J., Xiao, Y., Scott, N., Davies, J., de Santis, T., Adda, D., El-Sayed, M., Feld, J. J., Gane, E., Lacombe, K., Lesi, O., Mohamed, R., Silva, M., Tu, T., Revill, P., & Hellard, M. E. (2023). Pathway to global elimination of hepatitis B: HBV cure is just the first step. *Hepatology (Baltimore, Md.)*, 78(3), 976–990. <https://doi.org/10.1097/HEP.0000000000000430>
10. Maqsood Q, Sumrin A, Iqbal M, et al. Hepatitis C virus/Hepatitis B virus coinfection: Current prospectives. *Antiviral Therapy*. 2023;28(4). doi:10.1177/13596535231189643
- Mavilia, M. G., & Wu, G. Y. (2018). HBV-HCV Coinfection: Viral Interactions, Management, and Viral Reactivation. *Journal of clinical and translational hepatology*, 6(3), 296–305. <https://doi.org/10.14218/JCTH.2018.00016>
11. Lazarevic, I., Banko, A., Miljanovic, D., & Cupic, M. (2024). Hepatitis B Surface Antigen Isoforms: Their Clinical Implications, Utilisation in Diagnosis, Prevention and New Antiviral Strategies. *Pathogens*, 13(1), 46. <https://doi.org/10.3390/pathogens13010046>
12. Lampertico and Pietro ,(2017). Clinical Practice Guidelines on the management of hepatitis B virus infection. *Journal of Hepatology*, Volume 67, Issue 2, 370 – 398.
- Khanam, A., Chua, J. V., & Kottilil, S. (2021). Immunopathology of Chronic Hepatitis B Infection: Role of Innate and Adaptive Immune Response in Disease Progression. *International Journal of Molecular Sciences*, 22(11), 5497. <https://doi.org/10.3390/ijms22115497>
13. Milich D. R. (2016). The Concept of Immune Tolerance in Chronic Hepatitis B Virus Infection Is Alive and Well. *Gastroenterology*, 151(5), 801–804. <https://doi.org/10.1053/j.gastro.2016.09.037>
14. Connors EE, Panagiotakopoulos L, Hofmeister MG. Screening and Testing for Hepatitis B Virus Infection: CDC Recommendations — United States, 2023. *MMWR Recomm Rep* 2023;72(No. RR-1):1–25. DOI: <https://dx.doi.org/10.15585/mmwr.rr7201a1>

15. Wang, J., Ding, W., Liu, J., Liu, Y., Yan, X., Xia, J., Wu, W., Jia, B., Chen, Y., Gao, D., Hong, S., Wang, X., Wang, L., Tong, X., Yin, S., Zhang, Z., Li, J., Huang, R., & Wu, C. (2022). Association of Coexistent Hepatitis B Surface Antigen and Antibody With Severe Liver Fibrosis and Cirrhosis in Treatment-Naive Patients With Chronic Hepatitis B. *JAMA network open*, 5(6), e2216485. <https://doi.org/10.1001/jamanetworkopen.2022.16485>
16. Jiang, X., Chang, L., Yan, Y., & Wang, L. (2021). Paradoxical HBsAg and anti-HBs coexistence among Chronic HBV Infections: Causes and Consequences. *International journal of biological sciences*, 17(4), 1125–1137. <https://doi.org/10.7150/ijbs.55724>
17. Tan, A., Koh, S., & Bertoletti, A. (2015). Immune Response in Hepatitis B Virus Infection. *Cold Spring Harbor perspectives in medicine*, 5(8), a021428. <https://doi.org/10.1101/cshperspect.a021428>
18. Wang, S. H., Yeh, S. H., & Chen, P. J. (2021). Unique Features of Hepatitis B Virus-Related Hepatocellular Carcinoma in Pathogenesis and Clinical Significance. *Cancers*, 13(10), 2454. <https://doi.org/10.3390/cancers13102454>
19. Enya, T., & Ross, S. R. (2025). Innate Sensing of Viral Nucleic Acids and Their Use in Antiviral Vaccine Development. *Vaccines*, 13(2), 193. <https://doi.org/10.3390/vaccines13020193>
20. Groth, C., Wupper, S., Gnouamozi, G. E., Böttcher, K., & Cerwenka, A. (2024). Intrinsic Immune Response of HBV/HDV-Infected Cells and Corresponding Innate (Like) Immune Cell Activation. *Livers*, 4(4), 562-593. <https://doi.org/10.3390/livers4040040>
21. Shi, W., Li, K., & Zhang, Y. (2023). Current tests for diagnosis of hepatitis B virus infection and immune responses of HBV-related HCC. *Frontiers in oncology*, 13, 1185142. <https://doi.org/10.3389/fonc.2023.1185142>
22. Alhajj M, Zubair M, Farhana A. Enzyme Linked Immunosorbent Assay. [Updated 2023 Apr 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK555922/>
23. Ricco, G., Popa, D. C., Cavallone, D., Iacob, S., Salvati, A., Tabacelia, D., Oliveri, F., Mascolo, G., Bonino, F., Yuan, Q., Xia, N. S., Gheorghe, L., & Brunetto, M. R. (2018). Quantification of serum markers of hepatitis B (HBV) and Delta virus (HDV) infections in patients with chronic HDV infection. *Journal of viral hepatitis*, 25(8), 911–919. <https://doi.org/10.1111/jvh.12895>

24. Wei, L., & Ploss, A. (2021). Mechanism of Hepatitis B Virus cccDNA Formation. *Viruses*, 13(8), 1463. <https://doi.org/10.3390/v13081463>
- Boonstra, A., & Sari, G. (2025). HBV cccDNA: The Molecular Reservoir of Hepatitis B Persistence and Challenges to Achieve Viral Eradication. *Biomolecules*, 15(1), 62. <https://doi.org/10.3390/biom15010062>
25. Hsu, Y. C., Huang, D. Q., & Nguyen, M. H. (2023). Global burden of hepatitis B virus: current status, missed opportunities and a call for action. *Nature reviews. Gastroenterology & hepatology*, 20(8), 524–537. <https://doi.org/10.1038/s41575-023-00760-9>
26. Al-Busafi, S. A., & Alwassief, A. (2024). Global Perspectives on the Hepatitis B Vaccination: Challenges, Achievements, and the Road to Elimination by 2030. *Vaccines*, 12(3), 288. <https://doi.org/10.3390/vaccines12030288>
27. di Filippo Villa, D., & Navas, M. C. (2023). Vertical Transmission of Hepatitis B Virus-An Update. *Microorganisms*, 11(5), 1140. <https://doi.org/10.3390/microorganisms11051140>
28. Nelson, N. P., Easterbrook, P. J., & McMahon, B. J. (2016). Epidemiology of Hepatitis B Virus Infection and Impact of Vaccination on Disease. *Clinics in liver disease*, 20(4), 607–628. <https://doi.org/10.1016/j.cld.2016.06.006>
29. Rizzo, G. E. M., Cabibbo, G., & Craxì, A. (2022). Hepatitis B Virus-Associated Hepatocellular Carcinoma. *Viruses*, 14(5), 986. <https://doi.org/10.3390/v14050986>
30. Amponsah-Dacosta, E., Tamandjou Tchuem, C., & Anderson, M. (2020). Chronic hepatitis B-associated liver disease in the context of human immunodeficiency virus co-infection and underlying metabolic syndrome. *World journal of virology*, 9(5), 54–66. <https://doi.org/10.5501/wjv.v9.i5.54>
31. Fu, M. X., Lambert, G., Cook, A., Ndow, G., Haddadin, Y., Shimakawa, Y., Hallett, T. B., Harvala, H., Sicuri, E., Lemoine, M., & Nayagam, S. (2025). Quality of life in patients with HBV infection: A systematic review and meta-analysis. *JHEP reports : innovation in hepatology*, 7(4), 101312. <https://doi.org/10.1016/j.jhepr.2024.101312>
- Nguyen, M. H., Wong, G., Gane, E., Kao, J. H., & Dusheiko, G. (2020). Hepatitis B Virus: Advances in Prevention, Diagnosis, and Therapy. *Clinical microbiology reviews*, (2), e00046-19. <https://doi.org/10.1128/CMR.00046-19>
32. Singh, A., Kumar, J., & Kumar, V. (2023). Chronic Hepatitis B Infection: Current and Emerging Therapeutic Strategies. *Current topics in medicinal chemistry*, 23(18), 1727–1752. <https://doi.org/10.2174/1568026623666230413094331>

الخلفية: التهاب الكبد B هو عدوى فيروسية تضر بالكبد. غالبًا ما يزول الشكل الحاد من الفيروس دون علاج. لكن التهاب الكبد B المزمن هو مرض غير قابل للشفاء. **هدف الدراسة:** تقييم المستوى الصحي العام للأشخاص المصابين بالتهاب الكبد الفيروسي B. **المرضى والطرق:** تم الحصول على البيانات الديموغرافية والسريية من خلال بيانات التحليل الطبي للمرضى الذين حضروا إلى المستشفى التخصصي لأمراض الجهاز الهضمي والكبد والجراحة في محافظة النجف من محافظة من أكتوبر 2023 إلى يناير 2025. **النتائج:** تم تضمين ما مجموعه 60 مريضًا في الدراسة الحالية. كانت غالبية المرضى من الذكور، حيث شكلوا 44 حالة (73.33%)، ومثلت الإناث نسبة أصغر، حيث بلغ عددهم 16 حالة (26.66%). يسלט هذا التوزيع الضوء على أن المشكلة أكثر انتشارًا بين الأفراد في العشرينات والثلاثينيات من العمر، مع وجود ملحوظ في الفئة العمرية الأكبر سنًا (50-69). كان جميع المرضى من النجف. نسبة صغيرة من المرضى هم طلاب وأكبر نسبة من المرضى هم من مكتسبي الدم ومعظم المرضى لديهم مستويات عالية من (AST و ALT و ALP) مما يشير إلى وجود مشاكل في وظائف الكبد. كما لا تظهر أي عدوى بفيروسات أخرى على مرضى التهاب الكبد B ويتم تشخيص التهاب الكبد B عن طريق اختبار HBs-Ag الذي يظهر لدى جميع المرضى. عندما يقوم المرضى بإجراء اختبار تعداد الدم الكامل، يظهر معظم المرضى زيادة في تعداد الدم الكامل والصفائح الدموية ويعاني عدد قليل من المرضى من زيادة في خلايا الدم الحمراء والهيموغلوبين. وأخيرًا، فإن أكثر الطرق المستخدمة في تشخيص المرض هي الاختبار المصلي وأحدثها هو تفاعل البوليميراز المتسلسل (PCR). **الاستنتاجات:** أدت النسبة الأعلى من التهاب الكبد B إلى زيادة الحاجة إلى موارد الرعاية الصحية في هذه المجموعة، مثل العلاج البيولوجي والاستشفاء والجراحة. نعتقد أن هذه النتيجة يمكن أن تزيد الوعي بشكل غير مباشر بأهمية الاستثمار في الوعي بالمرض والوصول إلى الفحوصات التشخيصية والعلاج ضمن نافذة الفرصة لتجنب / منع المضاعفات والإعاقة.



**جمهورية العراق
وزارة التعليم العالي و البحث العلمي
جامعة الفرات الاوسط معهد التقني
معهد التقني الطبي / الكوفة
قسم صحة مجتمع**

**تقييم المستوى الصحي العام للأشخاص المصابين بفيروس التهاب الكبد
الفيروسي ب
البحث التخرج مقدم**

**الى جامعه الفرات الاوسط/ قسم صحه مجتمع/ معهد الكوفه
من اجل استيفاء متطلبات للحصول على شهاده الدبلوم**

الاعداد

مرتضى صادق زيد
فاطمة احمد حسين
حبيب شاهين محمد
نرجس حازم هادي
زيد محمد حبيب حمد
اية عبد الامير كاظم حسن
سجاد عباس حسين
زهراء عباس رهيف
سجاد عبد الله عبد الحر
مريم علي عبد
علي عبد الزهره طالب
اسراء إبراهيم مزهر
محمد جعفر ياسر
اقبال عبد الامير حميد
مرتضى شمخي ابشير
يوسف حاتم غاني

**مشرف البحث
د. سارة حسن كاظم**