Survey study for Hepatitis B and C viruses in infected patients in Babylon province

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections pose significant public health challenges globally, contributing to liver- related morbidity and mortality. Understanding the epidemiological characteristics and risk factors associated with these infections is essential for informing prevention and control strategies.

Objective: This study aimed to investigate the epidemiology, risk factors, and clinical outcomes of hepatitis B and C infections among individuals in Babylon province, Iraq.

Methods: A cross-sectional survey was conducted among 95 respondents diagnosed with hepatitis B or C infections in Babylon province. Data were collected through a survey Google Form distributed online, assessing demographic

characteristics, vaccination status, disease status (acute vs. chronic), and risk factors associated with infection.

Results: The study revealed a high prevalence of hepatitis B (53.3%) and hepatitis C (46.7%) infections among respondents. Vaccination coverage against hepatitis B was low (41.1%), with notable risk factors including the use of non-

sanitized equipment (14.9%) and blood transfusions (9.1%) before infection. Acute infections accounted for 72% of cases, highlighting the need for early detection and intervention.

Conclusion: These findings underscore the urgent need for targeted prevention and control measures to reduce the burden of hepatitis B and C infections in Babylon province. Strengthening vaccination programs, improving infection control practices, and enhancing access to screening and treatment services are crucial steps toward mitigating the impact of these viral infections on public health.

Keywords : Hepatitis B , Hepatitis C , Babylon , province , Survey , Vaccination.

Introduction

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections represent significant global health challenges, posing substantial burdens on healthcare systems and populations worldwide. These viral infections are major causes of liver-related morbidity and mortality, contributing to a wide spectrum of liver diseases, including acute and chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC).

Hepatitis B is primarily transmitted through exposure to infected blood or body fluids, as well as from mother to child during childbirth. It is estimated that approximately 257 million people are living with chronic HBV infection globally, with significant regional variations in prevalence rates. While the availability of safe and effective vaccines has led to a decline in HBV incidence in many parts of the world, challenges remain in achieving universal vaccination coverage and addressing the needs of individuals already infected with the virus.

Hepatitis C, on the other hand, is primarily spread through contact with infected blood, often resulting from unsafe injection practices, contaminated medical equipment, or transfusion of unscreened blood products. An estimated 71 million people are living with chronic HCV infection worldwide, with a significant burden of disease-related morbidity and mortality. Although the advent of direct-acting antiviral (DAA) therapies has revolutionized the treatment landscape for HCV, access to diagnosis and treatment remains a challenge in many settings,

particularly in low- and middle-income countries.

The epidemiology of hepatitis B and C infections varies across geographic regions and populations, influenced by factors such as healthcare infrastructure, socioeconomic disparities, cultural practices, and access to preventive measures and healthcare services. Certain demographic groups, such as people who inject drugs, men who have sex with men, and individuals from marginalized communities, are disproportionately affected by these viral infections, underscoring the importance of targeted prevention, screening, and treatment efforts.

In this context, understanding the complex interplay between viral pathogenesis, transmission dynamics, risk factors, and clinical outcomes of hepatitis B and C infections is essential for developing effective public health strategies and interventions. This review aims to provide a comprehensive overview of the epidemiology, transmission modes, risk factors, clinical manifestations, and current management strategies for hepatitis B and C infections, with a focus on the challenges and opportunities in global disease control and prevention efforts.

Materials and methods

Study Design:

This study employed a cross-sectional observational study design to examine the epidemiological characteristics and risk factors associated with hepatitis B and C infections among infected patients in Babylon province.

Data were collected through a survey Google Form distributed online to individuals residing in Babylon province who had been diagnosed with hepatitis B or C infections.The survey questionnaire included items related to participants' demographic characteristics, vaccination status, disease status (acute vs. chronic), mode of infection, previous medical history, and other relevant factors.

Study Population:

A total of 95 respondents participated in the study, representing individuals with hepatitis B or C infections in Babylon province. The study population consisted of individuals of different ages and genders, with 51.6% males and 48.4% females.

Variables and Measurements

The main variables of interest included:

Demographic characteristics: Age, gender

Disease status: Acute infection, chronic infection

Vaccination status: Vaccinated, not vaccinated

Risk factors: Pregnancy status, use of non-sanitized equipments, tattooing history, kidney dialysis history, blood transfusion history, medication history, mode of diagnosis, mode of infection

Disease outcomes: Mortality, morbidity (chronic vs. acute infection)

Data Analysis:

Descriptive statistics were used to summarize the demographic characteristics and distribution of variables among the study participants.

Inferential statistics, such as chi-square tests or logistic regression analysis, were employed to assess associations between variables, such as vaccination status and disease outcomes.

The statistical software IBM SPSS was utilized for data analysis.

Ethical Considerations:

The survey was conducted in accordance with ethical guidelines to protect participant privacy and confidentiality.

Participants were informed about the purpose of the survey, and their

participation was voluntary.

As the data collected were anonymous and did not include identifying information, participant privacy was ensured.

Results and discussion

Results:

The important findings of this study include the significant associations between the male participants and HBV infection, and between the female participants and HCV. Males may be more prone to HBV infection due to the effect of sex hormones such as androgen and estrogen, which are produced in males and females, respectively . These hormones exert their biological function by binding to specific receptors, such as androgen receptors (ARs) or estrogen receptors

(ERs), thereby activating signal transduction pathways . The liver is considered to be a sexually dimorphic organ as it expresses both ARs and ERs, and thus it is responsive to sex hormones . HBV X protein has been shown to enhance the transcriptional activity of ARs in an androgen concentration–dependent manner , which may amplify the sex difference in HBV-infected patients. In addition, a transgenic animal studies indicated that HBV replication and gene expression may be enhanced in the livers of males compared to females . It supported the idea of W4P mutation increasing the HBV virion replication and greater IL-6-mediated inflammation in male individuals . Another study demonstrated that NTCP, a functional receptor for HBV infection, especially in rs2296651 variant which is typically Asian-specific, was significantly associated with a decreased risk of HBV infection in Taiwanese women .

These genetic and animal studies may partly explain the male predominance in HBV infection.The finding of this study showed a significant association between HCVinfection and the female participants in this study is consistent with several other studies .

However, several reviews have reported no sex disparity in HCV infection, and other studies have even reported that HCV infection is more common in men than in women. The major transmission route of HCV in Taiwan used to be through iatrogenic pathways. Nowadays, the risk of iatrogenic exposure has diminished, and HCV infection is sporadic . A possible reason for the higher susceptibility to HCV in women may be because women have less access to medical support than men . In addition, since most HCV-infected patients are asymptomatic , they tend to have low awareness of the disease and therapeutic options. Therefore, HCV can incubate in these patients for a long time without being noticed.

Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections accounts for an important global health problem affecting over 250 million people all around the world. They can cause acute, transient and chronic infections in the human liver. Chronic infection of liver can lead to its failure or cancer.

To deal with this problem, alternative approaches or strategies to inhibit these infections have already been started. DNA and mRNA-based vaccination will increase the efficacy and reduce toxicity in

patients with Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections.

Gene vaccines represent a promising alternative to conventional vaccine approaches because of their high potency, capacity for rapid development, low-cost manufacture and safe administration. MRNA-based vaccination is a method to elicit potent antigen-specific humoral and cell-mediated immune responses with a superior safety profile compared with DNA vaccines.

Exploring the intricacies of these pathways can potentially help the researchers to explore newer vaccines. In this study, DNA and mRNA- based vaccination are introduced as an approach to treat Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections. DNA and mRNA-based vaccines as one of the most successful therapeutics are introduced and the clinical outcomes of their exploitation are explained

In addition, HCV-related HCC develops less frequently in women, with slower disease progression and better treatment response, resulting in higher overall survival (11). Taken together, these factors may explain the high prevalence of HCV infection in women.

Results showed that rate for HBV (20%) and HCV (2%) in the 0-20 year age group. In the 21-40 year age group, the infection rates for HBV, HCV were increased to 58% and 42% respectively. The rate for HBV was reduced to 17% in the 41 to 60 year age group, whereas the prevalence of anti-HCV was reduced to 42% only.

In this study, 21 respondents, accounting for 22.1% of the total sample, includes respondents that they had used medical instruments that were either non-sterilized or previously used by another person before being infected with hepatitis.

A total of 74 respondents, constituting 77.9% of the total sample,includes respondents who indicated that they had not used non-sterilized or previously used medical instruments before hepatitis infection.

These results provide insights into the potential risk factors associated with the transmission of hepatitis infection, specifically related to the use of medical instruments. The proportion of respondents who reported using non-sterilized or previously used instruments highlights a potential avenue for infection transmission and underscores the importance of implementing proper sterilization protocols and

infection control measures in healthcare settings.

The results revealed that 9% of respondents reported a history of kidney dialysis, while 86% did not. Furthermore, the data showed that 34% of infections were attributed to hepatitis B, while 61% were attributed to hepatitis C.

Medical students are a group of health care workers that are at high risk to get HBV and HCV infections because of their direct contact with patients, blood and other body fluids during their professional training, and lack of experience and professional skills increases the risk of infection . Medical students receive percutanous injuries as often or more than health care

workers and are, therefore, at greater risk of occupational exposure to HBV and HCV infections than health care workers, a fact that might partially be explained by poor knowledge and non-adherence to universal infection control procedures

Regarding to the use of immunosuppressive drugs the study revealed that 31/95. 32.6% of participants were used immunosuppressive drugs while 64/95 .67% of participants weren't used the immunosuppressive drugs

The results showed that the rate of infection in hepatitis B and c according to age .60%in group (20-25)year age group. 14%in (26-30)year. 7%in (31-35)year .4% in(36-40)year. 3% in(41-45)year and 7% in group (46-50) year age group.

Accurate diagnosis of viral hepatitis is based on determination of specific viral markers. In HBV infection they include HBsAg, anti-HBs, HBeAg, anti- HBe, anti-HBc, IgM anti-HBc, and HBV DNA. There are patients with HBV marker constellation indicating serologic recovery, but with HBV DNA in the liver indicating continuous viral replication. Mutations have been described in all four HBV genes. It is important to take into account the main precore mutation which leads to a decrease or complete inhibition of HBeAg production (HBeAg negative HBV infection). Diagnostically most important are surface gene mutations because they can result in the false diagnosis or delay in diagnosis in important groups of patients. Anti-HCV and HCV RNA are found in sera of patients with HCV infection. A false positive result is possible with ELISA, especially in patients with low c/o ratio and in all individuals with a low risk of HCV infection.

It is necessary to confirm ELISA positivity with confirmation techniques (western blot, immunoblot). There are qualitative and quantitative assays for HCV RNA determination. HCV genotyping should be done, since different viral genotypes respond differently to therapy and therapeutic protocols are different. It is possible to determine HCVAg free or complexed with the antibody. Determination of free HCVAg could enable the diagnosis of acute HCV infection.

Discussion:

The findings of this study shed light on the epidemiological characteristics and risk factors associated with hepatitis B and C infections in Babylon province. The high prevalence rates of both hepatitis B and C infections underscore the urgent need for targeted prevention and control measures in the region.

The relatively low vaccination coverage against hepatitis B (41.1%) highlights the importance of strengthening vaccination programs and raising awareness about the benefits of vaccination among high-risk populations. Additionally, the presence of risk factors such as the use of non-sanitized equipment and blood transfusions before infection emphasizes the need for improved infection control practices and screening protocols in healthcare settings.

The high proportion of respondents diagnosed incidentally (19.5%) suggests the existence of undiagnosed cases and the importance of implementing systematic screening programs to identify asymptomatic individuals and provide timely interventions.

Furthermore, the predominance of acute infections (72%) underscores the need for enhanced surveillance and treatment strategies to prevent disease progression and reduce the burden of chronic liver disease.

Overall, these findings provide valuable insights into the epidemiology and risk factors of hepatitis B and C infections in Babylon province, informing public health policies and interventions aimed at reducing transmission rates, improving vaccination coverage, and enhancing access to screening and treatment services.

References

1. World Health Organization. (2021). Hepatitis B. Retrieved from https://www.who.int/news-room/fact-sheets/detail/hepatitis-b

2. World Health Organization. (2021). Hepatitis C. Retrieved from https://www.who.int/news-room/fact-sheets/detail/hepatitis-c

3. Blach, S., Kondili, L. A., Aghemo, A., Cai, Z., Dugan, E., Estes, C., & Razavi, H. (2020). Impact of COVID-19 on global HCV elimination efforts. Journal of Hepatology, 74(1), 31-36.

4. Kim, D., Li, A. A., Perumpail, B. J., Gadiparthi, C., Kim, W., & Cholankeril, G. (2020). Disparities in hepatitis C screening in the United States population. Journal of Medical Virology, 92(10), 1715-1720.

5. Liang, T. J., & Ward, J. W. (2020). Hepatitis B in the United States— lessons learned and future directions. New England Journal of Medicine, 383(11), 1079-1080.

6. Reddy, K. R., & Hoofnagle, J. H. (2021). Management of chronic hepatitis B: an update. Hepatology, 73(S1), 227-242.