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Original article

Prevalence of Hepatitis B & C Viruses among Patients in Dialysis Centers in Zintan and Yefren Cities, Libya

Adell Abubakeer[1]*, Rahma Alfaqi[2], Elham Alhagig[3], Mariam Ali[4], Ziad Alfliow[5]

Department of Medical Laboratories, College of Medical Technology, University of Zintan, Zintan, Libya.
Corresponding Email. adell.abubakeer@uoz.edu.ly

Abstract
Patients on hemodialysis face a higher risk of viral hepatitis due to factors like frequent blood transfusions, prolonged vascular access, and exposure to infected patients and equipment. These issues pose significant challenges for healthcare systems, especially in developing countries. This study aimed to assess the prevalence of HBV and HCV among hemodialysis patients in Zintan and Yefren, Libya. In this study, 87 serum specimens were collected from hemodialysis patients, 47 men and 40 women, between February and May 2024. The samples were tested for hepatitis B surface antigen (HBsAg) and HCV antibodies using ELISA. Results showed a low prevalence; HBsAg was positive in 1.14% (1 out of 87), and anti-HCV antibodies were also detected in 1.14% (1 out of 87). While the low prevalence suggests a reduced risk in these facilities, further research on demographic and clinical risk factors is needed. In conclusion, the prevalence of HBV and HCV among hemodialysis patients in this region is reassuringly low, indicating effective management practices.
Keywords: Hepatitis B, Hepatitis C, Hemodialysis, Zintan, Yefren, Libya.

Introduction

Patients undergoing hemodialysis are at an increased risk of contracting hepatitis B (HBV) and hepatitis C (HCV) viruses, which are significant contributors to illness and mortality. Preventing the transmission of these viruses in hemodialysis units remains a global challenge. Infections caused by HBV and HCV are major causes of morbidity and mortality among hemodialysis patients, complicating their management in renal dialysis units [1]. The reported prevalence and incidence of HCV infection in hemodialysis patients varies from country to country and ranges between 1 and 84.6% [2]. The most common viral causes of liver disease worldwide are hepatitis B virus (HBV) and hepatitis C virus (HCV), with an estimated global infection of approximately 180 million and 240 million individuals, respectively. Hepatitis C virus is severe, transmissible between individuals, and leads to significant illnesses and fatalities. It is particularly common among individuals with kidney disease and kidney failure [3]. Patients undergoing dialysis are at high risk of hepatitis C virus infection if proper preventative measures are not in place in the dialysis setting. Most individuals with hepatitis C virus infection do not show symptoms, requiring screening, especially for chronic kidney disease (CKD) and hemodialysis (HD) patients. Additionally, this virus has been identified as an independent risk factor for both the onset of CKD and the rapid progression of hepatitis C virus infection in patients with CKD, according to multiple studies [3].

Hepatitis B (HBV) and hepatitis C (HCV) viruses are the leading causes of chronic liver disease in patients with end-stage renal disease undergoing hemodialysis. The prevalence of hepatitis infection among hemodialysis patients is high and varies between countries and between dialysis units within a single country. Both HBV and HCV are the most common viral causes of hepatic diseases worldwide [3]. Respectively, with 3-4 million people being infected every year [4,5]. HBV causes hepatitis of altering severity in up to 95% of children and 10% of adult patients [4]. The current study aimed to document the prevalence of hepatitis B and C virus among HD patients at the Zintan and Yefren Cites of Libya.

Methods

Study design

This cross-sectional study was conducted at two hemodialysis units located in Zintan and Yafran, Libya, from February to May 2024. Patients undergoing hemodialysis (HD) were enrolled in the study, and clinical data, including age and gender, were collected from each participant.

Samples

A serum sample was also obtained from each patient to test for antibodies to the hepatitis B virus and hepatitis C virus. The samples were stored at -20°C and thawed at room temperature before testing. Hepatitis B surface antigen (HBsAg) and anti-HCV antibodies were measured, and laboratory diagnosis was further confirmed using enzyme-linked immunosorbent assay (ELISA). This testing was performed at Al-Burhan Laboratory in Zintan City.

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Ethical Clearance

Ethical clearance was obtained from the directors of both hemodialysis units in Zintan and Yafran. Informed consent was also secured from all participants. To ensure confidentiality, personal identifiers were omitted, and the anonymity of personal data records was maintained.

Statistical analysis

Data was presented as descriptive statistics using Microsoft excel, and presented as number and percentages.

Results

A total of 87 patients participated in the study. The majority were male, comprising 47 individuals (54.02%), while female participants numbered 40 (45.9%), as shown in (Table 1). The ages of participants ranged from 14 to 80 years. All participants were dialysis patients from the Yefren and Zintan dialysis centers, with 40 patients from the Yefren Center and 47 from the Zintan Center.

Table 1. Gender distribution of all hemodialysis patients

Gender	Frequency	Percent%
Male	*47*	*54%*
Female	*40*	*46%*

Our study found that patients receiving hemodialysis treatment spanned various age groups, from 14 to 80 years old. Among these groups, 14 to 39-year-olds accounted for 28.7%, 40 to 65-year-olds accounted for 65.5%, and those aged 66 and older accounted for 5.7%. This suggests that the proportion of patients aged 66 and older, at 5.7%, is lower than the other age groups, as shown in (Table 2).

Table 2. Age distribution of all hemodialysis patients

ID	Age	Frequency	Percent%
1	**14 to 39**	**25**	**28.7%**
2	**40 to 65**	**57**	**65.5%**
3	**66 and more**	**5**	**5.7%**

Results indicated the prevalence of hepatitis B virus was 1.14% (1 in 87 patients) from overall HD patients, Age of the case 62 years, as shown in (Table 3).

Table 3. The overall prevalence of HBV among all hemodialysis patients

Hepatitis B	Frequency	Percent%
Negative	86	98.9
Positive	1	1.1
Age of the case	62	

This study results showed that the prevalence of Hepatitis C virus infection was 1.14% (1 of 87 patients), Age of the case 40 years. B and C were equal in the study population, as shown in (Table 4).

Table4. The overall prevalence of HCV among all hemodialysis patients

Hepatitis C	Frequency	Percent%
Negative	86	98.9
Positive	1	1.1
Age of the case	40	

Discussion

Results indicated a prevalence of hepatitis B virus at 1.14% (1 in 87 patients) among overall hemodialysis patients. Additionally, the prevalence of positive hepatitis C antibodies in hemodialysis patients was also 1.14% (1 of 87 patients).

Infections caused by hepatitis B virus (HBV) and hepatitis C virus (HCV) are significant contributors to illness and death among patients undergoing hemodialysis (HD). These infections pose challenges in managing patients within renal dialysis units, as individuals with chronic renal failure do not effectively clear these viral infections [1]. Patients undergoing hemodialysis (HD) are at high risk for viral hepatitis infections due to the frequent need for blood transfusions, long-term vascular access, and potential exposure to infected individuals and contaminated equipment [6]. Hepatitis C represents a major worldwide public health problem [7]. About 200 million people in the world's population are infected with HCV [8].

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Through our study, the results showed that the gender prevalence rate among 87 cases was 47 males and 40 females. The high percentage of male dialysis patients in this study is consistent with the study in Tunisia on the prevalence and risk factors of hepatitis B and C hemodialysis patients in Tunisia between 2012 and 2014[11]. A study in India (Maharashtra) on the prevalence of asymptomatic hepatitis B virus and hepatitis C virus infection in patients with maintenance hemodialysis in tertiary care hospitals was conducted in 2018[12]. Where the number of males was 75, the number of females was 34, and the number of males was 104, and the number of females was 31, respectively. Also, the results of another study conducted in Libya on the prevalence of hepatitis C infection in hemodialysis patients in 2019[13]. Showed several males 1297 and several females 1028 conducted in 37 centers, which was a wider scope of the study that supported our study in terms of numbers.

As for the age group in our study, the average age of dialysis patients ranged from 14-80. The majority of patients infected with hepatitis B and C virus were in the second category, from 40-65. while in a study (32) conducted among patients undergoing dialysis at a teaching hospital in Uttarakhand to determine the prevalence of hepatitis B and C virus in 2019, the ages of all patients ranged between 15-71, and the ages of patients with hepatitis B ranged from over 60. As is the case for hepatitis patients C between 41-50 years old. It was found in this study that one case was a carrier of hepatitis B virus out of 87 patients, or 1.14%. Another study was conducted in Lebanon on the incidence and prevalence of hepatitis B and hepatitis C in hemodialysis patients between 2010 and 2012[14]. It was found that 60 patients out of 3769 were infected with hepatitis B virus, a rate of 1.6%. In contrast to the results of our study, the rate of HBV infection was high in a study conducted in Mashhad, Iran, to the prevalence of HBV, HCV, and HIV among hemodialysis patients in tertiary care hospitals [15]. Of 9 out of 65 patients, 13.8% were infected.

Through the results of our study, it was found that the number of positive cases of hepatitis C virus was one out of 87 cases, or 1.14%, while the number of positive cases in a study conducted in Iran to the prevalence of HBV, HCV, and HIV among hemodialysis patients in tertiary care hospital [15]. Was 3 out of 65 patients, or 4.6%. Another study was conducted in Iran on the prevalence of occult hepatitis C virus infection in hemodialysis patients from 2012 to 2014[16]. It was found that the number of positive patients was 8 out of 302 patients, i.e., 2.6%. The results of this study showed that the rate of infection with hepatitis B virus and hepatitis C virus was equal. On the contrary, a Libyan study [17]. It was conducted on a larger scale, in which the rate of infection with hepatitis B virus was higher than that of hepatitis C virus.

The study's results indicated that the infection rates of hepatitis B and hepatitis C viruses were identical. On the contrary, a Libyan study Was conducted on a larger scale, in which the rate of infection with hepatitis B virus was higher than that of hepatitis C virus [17].

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Conclusion

This study examines two dialysis units in Western Libya, finding a low prevalence of HBV and HCV infections in Zintan and Yafran. Observing safety protocols during blood transfusions is vital to protect medical staff and blood units. Additionally, educating patients and their families about hepatitis transmission, prevention, and infection control is crucial. Further research is recommended to explore the risk factors for HBV and HCV in hemodialysis patients**.**

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Conflicts of Interest. Nil

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المستخلص

يواجه المرضى الذين يخضعون لغسيل الكلى خطرًا للإصابة بالتهاب الكبد الفيروسي بسبب عوامل مثل عمليات نقل الدم المتكررة، والتعرض للمرضى المصابين والمعدات وغيرها. تشكل هذه القضايا تحديات كبيرة لأنظمة الرعاية الصحية، وخاصة في البلدان النامية. هدفت هذه الدراسة إلى تقييم انتشار التهاب الكبد الفيروسي ب والتهاب الكبد الفيروسي سي بين مرضى غسيل الكلى في مركز الغسيل في الزنتان ويفرن، ليبيا. في هذه الدراسة، تم جمع 87 عينة مصل من مرضى غسيل الكلى، 47 رجلاً و40 امرأة بين فبراير ومايو 2024. تم اختبار العينات بحثًا عن مستضد سطح التهاب الكبد ب (HBsAg)والأجسام المضادة لفيروس التهاب الكبد سي باستخدام تقنية المقايسة المناعية المرتبطة بإلنزيم (ELISA).

أظهرت النتائج انتشارًا منخفضًا، وكان مستضد سطح التهاب الكبد ب إيجابيًا بنسبة 1.14٪ (1 من أصل 87) وتم الكشف عن أجسام مضادة لفيروس التهاب الكبد سي أيضًا بنسبة 1.14٪ (1 من أصل 87). في حين يشير الانتشار المنخفض إلى انخفاض المخاطر في هذه المرافق، إلا أن هناك حاجة إلى مزيد من البحث حول عوامل الخطر الديموغرافية والسريرية. وفي الختام، فإن معدل انتشار التهاب الكبد الفيروسي ب و ج بين مرضى غسيل الكلى في هذه المنطقة منخفض بشكل مطمئن، مما يشير إلى ممارسات إدارة فعالة.

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