



# The Prevalence of Hepatitis B and C Virus in Patients With End-Stage Kidney Disease on Regular Hemodialysis in Duhok, Iraq: A Brief Report

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## Abstract

**Background and aim:** Hepatitis B and C virus (HBV and HCV) infections are considered as major global public health concerns. Chronic infections may lead to liver cirrhosis, hepatic failure, and hepatocellular carcinoma. Therefore, the aim of this study was to investigate the prevalence of HBV and HCV infections in patients with end-stage kidney disease (ESKD) and on regular hemodialysis in Duhok located in the Kurdistan region of Iraq. **Methods:** A cross-sectional study was conducted in Duhok, Iraq between January 2019 and October 2019. During this period, a total of 143 patients within the age range of 9-72 years old with ESKD visited the Duhok dialysis center for regular hemodialysis. Enzyme-linked immunosorbent assay (ELISA) was conducted to test HBV and HCV positivity and then HBV viral load was tested by the real-time polymerase chain reaction (RT-PCR). Finally, HCV positivity was confirmed by the Xpert HCV quantification assay.

**Results:** Among the recruited samples, 5 out of 143 (3.49%) patients were positive for HBV while HBV viral load for those patients was undetected. On the other hand, 3/143 (2.1%) patients tested positive for HCV Ab. All these 3 patients were also confirmed positive by the RT-PCR.

**Conclusions:** ESKD patients on regular analysis showed a low prevalence of HBV and HCV in the Duhok dialysis center. An effective infection control program, vaccination, and treatment of HCV make the elimination of HBV and HCV feasible in such a group.

**Keywords:** Viral Hepatitis, HBV, HCV, ESKD, ELISA, RT-PCR



## Background

Infection with hepatitis B and C virus (HBV and HCV) is a global health problem (1,2). Currently, around 350 and more than 150 million subjects are infected with HBV and HCV, respectively (1,2). Such infections are associated with long-term complications including liver cirrhosis, hepatic failure, and hepatocellular carcinoma (1,2). In addition, infections with HBV and HCV are considered as the most common blood-borne infections in subjects with end-stage kidney disease (ESKD) on regular hemodialysis (3). The prevalence of HBV has been studied in the general population and it ranges from less than 1% in Western countries to more than 10% in Southeast Asia (4). Additionally, the prevalence of HCV in the general population ranges from 10% in Egypt to less than 1% in developed countries (2). On the other hand, the prevalence of HBV infection in patients with ESKD on regular hemodialysis ranges from less than 1% in developed countries to as high as 20% in developing countries (5). Besides, the prevalence of HCV in such

patients ranges from 5% in developing countries to up to 54% in developed countries (6). Previous studies have thoroughly evaluated the prevalence of HBV and HCV in the region (7-9). However, data about the prevalence of HBV and HCV in our region is sparse. Further, continuous monitoring of the prevalence of such viruses in patients with ESKD is important for the early discovery of the outbreaks and the elimination of the viruses.

## Objectives

The present study aimed to investigate the prevalence of HBV and HCV in patients with ESKD and on regular hemodialysis.

## Materials and Methods

### Study Design

This cross-sectional study was conducted in Duhok between January 2019 and October 2019. During the study, 143 patients with ESKD visited a Duhok dialysis center for regular hemodialysis. All patients with regular

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hemodialysis were recruited based on their consent for participating in the study while those with acute renal failure were excluded from the study.

### Enzyme-linked Immunosorbent Assay

Hepatitis B surface antigen (HBsAg), hepatitis B core IgG (HBc IgG), and hepatitis C virus antibodies (HCV Ab) were tested using the commercial ELISA kit (DIA. PRO diagnostic Bioprobes ELISA kit, Italy) following the manufacturer's instruction.

### DNA Extraction and Real-time Polymerase Chain Reaction

To extract HBV DNA, QIAamp commercial viral DNA extraction kit was utilized (Qiagen) following the manufacturer's instructions. Then, HBV viral load was tested by the artus HBV RG PCR-based RT-PCR (Qiagen), followed by performing the RT-PCR testing using the Rotor-Gene Q RT-PCR.

### Quantification of HCV RNA

To confirm HCV positivity, all HCV Ab positive samples were tested for HCV by Xpert HCV quantification assay (Cepheid, Sunnyvale, California, the USA). In this assay, the amplification ranges from 10 IU/mL to 10<sup>8</sup> IU/mL.

## Results

### Hepatitis B Virus Positivity

In general, 143 patients within the age range of 9-72 years old were registered in the Duhok dialysis center between January 2019 and October 2019. In addition, 79/143 (52.44%) of the patients were females and all patients were recruited in the study and tested for HBsAg. Further, 5/143 (3.49%) patients (3 males and 2 females) were tested positive for HBsAg. Then, patients who were positive for HBsAg were tested for HBc IgG antibodies in order to confirm the chronicity of HBV infection. All tested patients were positive for HBc IgG. The viral load for those patients was undetected.

### Hepatitis C virus Positivity

Among the recruited samples, 3 (2.1%) cases were tested positive for HCV Ab including 2 males and 1 female. Furthermore, all samples with positive HCV AB were tested to confirm HCV positivity and three patients were positive by RT-PCR.

## Discussion

Infections with HBV and HCV are public health issues worldwide. The World Health Organization has set a plan for the elimination of the infection by 2030. To achieve this, it is important to eliminate the infection in patients who are at high risk such as those who are on hemodialysis (10). Recent studies have shown that the prevalence of

HCV positivity in patients on regular hemodialysis is within the range of 1.4%-28.3% and 4.7%-41.9% in developed and developing countries, respectively (11). In two projects conducted in Saudi Arabia and Jordan investigating the prevalence of HBV in patients with ESKD on hemodialysis, the prevalence of HBV was found to be 4.6% and 5.9%, respectively (12,13). In the USA, the prevalence of HCV in patients with ESKD on regular hemodialysis ranged from 5% to 10% (14). In another study conducted in Turkey, the prevalence of HBV and HCV was 13% and 20%, respectively (15). Based on the results of a previous study in Iraq, HBV and HCV positivity in patients on hemodialysis were 3.2% and 4.3%, respectively (16). In this study, the prevalence of HBV and HCV in patients on hemodialysis was 3.49% and 2.1%, respectively. The low prevalence of HBV in this group encourages the elimination of the infection in such patients. Additionally, a good vaccination program may help to decrease the transmission of infection in this age group. On the other hand, the low prevalence of HCV positivity in this group of patients, along with the approval of direct-acting antiviral drugs with high success rates makes the elimination of the virus feasible (17,18). To conclude, the prevalence of HBV and HCV was low in patients with ESKD who were on hemodialysis. Accordingly, the elimination of viral infections is feasible by implementing a good infection control program, vaccination, and treatment of HCV.

### Conflict of Interest

None.

### Ethical Statement

The study protocol and the consent were reviewed and approved by the Research and Ethics Committee of College of Medicine, University of Zakho, Kurdistan. Informed consent was obtained from all subjects as well.

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