

# Detection of seropositive anti-hepatitis C Virus (HCV) antibody in haemodialysis patients in AL-Diwaniyah City, Iraq

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## Abstract

**Background:** It is well known that patients undergoing dialysis treatment, and in particular hemodialysis (HD), are at increased risk for blood-borne viral infections. This is due to their underlying impaired cellular immunity which increases their susceptibility to infection. In addition, the process of HD requires blood exposure to expected infectious materials. The purpose of current study was to detect Iraqi patients who are seropositive for anti-hepatitis C Virus (HCV) antibodies.

**Methods:** The study was conducted in the AL-Diwaniyah Teaching Hospital and the Public Health Laboratory in AL-Diwaniyah City, Iraq from January 2017 to December 2017. Sera from 300 haemodialysis patients were investigated by fourth generation enzyme-linked immunosorbent assay (EISA) test. In addition, positive sera and 10% of the negative ones were sent to the Central Public Health Laboratory in Baghdad for confirmation of results using polymerase chain reaction technique. **Results:** out of the 300 haemodialysis patients involved in the study, 17 patients were seropositive for the HCV antibodies; seven of them were males and ten were females. Polymerase chain reaction technique confirmed the obtained results.

**Conclusions:** Patients undergoing haemodialysis are real risk of infection with hepatitis C virus. However, the occurrence of infection is determined by a number of factors.

**Key words:** Haemodialysis, Renal failure, Hepatitis C infection, ELISA, PCR.

## INTRODUCTION

Renal failure patients basically have reduced cellular immunity<sup>[1]</sup>. In addition, the plasma of uremic patients contains inhibitory factors that reduce lymphocytes responses *in vitro*, so that, they have increased vulnerability to viral infections<sup>[2]</sup>. Moreover, immune-enzymatic assays for detection of anti-HCV antibodies are usually using the 3<sup>rd</sup> and 4<sup>th</sup> generation tests (Enzyme-Linked Immunosorbent Assay; ELISA) which have HCV nonstructural genes and HCV core antigens<sup>[3]</sup>. The specificity of these tests, which are obtainable on the marketplace, is greater than 99% while their sensitivity is 95-99%<sup>[4]</sup>.

Surgical procedures, blood transfusion and frequent visits to different haemodialysis dialysis (HD) units remain the major risk factors for contracting viral hepatitis<sup>[5]</sup>. Khedmat et al.<sup>[6]</sup> said that, in HD centers HCV infection is a universal problem and the incidence of this infection varies according to the geographical area.

The occurrence of HCV in HD patients varies significantly throughout the world with a prevalence ranging from 3.9% to 71%. These variations depended on the time length on HD and the number of blood transfusions<sup>[7,8]</sup>.

Some researchers like Jadoul et al.<sup>[9]</sup> concluded that there was a decrease in HCV occurrence in HD patients in the last years, generally, due to application of firm universal viral infection measures. Moreover,<sup>[10]</sup> had noticed the outcome of isolation procedures on reducing the incidence of HCV infection in HD centers. Furthermore, the effects of HD time and receiving patients isolation procedures on reducing the occurrence of HCV had been reported by<sup>[11,12,13]</sup>.

The purpose of current study was to detect, using immunological tests, patients who are seropositive for anti-hepatitis C Virus (HCV) antibodies in Iraqi patients undergoing haemodialysis in AL-Diwaniyah City.

## MATERIALS AND METHODS

The study was conducted in AL-Diwaniyah Teaching Hospital and Public Health Laboratory in Diwaniyah City, Iraq from January 2017 to December 2017. Sera from 300 patients were

analysed using fourth generation enzyme-linked immunosorbent assay (EISA) test. Participants' age ranged from 27-60 years. They have history of HD for 1-36 months and attended HD unit 2-3 times weekly with HD sessions ranged from 3-4 hours. Ethical approval of study was obtained from the Research Ethics Committee at AL-Qadisiyah Health Directorate, Iraq.

Patients' sera were tested by 4<sup>th</sup> generation ELISA test (In Tec product, INC. (<http://www.intecasi.com>) for the qualitative determination of antibodies to HCV in the HD patients and the test was done according to manufacturer instructions (CAT.No.ITP23003). Anti-HCV positive and negative controls were used for the anti-HCV.

All anti-HCV antibodies positive sera were retested with the same assay for confirmation of anti-HCV virus positivity. In addition, all that seropositive sera with 10 % of the seronegative sera were sent to Central Public Health laboratory in Baghdad for PCR test for further accuracy to detect that sera containing anti-HCV antibodies are also HCV PCR-positive indicating that these antibodies are markers of ongoing infection.

## RESULTS

The results of current study revealed that 17 (5.66%), out of 300 HD patients recruited in the study, were seropositive for HCV (Figure 1). Seven of them were males and 10 were females. On the other hand, out of the 283 who were seronegative, 137 were females and 146 were males (Figure 2).

All the anti-HCV antibodies positive sera were retested with the same assay for confirmation of anti-HCV virus positivity in public health laboratory in AL-Diwaniyah where they found also positive and all that seropositive sera with 10 % of the seronegative sera were sent to the Central Public Health Laboratory in Baghdad for PCR test. The latter test confirmed that the sera which were positive for anti-HCV antibodies are also HCV PCR-positive. These data indicated that these antibodies are good markers of ongoing infection.

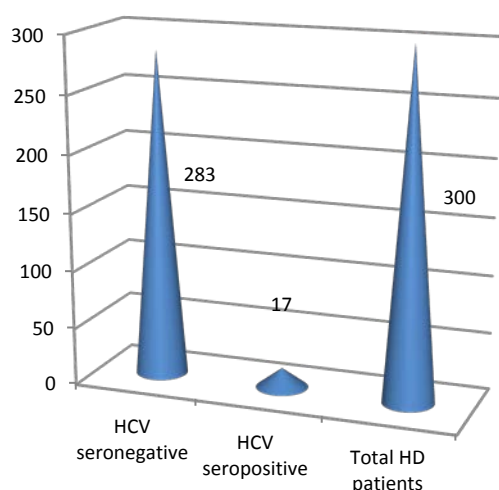


Figure 1 Seropositive and seronegative for HCV antibodies in haemodialysis patients

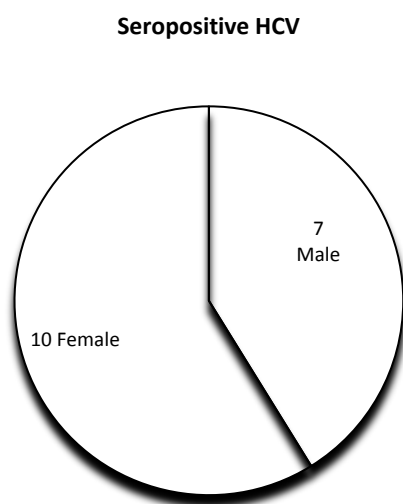


Figure 2: Distribution of male and female for seropositive HCV antibodies.

#### DISCUSSION

We Used Enzyme-linked immune sorbent assays (ELISA) test because it is highly sensitive and specific. Also, it is commonly used to detect seropositive HCV patients, as these tests are based on core antigens and non-structural proteins of the virus [14].

We recommended the immunoassay for HCV serology testing in this study since this test is offered to individuals who are part of a population with high HCV prevalence or who have a history of HCV risk contact. Presence of antibodies to hepatitis C virus (HCV) indicating history of exposure to HCV also screening test for HCV infection is done using HCV immunoassay serological testing [15].

Previous studies conducted in Iraq [16-19] investigated HD patients found that 6.6%, 11.7%, 7.1% and 7.1%, respectively, were seropositive for anti-HCV antibodies.

The results of current study reported that 5.66% of HD participants were seropositive for anti-HCV antibodies which are similar to the figures reported in the aforementioned Iraqi studies. However, higher figures were reported by other studies which were also conducted in Iraq [20, 21, 22, 23]. These studies reported that 40.3%, 26.7%, 42.6%, 26.05%, respectively.

Many reasons could contribute to the spread of HCV infection, These include, but not limited to, blood transfusion as the risk increases increasing the number of units transfused to those HD patients [24]. In addition, the duration HD session is another reason [25], the longer the duration of HD the higher is the risk of infection.

Regarding gender differences, the results of current study showed that out of the 17 seropositive patients, 7 were males and 10 were females. These data indicated that HCV infection is more prevalent among female than among male HD patients. These data are supported by those reported by a previous studies [26,19].

On the other hand, studies conducted in regional countries revealed that the incidence of HCV infection among HD patients was variable. For example, the incidence of HCV infection among Egyptian HD patients ranged from 48.2% to 87.5% [27,28,29] while in Lebanon the incidence varied from 13% in 2007 to 4.7% in 2016 [30]. Indeed, the latter figure is similar to that reported in current study. However, in Syria, [31] reported that 54.4% of the HD patients were HCV antibody positive, whereas the infection rate among Jordanian HD patients was 16.5% [32].

Furthermore, in Palestine the percentages of HD patients infected with HCV were 22% and 24.7% in 2010 and 2016, respectively [33,34]. Interestingly, in Iran [35] the percentage of seropositive HD patients for HCV antibodies (5.2%-8.1%) was similar to that reported in current study, but lower than that reported in Turkey where a study [36] reported that 19.9% of HD patients in Antalya were serologically positive for HCV infection.

So we found that the occurrence of HCV in HD patients in AL-Diwaniyah City still low in comparison with that reported in Arabian area and Middle East. .

#### CONCLUSION

Viral hepatitis type C continues to be an important health problem in HD patients, specifically in the developing nations with limited funds. However, current study reported that disinfection of the dialysis machines using hot water rinsing between HD sessions and chemical disinfection at the end of the day or at the end of the week are important measures to prevent the spread of HCV infection among patients attending HD units. Also, screening patients with renal failure before undergoing HD and blood before transfusion for HCV antibodies are important measure that can prevent HCV infection too. In addition, HD patients known of HCV infection should be isolated during HD sessions.

Ethical Approval was obtained from the Research Ethics Committee in AL-Diwaniyah Health Directorate, AL-Diwaniyah City, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

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