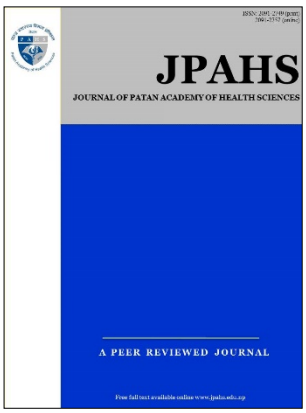

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Hepatitis C sero-prevalence and risks of transmission in end-stage renal failure patients undergoing hemodialysis

Nora Ranjitkar Manandhar,[1] Paras K Acharya,[2] Yuba Raj Sharma,[2] Gyan K Kayastha,[2] Bimal Pandey[1]

[1]Assistant Professor, [2]Professor, Department of Internal Medicine, Patan Academy of Health Sciences, Lalitpur, Nepal

Correspondence
Dr. Nora Ranjitkar Manandhar
Department of Internal Medicine, Patan Academy of Health Sciences, Lalitpur, Nepal
Email: noraranjitkar@pahs.edu.np

Peer Reviewers

Asst. Prof. Dr. Ashis Shrestha
Patan Hospital, PAHS

Prof. Dr. Jay N Shah
Patan Hospital, PAHS

ABSTRACT

Introductions: Hepatitis C virus (HCV) infection is common in the patients undergoing hemodialysis (HD). The quality of life and survival of patients with hepatitis C infected end-stage renal disease is less than that of the noninfected ones. This study aims to determine the prevalence of HCV in patients undergoing HD and the risk of transmission.

Methods: This was a retrospective study of charts of the chronic kidney disease patients who underwent dialysis at Patan Hospital from March 2011 to July 2017. Those patients who were positive for HIV, HBsAg and HCV before the initiation of dialysis were excluded. Pearson Chi square test and Fisher's Exact test were used to determine the significance of the results.

Results: Out of 173 patients, 12 (6.9%) seroconverted to HCV: five (41.66%) in first year, four (33.33%) in second year, and three (25%) in third year (Fisher's Exact test p=0.26). Out of 173 patients, 137 (79.2%) received blood transfusion, 27 (15.6%) received erythropoiesis stimulating agent (ESA), 9 (5.2%) received both blood transfusion and ESA. The HCV seropositivity were 9 (75%), 2 (16.66%), and 1 (8.33%) respectively in them, Fisher's Exact test p value was 0.65. There was no significant association between the seroconversions in in-center versus multicenter HD and the number of dialyses per week.

Conclusions: Hepatitis C infection was common (6.9%) in HD patients. There was no significant association of transmission in regards to duration of HD, transfusion or single vs multicentre HD.

Keywords: end-stage renal disease, hemodialysis, hepatitis C virus

INTRODUCTIONS

According to the WHO, there are 30 million carriers of hepatitis C virus, 1.6% of population in the South-East Asia Region. There are 500,000 cases of viral hepatitis, cirrhosis and liver cancer, resulting in 120,000 deaths annually. The HCV seroprevalence is highest in the intravenous (IV) drug users, 50-100%.[1]

The patients on hemodialysis (HD) are at higher risk for HCV infection, with the seroprevalence of 5-60%.[2] Hepatitis C is the commonest cause of hepatitis in HD patients.[3] The HCV contaminated blood transfusion, de novo transmission, duration of HD are main risk factors.[4-7]

The HCV infected persons on HD have a decreased quality of life and increased risk of mortality. The HCV infected renal transplant recipients have deleterious effect on transplant outcomes and reduced graft as well as patient survival.[8]

The aim of the study was to assess the prevalence of hepatitis C and associated risk factors of the transmission.

METHODS

This was a retrospective study conducted at HD unit of Patan Hospital, Patan Academy of Health Sciences (PAHS), Nepal. Charts of the chronic kidney disease patients who had undergone maintenance dialysis were studied from March 2011 to July 2017, total of five years and four months. The serological test was conducted by using NANBASE C-96 V4.0 test kit. It is a fourth generation enzyme immunoassay diagnostic kit. This test has sensitivity and specificity of 100% and 99.8% respectively.

The inclusion criteria for the study were:

- The patient in the end-stage renal disease (ESRD) needing a maintenance HD
- The patients who had at least two documented serological tests of HCV, at least three months apart.
- The first test done before the initiation of the HD having negative result

The exclusion criteria for the study were:

- Seropositivity for the Human Immunodeficiency Virus, Hepatitis B virus and Hepatitis C virus infections before the commencement of the HD
- Patients with acute renal failure needing the renal replacement therapy.
- If the duration of HD could not be assessed.

The following variables were studied: age, sex, address, duration of HD in months, receiving blood transfusions and/or erythropoiesis stimulating agents (ESA), number of HD sessions, single center or multi center dialysis were noted; (these were the patients who had received HD from another center.

SPSS 20 was used for data analysis. Pearson Chi square test and Fishers exact test of independence was used to measure the statistical significance of the result.

RESULTS

There were 193 ESRD patients who underwent HD. Twenty patients were excluded and data on remaining 173 were analysed (Figure 1). Median age was 52 years (range 16-80 years), 97 male and 76 female (male to female ratio was 1.278). The point prevalence of hepatitis C seropositive was 6.9%.

Nine patients underwent renal transplantation; five in the first year, three in second year and one in the fourth year. Four got transferred out to another center; one in first year and three in second year of enrolment to dialysis. Most of the patients, 73 (42.20%) were from Lalitpur district, Nepal. Eighty-six patients underwent dialysis treatment for up to one year duration, 50 for up to two years, 20 for 3 years, nine for 4 years, six patients for 5 years and 2 for more than 5 years.

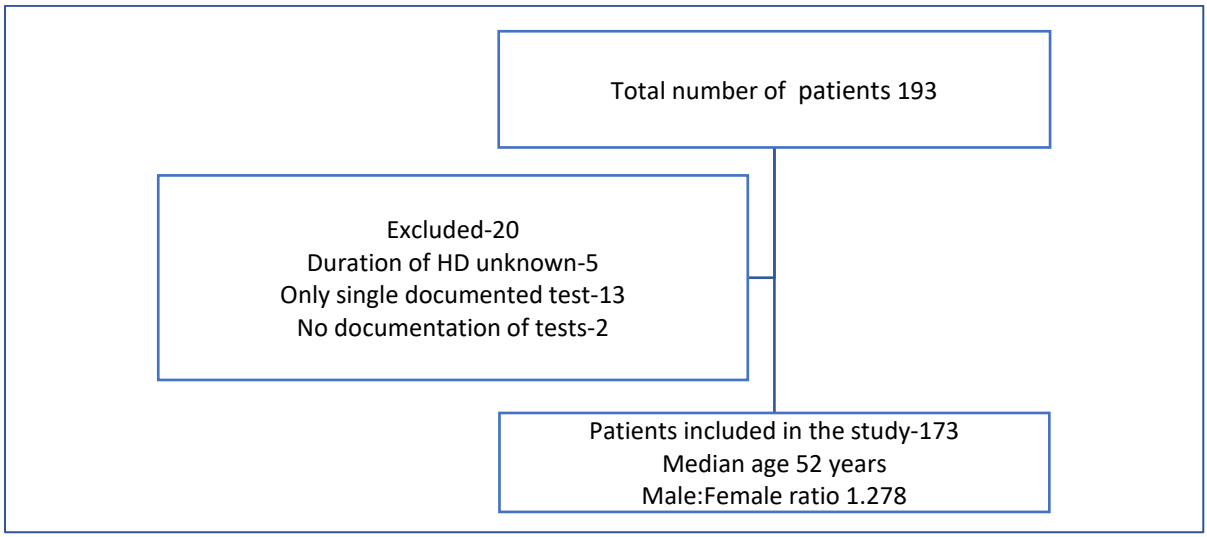

Figure 1. Flow chart of the patient selection

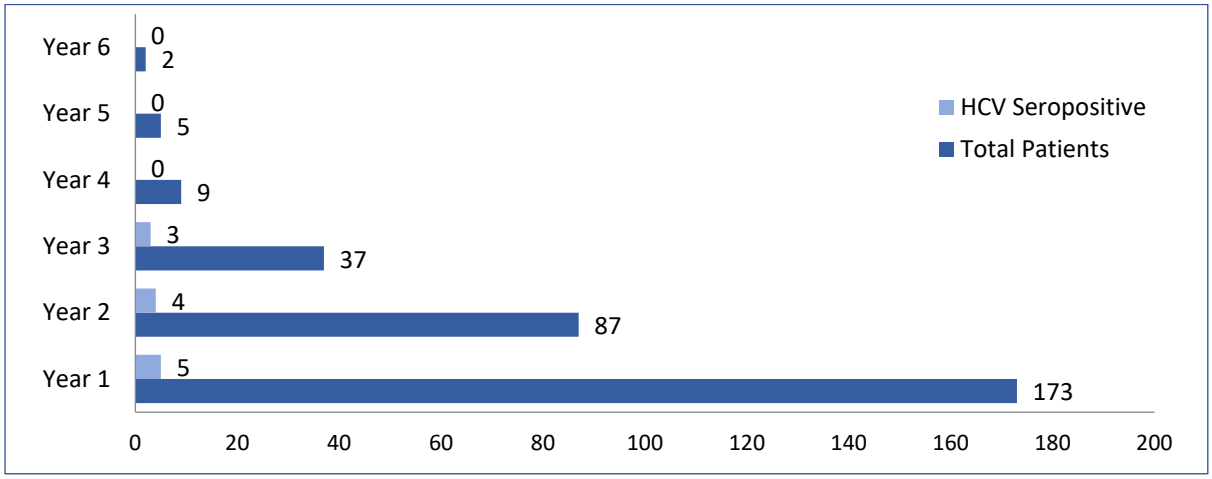

Figure 2. Prevalence of hepatitis C seropositivities during dialysis; p=0.26.

One hundred thirty-seven (79.20%) patients received blood transfusion only, 27 (15.60%) ESA and 9 (5.20%) received both blood transfusion as well as ESA.

Among the patients with chronic kidney disease, 86 (49.71%) were dialysed in our center only, 53 (30.63%) received initial management from another center and later from our unit and for remaining 34 (19.65%), it was not clear whether they received their initial dialysis in our center or another center.

Twelve (6.9%) patients seroconverted during the study period, 5 females and 7 males. Five (41.66%) seroconverted within one year of enrolment to the HD treatment, four (33.33%) during the second year and three (25%) during the third year. Prevalence of HCV seropositivity during the first year of initiation of HD was 2.89% (5 of 173), second year 4.59% and third year 8.10% (Figure 2); Fisher's Exact test showed p value of 0.26.

Out of the total 12 seropositive patients, nine (75%) had blood transfusion, 2 (16.66%) ESA and 1 (8.33%) had both ESA and blood transfusion. The prevalence of HCV seropositivity in the patients receiving blood transfusion, ESA， ESA and blood were 9/137

(6.6%), 2/27 (7.4%) and 1/9 (11.11%), respectively, p value (Fisher's Exact test) was 0.65, (Figure 3).

The seropositivity was seen in 6/86 (6.97%) who received HD in our center only; 6/53 (11.32%) had HD in our as well as other centers also, (Pearson Chi square=0.849, df=1, p=0.356). Using a Fisher's Exact test, p=0.53. (Figure 4).

In our center 32 (18.50%) patients received once a week HD, 133 (76.88%) twice a week, and 8 (4.62%) thrice a week. The number of patients with seroconversion were 3 (9.37%) in once a week HD group, 7 (5.26%) in twice a week HD group and 2 (25%) in thrice a week HD group, Fisher's Exact test showed the p value of 0.068,w (Figure 5).

Out of 173 patients, 80 (46.24%) dropped out of HD by the end of the first year, 44/87 (50.57%) by the end of 2ndyear, and 20/37 (54.05%) by the end 3rdyear. The cause of drop out was not known, possibly lost to follow up or demise of the patient.

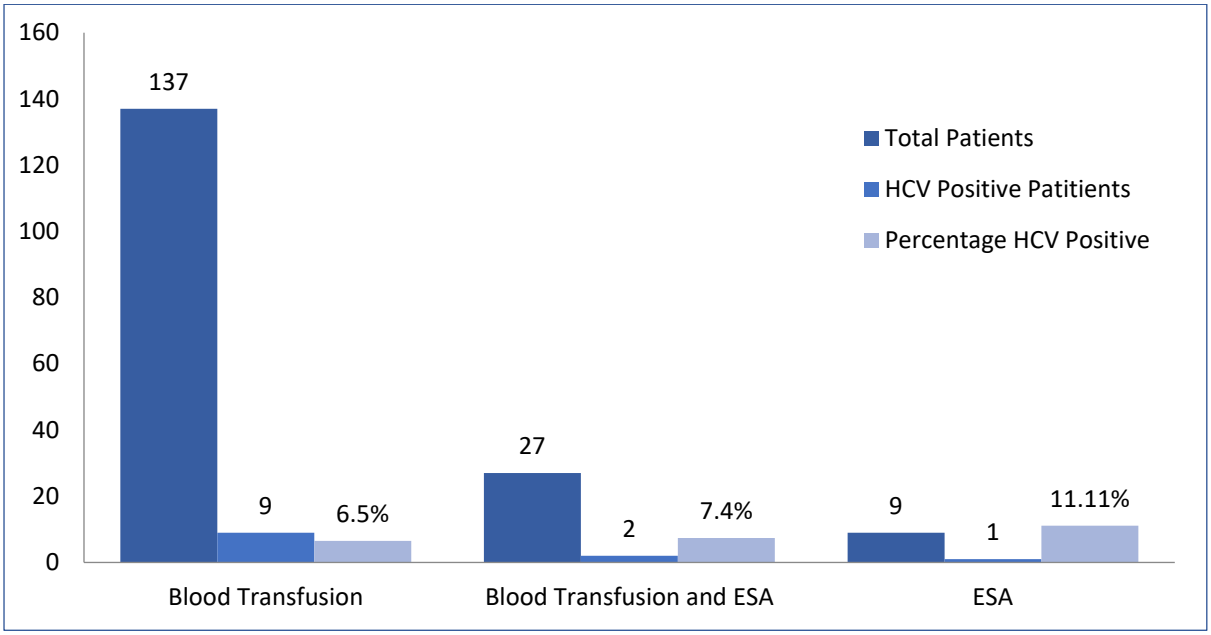

Figure 3. Figure showing the relation between the Blood Transfusion and or ESA use and the hepatitis C seropositive; p=0.65.

DISCUSSIONS

The point prevalence of hepatitis C seropositivity during HD in our study was 6.9% (12/173), which is higher than in a healthy general population 0.6%,[9] blood donors 0.39-0.66% [10,11]and people living with HIV AIDS 3.703%.[10] However, this is less than in the intravenous drug users (IDU), 94%.[9] The seroprevalence of Hepatitis C in patients receiving HD in northern and western India[13,14] is reported to be 23% and 2.7% respectively and in Pakistan[15] 29.2%. In a systematic review from Middle-East, the highest prevalence was seen in Syria (54%) and Egypt (50%), lowest in Iran (12%) and Lebanon (9%).[16] However, in a prospective study at two centers in Kathmandu, Nepal, during 2005-2006, there was no seroconversion reported.[17]

In a multicenter study involving 2796 patients in Germany, the hepatitis C prevalence was 7%. HCV seropositive was found in 6.1% of the patients but in 0.8 % of the patients the HCV antibody was absent but had the viremia.[18]

In our study, most of the infections occurred during the first year of HD, similar to the multicenter German study.[18] They also reported increased prevalence with HD, but in subgroup analysis the duration of dialysis was not significantly associated with the HCV viremia.[18] The Northern Indian study however reported duration of HD as an independent risk factor for acquiring Hepatitis C infection; 85.4±23.7 sessions of HD in seropositive patients against 60.1±14.7 sessions in seronegative patients, p value <0.01 students t-test.[13]

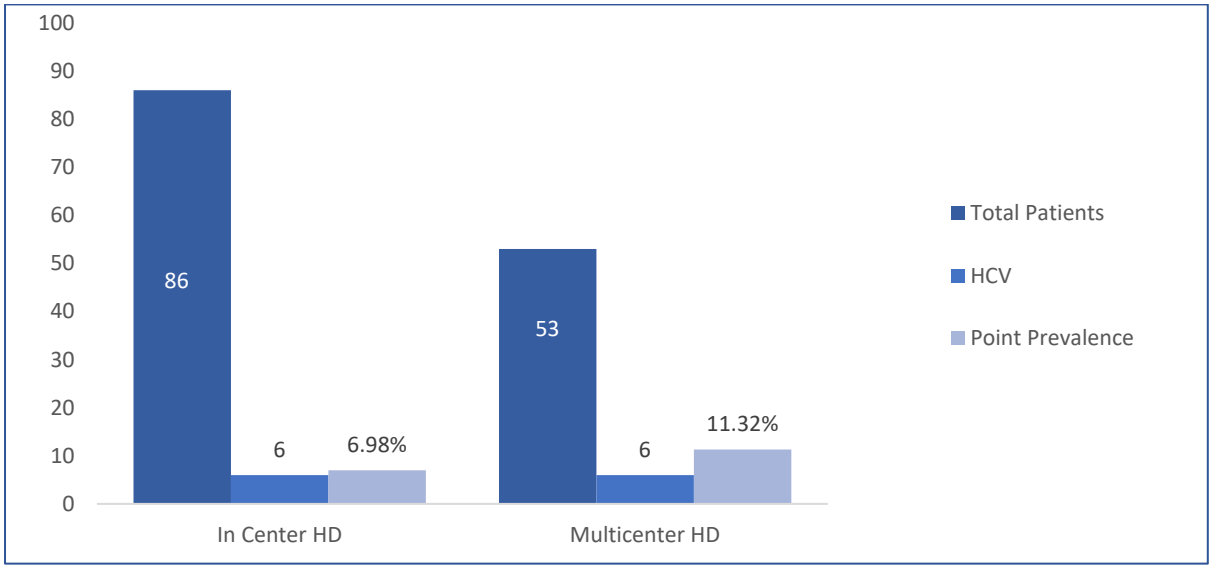

Figure 4. Figure showing the relation between in-center verses multicenter HD and hepatitis C seroprevalence; p=0.53.

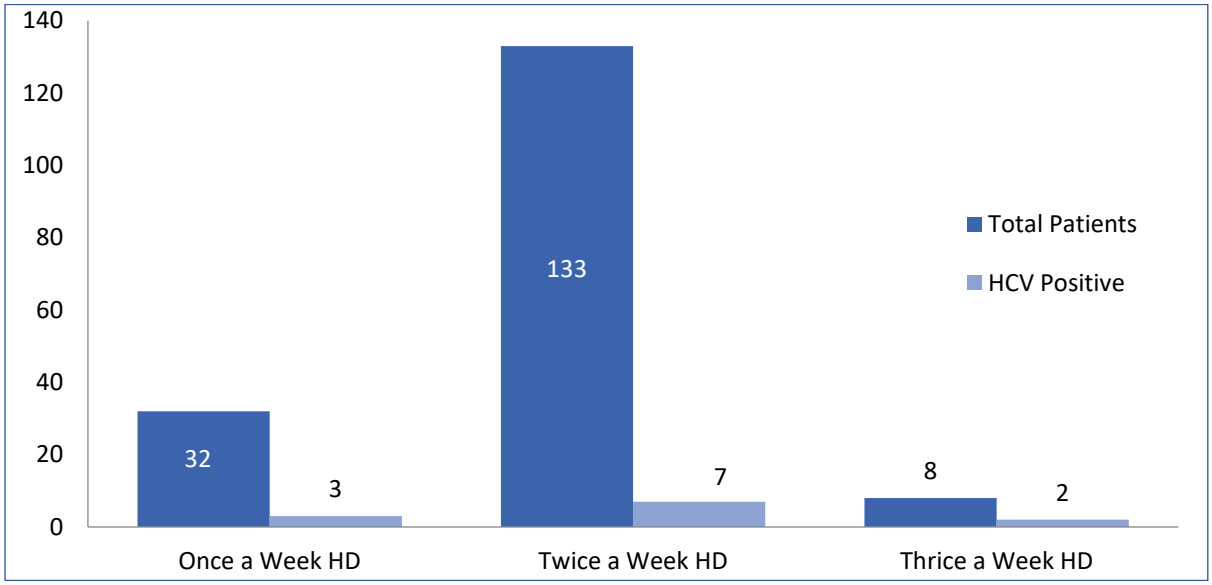

Figure 5. Figure showing the relation of the number of hemodialysis per week and the hepatitis C seropositivity; p=0.068

In our study, 75% of patients with seroconversion had blood transfusion. Our study did not show blood transfusion and ESA as a risk factor or protection against HCV positivity. It may be due to the small sample size. In the German study, the prevalence of the hepatitis C increased statistically with the increase in number of blood transfusions, the highest being in the patients with more than five transfusions. But it was not significantly associated with the patients with HCV viremia. The sub group analysis did not find blood transmission to be significantly associated with it.[18]

Our study showed that there is an increased risk for HCV seropositivity in the patients who had received HD in more than one center, though it was not statistically significant. There was no statistically significant increase in risk of acquiring hepatitis C with increased frequency of HD. Thus, less risk of nosocomial spread of infection.

Due to small sample size, we could not establish the statistical significance for any risk factors of transmission of hepatitis C in HD unit. We also could not explain why there was a high seroprevalence of hepatitis C at first year of initiation of HD, possibly patients were incubating the disease prior to the initiation of HD.

The number of patients who dropped out in our study was high, either due to loss to follow up or demise of the patient. In the study conducted in India, it showed a mortality rate of 54.04% on first year of dialysis treatment.[19] In another 5 year study done in India, the mortality rate was higher in diabetic ESRD patient than in nondiabetic ESRD, at 47.76% and 33.80% respectively.[20] The percentage of mortality rate and loss to follow combined were also very high reaching 73.43% in the diabetic patients and 60.14% in the nondiabetic in the study.[20]

The limitations of our study were small sample size, relying on the antibody test only, as we could not perform the Polymerase Chain Reaction test to detect the hepatitis virus in the blood stream or genotyping for viremia. This is because, they denied for these expensive tests.

CONCLUSIONS

Patients undergoing HD had low (6.9%) serocoversion for hepatitis C. There was no significant association of transmission in regards to duration of HD, transfusion or single vs multicentre HD.

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