Original article

Frequency of Hepatitis B and C Infections in Haemodialysis Patients

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Abstract

Background:
Hepatitis B (HBV), and Hepatitis C viral HCV) infections are the major health problems worldwide. Patients undergoing hemodialysis (HD) are more vulnerable to acquired such infections than the general population.

Objective:
To evaluate the prevalence of HBV and HCV infection in hemodialysis patients and the association of number of dialysis and history of blood transfusion with risk of HBsAg and HCV infection.

Methods:
This cross-sectional observational study was conducted in inpatient and outpatient department of Nephrology and Medicine, Rangpur Medical College and Hospital, Rangpur, Bangladesh from December 2021 to May 2022. A total of 80 diagnosed case of End Stage Renal Disease (ESRD), who underwent dialysis during the study period were included in the study. Complete history was taken either from patient or accompanying attendants. Collected data were classified, edited, coded and entered the computer for statistical analysis by using SPSS version 23.

Results:
Out of 80 hemodialysis patients, mean age was found 42.6±8.6 years with range from 21 to 59 years. Male patients were predominant (72.50%) with male to female ratio was 2.6:1. The prevalence of HBV and HCV infection was found in 8.75% and 11.25% respectively. Frequency of dialysis and history of blood transfusion was not significantly associated with risk of HBsAg and HCV infection.

Conclusion:
The prevalence of HBV and HCV infection was found in 8.75% and 11.25% respectively. Frequency of dialysis and history of blood transfusion was not significantly associated with risk of HBsAg and HCV infection.

Keywords: Hemodialysis, Frequency, Hepatitis B infection, Hepatitis C infection

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Introduction:

The susceptibility to acquire viral hepatitis during hemodialysis (HD) has several potential underlying reasons related to both the patient and the HD procedure.[1] First, although the rate of blood products transfusions has decreased since the introduction of erythropoietin stimulating agents, HD dependent patients still subject of recurrent transfusions. Second, HD machines and membranes are shared between different patients which increases the risk of direct blood cross contamination within one HD unit. Vaccination does not offer the same level of protection against HBV transmission in HD patients as in the general population and exposed to HBV or HCV, ESRD patients are more prone to become chronic carriers compared to the general population.[1] Acquiring an HBV and/or HCV infection has long-term impact on morbidity and mortality of HD patients.[2] In addition, HBV and/or HCV infection changes the clinical course and the prognosis after kidney transplantation. Patients with chronic renal failure (CRF) on hemodialysis are at high risk of contracting viral infections with HBV and HCV, the most common cause of liver disease in these patients.[3,4]A study showed that

around 80-85% of ESRD patients are on HD in Bangladesh.[5] There are different complications in this modality and outcome of hemodialysis depends largely on the management of these complications. Most important ones are dialysis adequacy, infections (viral, bacterial), malnutrition, cardiovascular (hypertension, heart failure, stroke) and these are responsible for majority of the morbidity and mortality in HD patients. The acute form of viral hepatitis is commonly due to hepatitis A, hepatitis B and hepatitis E. Patients on dialysis suffer frequently from chronic hepatitis with increased frequency of HBV and HCV, the incidence of which increases with duration of dialysis.[5]

The geographical distribution of HBV infection is not uniform throughout the world. In developed countries the prevalence of HBV in patients treated with hemodialysis is 1%,[6] while in developing countries the prevalence ranges from 2% to 20%.[7,8] The prevalence of HCV in hemodialysis patients ranges from 2.6 to 22.9% (mean 13.5%) in developed countries, but can reach up to 70% in developing countries.[8-10] In Latin America, the prevalence of HCV is also highly variable in hemodialysis patients, even within the same country. In Mexico, the prevalence is 6.7%,[11] in Brazil ranges from 6–72% (mean 52%).[12] In recent years there was a significant decrease in the prevalence of both HBV and HCV infections in industrialized countries.[13] Hepatitis C causes significant morbidity and mortality in dialysis dependent patients even after they have received renal transplant.[14]

In Bangladesh few studies have so far been conducted to find out the prevalence of hepatitis B and hepatitis C infections among undergoing haemodialysispatients.This facilitated better understanding of the overlooked problem among the physicians of our country and preventing transmission of HBV and HCV and other blood borne viruses among hemodialysis patients from both recognized and unrecognized sources of infection requires implementation of a comprehensive infection control program.

Methods:

This cross-sectional observational study was conducted inpatient and outpatient department of Nephrology and Medicine, Rangpur Medical College and Hospital, Rangpur, Bangladesh from December 2021 to May 2022. A total 80 diagnosed case of ESRD, who were HBsAg or anti HCV antibody seronegative before initiation of dialysis were included in the study. ESRD patients with HBsAg or anti HCV antibody positivity before initiation of dialysis were excluded from the study.A data collection sheet was filled with relevant information and investigation. A unique and anonymous code was assigned to each patient and patient confidentiality was ensured. Approximately 3 ml of blood was collected from each subject and sera was tested for anti HCV antibodies and Hepatitis B surface antigen (HBsAg) by an enzyme linked immunosorbent assay (ELISA).Statistical analyses were carried out by using the Statistical Package for Social Sciences(SPSS) version 23.0 for Windows. The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test was used to analyze the categorical variables, shown with cross tabulation with a p-value <0.05 was considered as statistically significant.

Results:

Out of 80 patients, mean age was found 42.6±8.6 years with range from 21 to 59 years.Male patients were predominant (72.50%) and male to female ratio was 2.6:1. and the average monthly income was 16337.5±5419.0 taka (Table-I).

Table-I: Distribution of the study patients by demographic characteristics (N=80)

Demographic characteristics	no. (%)
Age (years)	
21-30	5(6.25)
31-40	28(35.00)
41-50	31(38.75)
51-60	16(20.00)
Mean±SD	42.6±8.6
Range (min-max)	21.0-59.0
Sex	
Male	58(72.50)
Female	22(27.50)
Monthly income (Taka)	16337.5±5419.0
Range (min-max)	10000-40000

Mean BMI was 22.2±2.0 kg/m^2, mean SBP was 145.1±14.4 mmHg, DBP was 89.4±6.6 mmHg and pulse was 75.5±4.1 beats/min (Table-II).

Table-II: Distribution of the study patients according to general examinations (N=80)

General examinations	no. (%)
BMI (kg/m2)	
<18.5	2(2.50)
18.5-24.9	72(90.00)
25.0-29.9	6(7.50)
Mean±SD	22.2±2.0
Range (min-max)	18.2-26.4
SBP (mmHg)	145.1±14.4
Range (min-max)	120.0-170.0
DBP (mmHg)	89.4±6.6
Range (min-max)	80.0-100.0
Pulse (beats/min)	75.5±4.1
Range (min-max)	72.0-96.0

41(51.25%) patients received ≤6 time of dialysis followed by 27(33.75%) 7-12 time, 9(11.25%) 13-18 time and 3(3.75%) >18 time of dialysis (Figure-1). HBsAg was positive in 7(8.75%) patients (Figure-2) and anti HCV antibody positive was positive in 9(11.25%) patients (Figure-3).

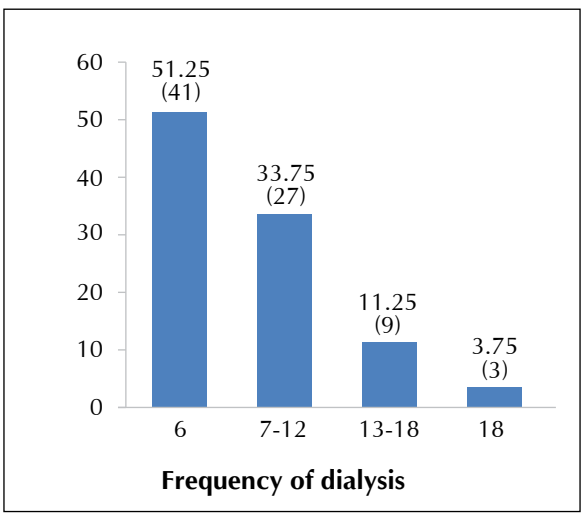

Figure-1: Distribution of the study patients according to frequency of dialysis (N=80).

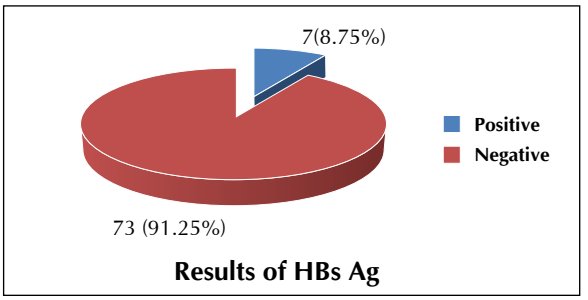

Figure-2: Distribution of the study patients according to results of HBsAg (N=80)

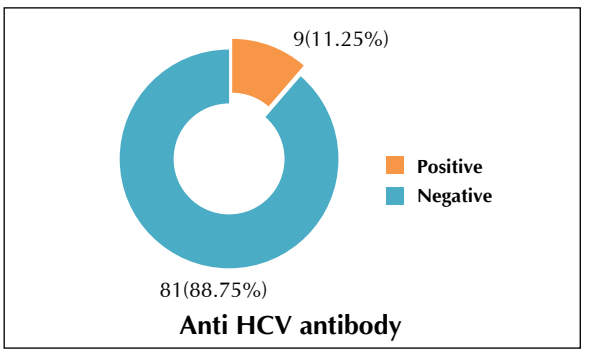

Figure-3: Distribution of the study patients according to anti HCV antibody (N=80)

In HBsAg positivepatients (n=7), 57.1% (4) patients required 7-12 times of dialysis compared with 53.42%(39) patients required ≤6 times dialysis in HBsAg negative patients (n=73)(p=0.500). History of blood transfusion was found 2(28.57%) in HBsAg positive patients and 9(12.33%) in HBsAg negative patients (p=0.245) (Table-III).

Table-III: Association between frequency of dialysis and history of blood transfusion with HBsAg (N=80)

Variables	HBsAg		p-value
	Positive (n=7) no. (%)	Negative (n=73) no. (%)	
Frequency of dialysis			
≤6	2(28.57)	39(53.42)	
7-12	4(57.14)	23(31.51)	0.500ns
13-18	1(14.29)	8(10.96)	
>18	0(0.00)	3(4.11)	
History of blood transfusion			
Yes	2(28.57)	9(12.33)	0.245ns
No	5(71.43)	64(87.67)	

ns= not significant

In anti-HCV positive patients, majority of (4,44.4%) patients required ≤6times of dialysis compared with37(52.11%)in anti HCV antibody negative patients(p=0.669). History of blood transfusion was found 3(33.3%) in anti-HCV positive patients and 8(11.27%) in anti HCV antibody negative patients (p=0.070) (Table-IV).

Table-IV: Association between frequency of dialysis and history of blood transfusion with anti HCV antibody (n=80)

Variables	Anti HCV antibody		p-value
	Positive (n=9) no. (%)	Negative (n=71) no. (%)	
Frequency of dialysis			
≤6	4(44.44)	37(52.11)	
7-12	3(33.33)	24(33.80)	0.669[ns]
13-18	1(11.11)	8(11.27)	
>18	1(11.11)	2(2.82)	
History of blood transfusion			
Yes	3(33.33)	8(11.27)	0.070[ns]
No	6(66.67)	63(88.73)	

ns= not significant

Discussion:

In this present study mean age of 42.6±8.6 years ranged from 21 to 59 years. In a study conducted by Malhotraet al[16] reported that most of the patients (41.3%) were in the 41-60 years of age group. Asifet al[14] described that majority 271(52.0%) of patients belonged to age group >45 years with mean age 44.99±16.50 years. In the study 58(72.50%) was male with male to female ratio 2.6:1 which was similar to many previous studies.[15-18]Regarding frequency of dialysis, 41(51.25%) patients received ≤6 time of dialysis followed by 7-12 (27, 33.75%) time, 13-18 time (9, 11.25%) and >18 time (3,3.75%) of dialysis. Study conducted by Anwar et al[16]revealed that, 30 (21.6%)patients were receiving peritoneal dialysis, while 47 patients (78.3%) were receiving hemodialysis.In this present study 11(13.75%) patients received blood transfusion. Peresonet al[19] documented out of 748 patients 182 (24.3%) had received blood transfusion.Present study observed that HBsAg and anti-HCV was positive in 7(8.75%) and 9(11.25%) respectively. Anwar et al[16] reported that out of 47 haemodialyzed patients, 5 patients (10.6%) and 12 patients (25.53%) were HBsAg and anti-HCV positive respectively. Asifet al[14] demonstrated that,of the total 521 patients, 150 (28.8%) patients were HCV positive, 28 (5.4%) HBV positive and 18 (3.4%) HBV and HCV positive whereas 325 (62.4%) were HBV and HCV negative. In another study by Saravananet al[20] out of 251 patients, 67 (26.7%) were positive for anti-HCV, 112 (44.6%) were positive for HBV and 15 (5.9%) had dual infection. In a more recent study conducted in Taiwanon a total of 1681 HD serological tests showed that 230 patients (13.7%) were HBsAg (+) and 290 (17.3%) were anti-HCV (+), they were unable to detect HBV DNA in 97 of 230 (42.2%) HBsAg (+) patients, and HCV RNA could not be found in 76 of 290 (26.2%) anti-HCV (+) patients.[21] The results of the present study are consistent with the literature, but viral nucleic acid assays were not conducted in every patient, therefore the sensitivity and specificity of serological and virologic tests, and occult hepatitis B and C status could not be shown.

In HBsAg positive patients (n=7), 57.1% (4) patients required 7-12 times of dialysis compared with 53.42%(39) patients required ≤6 times dialysis in HBsAg negative patients (n=73) (p=0.500). In a study done by Anwar et al.[16] reported that out of total 28 patients with dialysis <50 times, 2 patients (7.14%) were HBsAg positive and 26 patients (92.85%) were HBsAg negative.Out of total 28 patients with dialysis <50 times, 6 patients (21.42%) were HCV positive and 22 patients (78.57%) were HCV negative. In the study (p=0.4) for HBV in relation to number of dialysis and (p=0.61) for HCV.This study showed 2(28.57%) HBsAg positive patients got blood transfusion vs 9(12.33%) in HBsAg negative patients (p=0.245). 3(33.3%) of anti-HCV positive patients had history blood transfusion vs 8(11.27%)of anti HCV antibody negative patients (p=0.070).Kizilateset al[18] reported that blood transfusion needed 18(56.0%) in HBsAg positive patients and 30(41.0%) in HCV patients. Salvatierra and Florez[17] demonstrated that positivity for HBsAg significantly correlated with transfusion (p = 0.003) and positives for anti HCV did not show correlation with transfusion (p = 0.23). Peresonet al[19] found no association was between transfusion history and the risk of acquiring HBV [2 transfused individuals (4.2%) and 10 non-transfused ones (6.7%), (p = 0.521)]. Perumalet al[22] reported that no significant

difference found between HBV and HCV infected patients compared to uninfected patients, in relation to blood transfusion. The above-mentioned studies finding were almost similar in this study.

Limitations:

Multicentered study, large sample was not included in this study. Therefore, in future, multicentered study may be undertaken with large sample size. Randomization and blinding were not done. Therefore, selection bias in this study can't be fully eliminated. Unwilling participants were not included in this study.

Conclusion

Prevalence of HBV and HCV infection was found in 8.75% and 11.25% respectively. Frequency of dialysis and history of blood transfusion was not significantly associated with risk of HBsAg and HCV infection. This study suggested need to be monitored for the early detection of these infections. To decrease the transmission of infection, the patients need to be segregated from the infected patients in the hospital and separate dialysis units have to be used for these infected patients.

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