ORIGINAL ARTICLE

FREQUENCY OF HEPATITIS-B AND C IN PATIENTS ON HAEMODIALYSIS FOR END STAGE RENAL DISEASE IN TERTIARY CARE HOSPITALS: A MULTICENTRE STUDY

Muhammad Asif, Raheel Ahmed*, Tanveer Ahmed*, Zia Uddin, Muhammad Zahid***, Izzat Ullah†**

Gastroenterology Department, Military Hospital, Rawalpindi, *Department of Nephrology and Renal Transplantation, Institute of Kidney Diseases Hayatabad, Peshawar, **Department of Nephrology, Khyber Teaching Hospital, Peshawar, ***Department of Physiology, Nowshehra Medical College Nowshehra, †Department of Gastroenterology, Pak Emirates Military Hospital Rawalpindi-Pakistan

Background: Patients undergoing haemodialysis are at increased risk for acquiring infections like hepatitis B virus and hepatitis C virus. This is due to their underlying impaired cellular immunity and exposure to contaminated equipment, frequent blood transfusions, hospitalization and surgery. This study was conducted to determine the frequency of Hepatitis B and C in patients undergoing haemodialysis in tertiary care hospitals. **Methods*:*** This cross-sectional study was conducted in dialysis units of three tertiary care hospitals, from January to August 2018. Data regarding demographics and hepatitis status was collected from patients and hospital records through a structured questionnaire. Categorical variables were shown in percentages and Chi square test was used to see association between hepatitis status and age, gender and duration of dialysis. **Results*:*** Of the total 521 patients, 318 (61%) were males. Mean age of participants was 44.98±16.51 years and mean duration since initiation of HD 19.74 months. Of the total, 150 (28.8%) were hepatitis C positive, 28 (5.4%) were hepatitis B positive and 18 (3.4%) having hepatitis B and C co–infection. Duration since initiation of dialysis was associated with hepatitis (p<0.001). Percentage of hepatitis was higher in males compared to females but statistically not significant. **Conclusion*:*** The frequency of hepatitis in our haemodialysis units is alarmingly high and significantly associated with duration since initiation of haemodialysis.

Keywords: ESRD; Haemodialysis; Hepatitis C; Hepatitis B and Prevalence

Citation: Asif M, Ahmed R, Ahmed T, Ziauddin, Zahid M, Izzatullah. Frequency of hepatitis b and c in patients on haemodialysis for end stage renal disease in tertiary care hospitals: A multicentre study. J Ayub Med Coll Abbottabad 2020;32(3):342–5.

INTRODUCTION

Chronic kidney disease is defined by the presence of kidney damage or decreased kidney function for ≥3 months. End stage renal disease represents the stage of chronic kidney disease in which kidneys cease functioning on permanent basis necessitating renal replacement therapy or kidney transplant to maintain life. Impaired cellular immunity in these patients makes them susceptible for contracting infections.[1] Additional risk factors include prolonged vascular access, exposure to contaminated equipment, frequent blood transfusions, hospitalization and surgery.[2,3] Chronic hepatitis B and C are the most frequently encountered viral infections in haemodialysis units.

Global prevalence of hepatitis C is around 2.2%, affecting almost 170 million people.[4,5] Course of chronic hepatitis C can be complicated by decompensated cirrhosis and hepatocellular carcinoma, causing over one million deaths annually.[6] In Pakistan sero–prevalence of hepatitis C is about 6.7%, affecting around 10 million people.[7] In Pakistan, the prevalence of adult viremic population is about 5.8%, making us the highest viremic population next to the china.[7]

Hepatitis B Virus is another viral infection causing significant morbidity and mortality worldwide. The global prevalence of chronic hepatitis B is 3.9%.[8] Worldwide, hepatitis B causes at least 786,000 deaths annually either from decompensated liver cirrhosis or hepatocellular carcinoma.[9] According to a country wide survey conducted by Pakistan Medical Research Council, seroprevalence of hepatitis B in general population was around 2.5%.[10]

Transmission of these viruses can result from exposure to infected body fluids like blood. High risk groups include intravenous drug abusers, those who need frequent transfusion of blood or blood products or regular haemodialysis, exposure to unsafe injections, needle stick injuries and contaminated surgical and dental equipment.

The prevalence of hepatitis B and C among dialysis patients is higher than general population and varies significantly from country to country, depending on prevalence in general population and implementation of standard infection control policies in dialysis units. Treatment of hepatitis B and C in this subgroup is challenging due to higher incidence of adverse events and concerns regarding safety of antiviral drugs.

Hepatitis C causes significant morbidity and mortality in dialysis dependent patients even after they have received renal transplant.[11] This study was conducted to determine the frequency of hepatitis B and C in patients undergoing dialysis.

MATERIAL AND METHODS

This cross–sectional study was conducted in dialysis units of three tertiary care hospitals of Pakistan and completed over period of eight months from January to August 2018. Ethical approval was obtained from the Ethical Review Board of the Military Hospital Rawalpindi. Patients of end stage renal disease on dialysis for at least more than 1month were included in the study while patients who were dialyzed for acute renal failure were excluded.

Patients fulfilling inclusion criteria were invited to participate in the study and assessed through a structured questionnaire. In addition, the patients' medical records were thoroughly checked for confirmation. Aims of the study were explained and informed written consent taken. Information regarding demographics, Hepatitis status and duration since initiation of dialysis (months) were recorded.

Data was analysed using SPSS version 22.0. Descriptive statistics were used to identify the prevalence of hepatitis and Chi square test was used to assess association between hepatitis status and age, gender, dialysis duration. Variables with p–value ≤ 0.05 were considered statistically significant.

RESULTS

Six hundred and fifty (650) patients fulfilling inclusion criteria were invited to participate in the study. Five hundred and sixty (560) patients responded giving response rate of 86.15% and additional 39 patients were dropped from the study due to incomplete information. Of the total 521 patients enrolled in the study, 318 (61%) were males and 203 (39%) were females. Mean age of the study participants was 44.99 years (±SD 16.50, range: 12–85 years). The mean duration since initiation of dialysis was 19.74 months (±SD 25.76, range: 01–226 months). The demographic characteristics of patients are presented in table1.

Table-1: General characteristics of the patients (n = 521)

Variable	Frequency (%)
Gender	
Male	318 (61)
Female	203 (39)
Age groups (years)	
Mean age: 44.99±16.50	
Range: 12–85	
< 30 years	111 (21.3)
30–45 years	139 (26.7)
> 45 years	271 (52.0)
Duration since initiation of dialysis (months)	
Mean duration: 19.74±25.76	
Range: 1–226	232 (44.5)
<12 months	264 (50.7)
12–60 months	25 (4.8)
>60 months	
Viral Hepatitis status	
Hepatitis B and C negative	325 (62.4)
Hepatitis C positive	150 (28.8)
Hepatitis B positive	28 (5.4)
Hepatitis B and C positive	18 (3.4)

Of the total, 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. Percentage of hepatitis was higher in males compared to females but this was statistically not significant (p=0.194). Percentage of hepatitis was higher in second age group (30–45years) compared to the other two age groups but this was statistically not significant (p=0.649). Duration since initiation of dialysis was significantly associated with hepatitis (p <0.001) as shown in table-2.

Table–2: Cross tabulation of hepatitis status against other variables

Variables	Hepatitis Status		p value
	Hepatitis Negative	Hepatitis Positive	
Gender			
Male	191 (58.8%)	127 (64.8%)	**0.194**
Female	134 (41.2%)	69 (35.2%)	
Age (years)			
Less than 30	68 (20.9%)	43 (21.9%)	
30–45 years	83 (25.5%)	56 (28.6%)	**0.649**
More than 45	174 (53.5%)	97 (49.5%)	
Duration since initiation of dialysis (months)	195 (60.0%)	37 (18.9%)	
<12 months	127 (39.1%)	137 (69.9%)	**<0.001**
12–60 months	03 (0.9%)	22 (11.2%)	
>60 months			

DISCUSSION

Hepatitis caused by Hepatitis B and C is highly prevalent in our country and causes significant morbidity and mortality and can be complicated by cirrhosis and hepatocellular carcinoma. Both viral infections are common in high risk groups including

patients on haemodialysis. The prevalence of both viral infections among dialysis patients varies markedly from country to country and among dialysis centres within a single country, depending on prevalence in general population and adherence to infection control policies in haemodialysis units.[11] Although various quality control measures have been adopted to reduce the risk of hepatitis C virus transmission in haemodialysis dependent patients, high hepatitis C prevalence remains a concern and does not seem to have changed.[3]

In our study, 28.8% patients on haemodialysis were HCV positive. Previous local studies conducted in Pakistan from 1999 to 2018, have reported variable rates of HCV prevalence, ranging from 23–47%.[3] Studies from Egypt have reported higher prevalence of HCV in dialysis patients (35–49%) compared to our results.[2,12] A meta–analysis conducted in the Middle East revealed that HCV infection among haemodialysis patients in the region was 25.3%; Egypt and Syria had the highest reported rates (50% & 54%), while Iran and Lebanon had the lowest (20% & 9%).[13] Studies from developed countries have shown lower rates of HCV prevalence (6–20%) compared to our study.[14]

In our study, 5.4% HBV patients on haemodialysis were positive and 3.4% HBV and HCV positive. Compared to our results, previous three local studies have reported higher rates of HBV prevalence (10.2% and 10.6%) in dialysis patients.[15,16] Studies conducted in India and Iran revealed fairly similar prevalence of HBsAg (5.5% and 7% respectively).[17–19] In another meta–analysis from Asia–Pacific countries and China, HBsAg positivity ranged between 1.3–14.6% while it was only 1.0% in the United States.[20–21] Such a low rate was only possible because of better HBV vaccination coverage of high risk patients which is still a huge dilemma in the developing region of the world.[21] Such a high prevalence in our setup may be attributed to high prevalence in general population, poor adherence to infection control measures, high number of intravenous medications use, frequent blood transfusions in our patients and non–vaccination of patients and health care workers against hepatitis B.

Our study showed that hepatitis C frequency increases with increased dialysis vintage which is in agreement with the results of The Dialysis Outcome and Practice Pattern study (DOPPS).[2,11] Statistically significant higher rates of hepatitis B were also noted in association with longer duration on dialysis which is in accordance with results of previous local studies.[15,16]

Prevalence of hepatitis was higher in the second age group (30–45years) compared to the other two age groups but statistically not significant (p=0.194). This was in accordance with a study from Egypt[2] and a study carried out in Tabriz, Iran which showed no statistically significant association between hepatitis C prevalence and age.[22] however this was not in agreement with other study which showed higher prevalence with increasing age.[23]

In our study, higher cases of hepatitis were seen in males compared to females but statistically not significant (p=0.649). This is in accordance with results of two studies from Egypt.[2,24] In a study carried out by Liu YB *et al*, the prevalence of hepatitis C in haemodialysis patients was more among men as compared to women.[25] This high risk in male may be explained by their exposure to other concomitant risk factors for hepatitis C particularly barbers community and multiple sexual partners.[3]

A large sample size and multi–cantered nature of our study is the relative strength of our study and helps to provide greater insight and in–depth analysis of the problem. However, some limitations in our study may affect the interpretation of our results. In our study possible risk factors for acquisition of HBV and HCV (like blood transfusions, history of dental and surgical procedures, sexual exposure, positive family history, intravenous drug use and shaving habits of patients etc.) were not considered which may overestimate the frequency of HBV and HCV attributable to haemodialysis. But we are hopeful that this study will highlight this important issue and will provide base for future research.

CONCLUSION

The frequency of hepatitis in our haemodialysis units is alarmingly high and is found to be significantly associated with duration of haemodialysis. High prevalence in the general population, multiple blood transfusions in these patients, poor adherence to infection control policies on behalf of health care workers and non-vaccination of patients and health care workers against hepatitis B are the possible causes for such a high prevalence. Training of health care workers in dialysis units, strict adherence to infection control policies, isolation of positive cases and vaccination against hepatitis B may help in decreasing further transmission.

AUTHOR'S CONTRIBUTION

MA: literature search, conceptualization of study design, data collection, write–up, and proof reading. RA: literature search, conceptualization of study design, data collection, write–up, and proof reading. TA: literature search, data analysis, data interpretation, write–up, and proof reading. ZU: write–up, and proof reading. MZ: literature search, conceptualization of study design, data collection.

IU: literature search, conceptualization of study design, data collection, write–up, and proof reading.

REFERENCES

1. Afzal A, Ashraf S, Raheel A, Chattah FS, Zafar F, Zafar A, *et al*. Haemodialysis; Awareness and Care Needed to Prevent Hepatitis C Infection in Haemodialysis Patients. Professional Med J 2017;24(11):1610–4.
2. Ibrahim MET, Elawady MA. Hepatitis C Virus Seroconversion among Hemodialysis Patients and the Role of Hepatitis C Virus Positive Patient's Isolation in Benha, Egypt. Clin Med Res 2017;6(1):31–6.
3. Khan S, Attaullah S, Ali I, Ayaz S, Naseemullah, Khan SN, *et al*. Rising burden of Hepatitis C Virus in hemodialysis patients. J Virol 2011;8:438.
4. Petruzziello A, Marigliano S, Loquercio G, Cozzolino A, Cacciapuoti C. Global Epidemiology of Hepatitis C Virus Infection: An Up-Date of the Distribution and Circulation of Hepatitis C Virus Genotypes. World J Gastroenterol 2016;22(34):7824–40.
5. Mohamed AA, Elbedewy TA, El-Serafy M, El Toukhy N, Ahmed W, Din ZAE. Hepatitis C virus: A global view. World J Hepatol 2015;7(26):2676–80.
6. Kumar V, Abbas AK, Aster JE. Robbins and Cotran Pathological Basis of Disease. Vol 2. 9th ed. Philadelphia: Elsevier Saunders; 2015.
7. Gower E, Estes C, Blach S, Shearer KR, Razavi H. Global Epidemiology and Genotype Distribution of the Hepatitis C Virus Infection. J Hepatol 2014;61(1):S45–57.
8. Polaris Observatory Collaborators. Global prevalence, treatment, and prevention of hepatitis B virus infection in 2016: a modelling study. Lancet Gastroenterol Hepatol 2018;3(6):383–403.
9. MacLachlan JH, Cowie BC. Hepatitis B Virus Epidemiology. Cold Spring Harb Perspect Med 2015;5(5):a0214410.
10. Qureshi H, Bile KM, Jooma R, Alam SE, Afrid HUR. Prevalence of hepatitis B and C viral Infections in Pakistan: Findings of a National Survey Appealing for Effective Prevention and Control Measures. East Mediterr Health J 2010;16:15–23.
11. Fissell RB, Bragg-Gresham JL, Woods JD, Jadoul M, Gillespie B, Hedderwick SA, *et al*. Patterns of hepatitis C prevalence and seroconversion in hemodialysis units from three continents: the DOPPS. Kidney Int 2004;65(6):2335–42.
12. Ahmed HA, Yassinea YS, Tawafea AR, Ebazaway MM. Epidemiological study of patients on regular haemodialysis at the Kafer El-Shakh Governorate, Egypt. Menoufia Med J 2015;28(2):267–71.
13. Ashkani-Esfahani S, Alavian SM, Salehi-Marzijarani M. Prevalence of hepatitis C virus infection among hemodialysis patients in the Middle-East: A systematic review and meta-analysis. World J Gastroenterol 2017;23(1):151–66.
14. Afifi A. The Egyptian Renal Registry. The 9th annual report for the year 2008 Published on 29th Annual congress of nephrology of Egyptian Society of Nephrology and Transplantation ESNT Hurghada Egypt 2009.
15. Idrees MK, Batool S, Ahmed E. Hepatitis B virus among maintenance haemodialysis patients: A report from Karachi, Pakistan. JPMA 2011;61(12):1210–14.
16. Anwar K, Imran M, Shahzad F, Noreen M, Atif M, Ahmad F, *et al*. Prevalence of Hepatitis B and Hepatitis C Infection among Patients Undergoing Dialysis. J Hum Virol Retrovirol 2016;3(3):00094.
17. Malhotra R, Soin D, Grover P, Galhotra S, Khutan H, Kaur N. Hepatitis B virus and hepatitis C virus co-infection in hemodialysis patients: A retrospective study from a tertiary care hospital of North India. J Nat Sci Biol Med 2016;7(1):72–4.
18. Prakash S, Jain A, Sankhwar SN, Usman K, Prasad N, Saha D, *et al*. Prevalence of hepatitis B & C viruses among patients on hemodialysis in Lucknow, Uttar Pradesh. Clin Epidemiol Global Health 2014;2(1):19–23.
19. Tajbakhsh R. Prevalence of Hepatitis B and C Virus Infections among Hemodialysis Patients in Karaj, Iran. Saudi J Kidney Dis Transpl 2015;26(4):792–6.
20. Johnson DW, Dent H, Yao Q, Tranaeus A, Huang CC, Han DS, *et al*. Frequencies of hepatitis B and C infections among haemodialysis and peritoneal dialysis patients in Asia-Pacific countries: Analysis of registry data. Nephrol Dial Transplant 2009;24(5):1598–603.
21. Finelli L, Miller JT, Tokars JI, Alter MJ, Arduino MJ. National surveillance of dialysis-associated diseases in the United States, 2002. Semin Dial 2005;18(1):52–61.
22. Somi MH, Etemadi J, Ghojazadeh M, Farmhand S, Faramarzi M, Foroutan S, *et al*. Risk factors of HCV seroconversion in hemodialysis patients in Tabriz, Iran. Hepat Mon 2014;14(6):e17417.
23. Soliman AR, Abd-Elaziz MM, El-Lawindi MI. Evaluation of an isolation program of hepatitis C virus infected hemodialysis patients in some hemodialysis centers in Egypt. ISRN Nephrol 2013;2013:395467.
24. Zahran AM. Prevalence of seroconversion of hepatitis C virus among hemodialysis patients in Menoufia Governorate, Egypt. Arab J Nephrol Transplant 2014;7(2):133–5.
25. Liu YB, Xie JZ, Zhong CJ, Liu K. Hepatitis C virus infection among hemodialysis patients in Asia: a meta-analysis. Eur Rev Med Pharmacol Sci 2014;18(21):3174–82.

Submitted: July 6, 2019	*Revised: October 20, 2019*	*Accepted: November 6, 2019*

Address for Correspondence:

Muhammad Asif, Consultant Gastroenterologist, Military Hospital Rawalpindi-Pakistan
Cell: +92 333 935 4517
Email: drasif401@gmail.com