



Original Article

Prevalence of HCV Infection in End Stage Renal Disease (ESRD) Patients on Maintenance Hemodialysis

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ARTICLE INFO

Key Words:

Hepatitis C infection, End Stage Renal Disease, Maintenance Hemodialysis

How to Cite:

Kumar, K. ., Das, B. ., Naveed, A. ., Kumar, S. ., Tassaduq Khan, M. ., & Memon, R. . (2023). Prevalence of HCV Infection in End Stage Renal Disease (ESRD) Patients on Maintenance Hemodialysis: HCV Infection in End Stage Renal Disease. Pakistan Journal of Health Sciences, 4(02).
<https://doi.org/10.54393/pjhs.v4i02.564>

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Received Date: 8th February, 2023Acceptance Date: 25th February, 2023Published Date: 28th February, 2023

ABSTRACT

Hepatitis C virus (HCV) is a significant cause of morbidity and mortality in haemodialysis patients. Patients on haemodialysis are at high risk for HCV, with frequency of infection several times higher than that in non-hemodialysis patients. **Objective:** To determine the frequency of HCV infection in End Stage Renal Disease (ESRD) patients on maintenance hemodialysis. **Methods:** The Descriptive Cross-sectional study was conducted at Department of Nephrology, Liaquat University of Medical and Health Sciences Jamshoro. All patients above 18 years of age and below 60 years of age of both gender having end stage renal disease on maintenance hemodialysis with 3 months or more of maintenance hemodialysis were consecutively enrolled. Post hemodialysis patient's serum was checked for anti HCV antibody by enzyme linked immune-sorbent assay (ELISA). Presence of anti HCV antibodies in serum detected by ELISA was labeled as HCV positive. **Results:** Of 90 patients, the mean age of the patients was 46.85 ± 8.21 years. There were 54 (60%) males and 36 (40%) females. The mean duration of hemodialysis was 10.39 ± 3.31 months. The frequency of HCV was found to be 21 (23.3%). A significant association of HCV was found with gender (p-value 0.006) whereas age (p-value 0.597) and duration of hemodialysis (p-value 0.715) was found to be insignificant. **Conclusion:** The frequency of HCV infection was found to be 23% in ESRD patients on maintenance hemodialysis. Early recognition and treatment of which improves the patient outcome.

INTRODUCTION

According to the "National kidney foundation, chronic kidney disease is defined as decrease Glomerular filtration rate (GFR) for ≥3 months duration [1]. In stage 5 CKD also known as end stage renal disease (ESRD) the GFR is < 15 ml/min/1.73m² [2]. ESRD patients require renal replacement therapy like hemodialysis to sustain life. In the developed country like USA, the number of CKD patient on regular hemodialysis are 468,000 [3-6]. The occurrence of HCV infection in CKD - 5 is increasing as compare to general population as there is strong evidence of HCV transmission in dialysis patient [7]. HCV is transmitted through blood and its load is increasing worldwide [8-11]. Around the globe

approximately 130-150 million people are infected with chronic hepatitis C. HCV infection affects liver leading to cirrhosis and hepatocellular carcinoma as well as kidneys causing albuminuria, cryoglobulinemia and membranoproliferative glomerulonephritis [12]. According to center of disease control (CDC%), the prevalence of HCV in ESRD is 8.5% [13]. In middle-east countries the prevalence of HCV in hemodialysis population 25.3% [14]. important viral factors responsible for pathogenesis of chronic hepatitis are viral diversity and replicative activity along with host factors such as immunodeficient states [15]. Increase morbidity in HCV infection in ESRD on

maintenance hemodialysis patients is due to increase in inflammatory markers and alterations in nutritional status. HCV is also associated with increase cardiovascular mortality [16]. Many risk factors like alcohol abuse, tobacco consumption, older age of HCV acquisition, duration of infection as well as co-infection with Human immunodeficiency virus or other hepatotropic viruses are associated with more rapid progression of liver disease in hemodialysis patients. HCV is a significant cause of morbidity and mortality in haemodialysis patients. Patients on haemodialysis are at high risk for HCV, with frequency of infection several times higher than that in non-hemodialysis patients. Early detection and regression of HCV can cause reduction of mortality in haemodialysis patients. Hence, the study was aimed to determine the frequency of HCV infection in ESRD patients on maintenance hemodialysis. Early recognition and treatment of which improves the patient outcome.

METHODS

The Descriptive Cross-sectional study was conducted up on 90 patients with ESRD (having GFR <15ml/min/1.73m²) who were on maintenance hemodialysis, at Department of Nephrology, Liaquat University of Medical and Health Sciences Jamshoro. All patients above 18 years of age and below 60 years of age of both gender having end stage renal disease on maintenance hemodialysis with 3 months or more of maintenance hemodialysis were consecutively enrolled. Patients with hepatic dysfunction, alcohol abuse, decompensated liver cirrhosis, multi organ dysfunction specifically AKI and patients with history of blood transfusions, surgery including dental procedures, tattooing, drug abuse, jaundice, hemophilia and thrombocytopenia were excluded from the study. Post hemodialysis patient's serum was checked for anti HCV antibody by enzyme linked immune-sorbent assay (ELISA). Presence of anti HCV antibodies in serum detected by ELISA was labeled as HCV positive. Descriptive statistics was analyzed by SPSS version 21.0. The quantitative variables such age, duration of hemodialysis was recorded as mean \pm S.D. and qualitative variables like gender and HCV status of patients. Effect modifiers age, gender and duration of hemodialysis was controlled through stratification, post stratification chi-square test was applied, keeping P-value <0.05 as significant".

RESULTS

The mean age of the patients was found to be 46.85 \pm 8.21 years, with 54 (60%) males and 36 (40) females (figure 1). There were 30 (33.3% patients with \leq 45 years and 60 (66.7%) patients with >45 years of age.

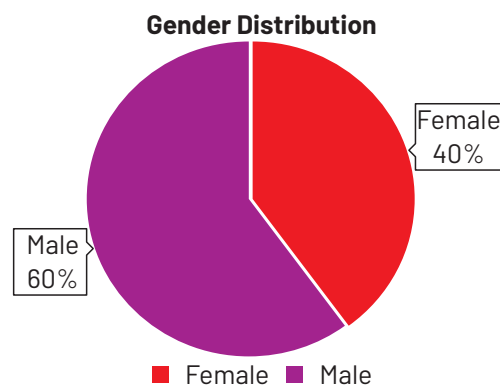


Figure 1: Gender distribution of patients

The mean duration of hemodialysis was 10.39 \pm 3.31 months. There were 44 (48.9%) patients with \leq 10 months of hemodialysis duration whereas 46 (51.1%) patients with >10 months of hemodialysis duration. The frequency of HCV was found to be 21 (23.3%). A significant association of HCV was found with gender (p-value 0.006) whereas age (p-value 0.597) and duration of hemodialysis (p-value 0.715) was found to be insignificant (Table 1).

Variable	HCV		Total	P-value
	Yes	No		
Duration of illness				
\leq 10 years	6 (20%)	24 (80%)	30 (100%)	0.597
>10 years	15 (25%)	45 (75%)	60 (100%)	
Total	21 (23.3%)	69 (76.7%)	90 (100%)	
Gender of patients				
Male	18 (33.3%)	36 (66.7%)	54 (100%)	0.006
Female	3 (8.3%)	33 (91.7%)	36 (100%)	
Total	21 (23.3%)	69 (76.7%)	90 (100%)	
Duration of hemodialysis				
\leq 10	11 (25%)	33 (75%)	44 (100%)	0.715
>10	10 (21.7%)	36 (78.3%)	46 (100%)	

Table 1: Comparison of HCV among patients (n=90)

DISCUSSION

This study was conducted in a large public sector hospital to assess the hepatitis C virus infection in patients with ESRD. For this purpose, patients above 18 years of age and below 60 years of age of both gender having end stage renal disease on maintenance hemodialysis with 3 months or more of maintenance hemodialysis were consecutively enrolled. ESRD patients require renal replacement therapy like hemodialysis to sustain life. In the developed country like USA, the number of CKD patient on regular hemodialysis are 468,000 [17]. The occurrence of HCV infection in CKD -5 is increasing as compare to general population as there is strong evidence of HCV transmission in dialysis patient. Around the globe approximately 130-150 million people are infected with chronic hepatitis C. HCV infection affects liver leading to cirrhosis and hepatocellular carcinoma as well as kidneys causing albuminuria, cryoglobulinemia and

membranoproliferative glomerulonephritis.¹⁷ In the current study, the frequency of HCV was found to be 23.3%. This finding found similar with a study conducted in middle-east countries in which the prevalence of HCV in hemodialysis population was found to be 25.3%.⁸ However, in a study by centre of diseases control (CDC), the prevalence of HCV in ESRD was reported to be 8.5% [18]. Important viral factors responsible for pathogenesis of chronic hepatitis are viral diversity and replicative activity along with host factors such as immunodeficient states. Increase morbidity in HCV infection in ESRD on maintenance hemodialysis patients is due to increase in inflammatory markers and alterations in nutritional status [19]. HCV is also associated with increase cardiovascular mortality. Many risk factors like alcohol abuse, tobacco consumption, older age of HCV acquisition, duration of infection as well as co- infection with Human immunodeficiency virus or other hepatotropic viruses are associated with more rapid progression of liver disease in hemodialysis patients. In the current study, we failed to collect data on alcohol abuse, tobacco consumption and duration of infection as well as co-infection with Human immunodeficiency virus or other hepatotropic viruses which were accounted by many other researchers [20, 21]. In this study, however, HCV was found significantly associated with gender while age and duration of hemodialysis was found to be insignificant while Ladino M *et al.*, found a significant association between female gender and comorbid infection of HCV [4]. It is reported that HCV is a significant cause of morbidity and mortality in haemodialysis patients. Current study postulates that the patients on haemodialysis are at high risk for HCV, with frequency of infection several times higher than that in non-hemodialysis patients, which is in line with the studies conducted by Pujol H., Crook ED., and Fabrizi F [12, 14, 15]. The findings of the study could be highlighted in the light of limitation that this study was a descriptive study. Furthermore, certain important variables were not included. Future multi-centre studies are recommended to preclude the findings of this study.

CONCLUSIONS

The frequency of HCV infection was found to be 23% in ESRD patients on maintenance hemodialysis. Early recognition and treatment of which improves the patient outcome”.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article

REFERENCES

- [1] Bahirwani R, Barin B, Olthoff K, Stock P, Murphy B, Rajender Reddy K, *et al.* Chronic kidney disease after liver transplantation in human immunodeficiency virus/hepatitis C virus-coinfected recipients versus human immunodeficiency virus-infected recipients without hepatitis C virus: Results from the national institutes of health multi-site study. *Liver Transplantation*. 2013 Jun; 19(6): 619-26. doi: [10.1002/lt.23648](https://doi.org/10.1002/lt.23648)
- [2] Shaikh GM, Khan DA, Khan FA, Ali MK. Validation of modified estimated glomerular filtration rate in chronic kidney disease patients. *Journal of the College of Physicians and Surgeons Pakistan*. 2013 Nov; 23(10): 793-97.
- [3] Zubair UB and Butt B. Assessment of quality of sleep and its relationship with psychiatric morbidity and socio-demographic factors in the patients of chronic renal disease undergoing hemodialysis. *Journal of the College of Physicians and Surgeons Pakistan*. 2017 Jul; 27(7): 427-31.
- [4] Ladino M, Pedraza F, Roth D. Hepatitis C virus infection in chronic kidney disease. *Journal of the American Society of Nephrology*. 2016 Aug; 27(8): 2238-46. doi: [10.1681/ASN.2016010030](https://doi.org/10.1681/ASN.2016010030)
- [5] Li M, Wang P, Yang C, Jiang W, Wei X, Mu X, *et al.* A systematic review and meta-analysis: Does hepatitis C virus infection predispose to the development of chronic kidney disease?. *Oncotarget*. 2017 Feb; 8(6): 10692-702 doi: [10.18632/oncotarget.12896](https://doi.org/10.18632/oncotarget.12896)
- [6] Molnar MZ, Alhourani HM, Wall BM, Lu JL, Streja E, Kalantar-Zadeh K, *et al.* Association of hepatitis C viral infection with incidence and progression of chronic kidney disease in a large cohort of US veterans. *Hepatology*. 2015 May; 61(5): 1495-502. doi: [10.1002/hep.27664](https://doi.org/10.1002/hep.27664)
- [7] Hakim W, Sheikh S, Inayat I, Caldwell C, Smith D, Lorber M, *et al.* HCV response in patients with end stage renal disease treated with combination pegylated interferon α -2a and ribavirin. *Journal of clinical gastroenterology*. 2009 May; 43(5): 477-81. doi: [10.1097/MCG.0b013e318180803a](https://doi.org/10.1097/MCG.0b013e318180803a)
- [8] 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 journal of gastroenterology*. 2017 Jan; 23(1): 151. doi: [10.3748/wjg.v23.i1.151](https://doi.org/10.3748/wjg.v23.i1.151)
- [9] Ocal S, Selcuk H, Korkmaz M, Altun R, Yildirim AE, Akbas E. Effect of HLA on hepatitis C virus clearance and persistence in anti-HCV-positive end-stage renal disease patients. *Saudi Journal of Gastroenterology*:

- Official Journal of the Saudi Gastroenterology Association. 2014 May; 20(3): 175-81. [doi: 10.4103/1319-3767.133007](https://doi.org/10.4103/1319-3767.133007)
- [10] Fabrizi F, Messa P, Martin P. Recent advances on hepatitis C virus in dialysis population. *Kidney and Blood Pressure Research*. 2014; 39(4): 260-71. [doi: 10.1159/000355803](https://doi.org/10.1159/000355803)
- [11] Poynard T, Yuen MF, Ratzin V, Lai CL. Viral hepatitis C. *The Lancet*. 2003 Dec; 362(9401): 2095-100. [doi: 10.1016/S0140-6736\(03\)15109-4](https://doi.org/10.1016/S0140-6736(03)15109-4)
- [12] Pujol FH, Ponce JG, Lema MG, Capriles F, Devesa M, Sirit F, *et al.* High incidence of hepatitis C virus infection in hemodialysis patients in units with high prevalence. *Journal of Clinical Microbiology*. 1996 Jul; 34(7): 1633-6. [doi: 10.1128/jcm.34.7.1633-1636.1996](https://doi.org/10.1128/jcm.34.7.1633-1636.1996)
- [13] Bergman S, Accortt N, Turner A, Glaze J. Hepatitis C infection is acquired pre-ESRD. *American journal of kidney diseases*. 2005 Apr; 45(4): 684-9. [doi: 10.1053/j.ajkd.2004.12.014](https://doi.org/10.1053/j.ajkd.2004.12.014)
- [14] Crook ED, Penumalee S, Gavini B, Filippova K. Hepatitis C is a predictor of poorer renal survival in diabetic patients. *Diabetes Care*. 2005 Sep; 28(9): 2187-91. [doi: 10.2337/diacare.28.9.2187](https://doi.org/10.2337/diacare.28.9.2187)
- [15] Fabrizi F, Poordad FF, Martin P. Hepatitis C infection and the patient with end-stage renal disease. *Hepatology*. 2002 Jul; 36(1): 3-10. [doi: 10.1053/jhep.2002.34613](https://doi.org/10.1053/jhep.2002.34613)
- [16] Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. *MMWR*. 2001; 50(5): 1-43.
- [17] Bukh J, Wantzin P, Krogsgaard K, Knudsen F, Purcell RH, Miller RH, *et al.* High prevalence of hepatitis C virus (HCV) RNA in dialysis patients: failure of commercially available antibody tests to identify a significant number of patients with HCV infection. *Journal of Infectious Diseases*. 1993 Dec; 168(6): 1343-8. [doi: 10.1093/infdis/168.6.1343](https://doi.org/10.1093/infdis/168.6.1343)
- [18] Nakayama E, Akiba T, Marumo F, Sato C. Prognosis of anti-hepatitis C virus antibody-positive patients on regular hemodialysis therapy. *Journal of the American Society of Nephrology*. 2000 Oct; 11(10): 1896-902. [doi: 10.1681/ASN.V11101896](https://doi.org/10.1681/ASN.V11101896)
- [19] Sterling RK, Sanyal AJ, Luketic VA, Stravitz RT, King AL, Post AB, *et al.* Chronic hepatitis C infection in patients with end stage renal disease: characterization of liver histology and viral load in patients awaiting renal transplantation. *The American journal of gastroenterology*. 1999 Dec; 94(12): 3576-82. [doi: 10.1111/j.1572-0241.1999.01649.x](https://doi.org/10.1111/j.1572-0241.1999.01649.x)
- [20] Izopet J, Rostaing L, Sandres K, Cisterne JM, Pasquier C, Rumeau JL, *et al.* Longitudinal analysis of hepatitis C virus replication and liver fibrosis progression in renal transplant recipients. *The Journal of Infectious Diseases*. 2000 Mar; 181(3): 852-8. [doi: 10.1086/315355](https://doi.org/10.1086/315355)
- [21] Mathurin P, Mouquet C, Poynard T, Sylla C, Benalia H, Fretz C, *et al.* Impact of hepatitis B and C virus on kidney transplantation outcome. *Hepatology*. 1999 Jan; 29(1): 257-63. [doi: 10.1002/hep.510290123](https://doi.org/10.1002/hep.510290123)