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Frequency of Hepatitis C in Patients with Chronic Kidney Disease Undergoing Hemodialysis

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Name of Author:
Abdul latif[1], Muhammad Hussain Baloch[2], Rashid Ali[3], Habib Ullah Rind[4]

Affiliation: *[1]Assistant Professor Postgraduate Medical Institute, Sheikh khalifa Bin Zayad Hospital, Quetta*
[2] Postgraduate Medical Institute, Sheikh khalifa Bin Zayad Hospital, Quetta
[3]Mekhran medical college Turbat
[4]Consultant Nephrologist and Transplant physician, Balochistan Institute of Nephrology- Urology Quetta

Corresponding Author:
Dr. Habib Ullah Rind
Consultant Nephrologist and Transplant physician, Balochistan Institute of Nephrology-Urology Quetta
Email: rindhabib@gmail.com

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Abstract: Background: Hemodialysis patients are at high risk to hepatitis C. So the screening for HCV is crucial in dialysis units. Objective: The objective of this study was to find out the frequency of hepatitis C in patients with CKD Undergoing Hemodialysis.**Materials and method:** The present cross-sectional study was conducted at Balochistan Institute of Nephrology- Urology Quetta from March 2025 to August 2025 after taking approval from the ethical committee of the institute. The required sample size was 100. Individuals of both genders and different age groups (15 - 80 years) receiving regular hemodialysis for at least three months were enrolled. A standardized proforma was used to gather data on demographics, including gender, age, and level of education, residence status, socioeconomic status, and dialysis duration. Blood samples were examined for hepatitis C infection with ELISA method in order to identify anti-HCV antibodies. The data were analyzed using SPSS version 25.0.**Results:** A total of 100 individuals receiving haemodialysis on regular basis were included in this study out of which male were 54(54%) and female were 46(46%). the mean age of the study group was 48.52 ± 12.90 years and mean duration of dialysis was 1.59 ± 1.80 years. There was not a significant relationship between socioeconomic status and HCV infection; 35 (45.4%) participants from the low socioeconomic group, 12 (52%) from the middle income group tested positive (p = 0.549). Similarly, 25 (43%) rural populations tested positive for HCV, compared to 24 (55.8%) urban inhabitants (p = 0.469). Patients on haemodialysis for two years or more had the greatest rate of HCV seropositivity (p value = 0.018). **Conclusion:** The current study concluded that individuals with CKD receiving hemodialysis had high frequency of HCV (44%).

Keywords: CKD, Hemodialysis, HCV, Seropositivity

INTRODUCTION

Chronic kidney disease affects around 10% of the global adult population1. The two important risk factors for CKD are diabetes and hypertension. Renal replacement treatment is commonly used to treat chronic kidney failure and end-stage renal disease. Hemodialysis is a renal replacement treatment used to remove harmful waste materials from the bloodstream. Hemodialysis is recommended three or twice each week for a 4-hour session. Blood gets

removed from the body through an arterio-venous fistula or dialysis catheter.2-3 Hemodialysis patients are susceptible to viral infections such as hepatitis C, B, and HIV. Individuals undergoing hemodialysis have a high risk of infection due to insufficient prevention measures, ineffective vaccination, and contaminated equipment. Hepatitis C virus has been associated to chronic renal failure in patients receiving hemodialysis.4-5It is a viral infection that is caused by HCV.This virus has single-stranded RNA and belonged to the Flavivirdae family. The pathogenesis of this virus begins when the virus enter the hepatocytes by receptor-mediated endocytosis, followed by cytoplasmic replication with RNA polymerase (RNA dependent RNA polymerase). Chronic infection, which occurs in 60-80% of cases, predominantly causes liver damage by cytotoxic T cells mediated immunity. This chronic condition triggers fibrosis, cirrhosis, and perhaps carcinoma of the liver. It is the most common cause of morbidity and mortality worldwide, with approximately 143 million reported cases and 1.7 million new cases in 2015. HCV infection has been linked to increased mortality in patients with CKD. 7-8 Hepatitis C was examined in hemodialysis individuals in epidemiological studies. In Pakistan, hemodialysis patients with Hepatitis C range from 16.4% - 44.1%.9 Studies shows that chronic hepatitis C can contribute to chronic renal damage in patients on hemodialysis. The purpose was to determine the incidence of Hepatitis C Virus among those with chronic kidney disease having regular hemodialysis. This study will provide the most recent information on the frequency of Hepatitis C Virus in individuals with regular hemodialysis.

Materials and method

The present cross-sectional study was conducted at Balochistan Institute of Nephrology- Urology Quetta from March 2025 to August 2025 after taking approval from the ethical committee of the institute. Written consent were taken from each individual and for sampling non-probability consecutive sampling technique was used. The sample size was determined using the WHO calculated by taking a 95% confidence level .The required sample size was 100. Individuals of both genders and different age groups(15 - 80 years) receiving regular hemodialysis for at least three months were enrolled in this study while individuals with antiviral therapy for HCV, history of chronic liver disease unrelated to hepatitis C, HIV infection and autoimmune diseases were excluded from the study. A standardized proforma was used to gather data on demographics, including gender, age, and level of education, residence status, socioeconomic status, and dialysis duration. Blood samples were examined for hepatitis C infection with ELISA method in order to identify anti-HCV antibodies. Due to limited resources, molecular validation by HCV RNA PCR testing was not conducted. The data were analyzed using SPSS version 25.0. The quantitative variables (age) were presented as mean ± SD, whereas categorical variables (gender, place of residence, socioeconomic status, & HCV seropositivity) were analyzed using frequencies and percentages. The Chi-square test was used to analyze the relationship between hepatitis C positive and categorical demographic characteristics. A p-value of less than 0.05 was regarded as significant.

Results

A total of 100 individuals receiving haemodialysis on regular basis were included in this study out of which male were 54(54%) and female were 46(46%). the mean age of the study group was 48.52 ± 12.90 years and mean duration of dialysis was 1.59 ± 1.80 years. Majority of the individuals belonged to low socioeconomic class 77(77%) and lived in rural areas 57(57%). Most of the participants were illiterate 70(70%) while 22(22%) of the individuals were matriculate. Anti-HCV antibodies were seen in 44(44%) of the individuals as presented in table 1. There was not a significant relationship between socioeconomic status and HCV infection; 35 (45.4%) participants from the low socioeconomic group, 12 (52%) from the middle income group tested positive (p = 0.549). Similarly, 25 (43%) rural populations tested positive for HCV, compared to 24 (55.8%) urban inhabitants (p = 0.469). Patients on haemodialysis for two years or more had the greatest rate of HCV seropositivity (p value = 0.018). Lower education levels were correlated with a higher risk of HCV infection. Illiterate Participants had greater infection rates than those with elementary or higher education as presented in table 2.

Table 1.Demographic features of the study population

Features	Numeric values
Gender	
Male	54(54%)
Female	46(46%).
Mean age	48.52 ± 12.90 years
Mean duration of dialysis	1.59 ± 1.80 years
Socioeconomic status	

Low	77(77%)
Middle	23(23%)
Residence	
Rural	57(57%).
Urban	43(43%)
Dialysis duration	
I year	60(60%)
2 years	21(21%)
More than 2 years	19(19%)
Hepatitis C serology	
Positive	44(44%)
Negative	56(56%)
Education status	
Illiterate	70(70%)
Matric	22(22%)
Secondary	5(5%)
Higher	3(3%)

Table 2. Relationship of HCV with various demographic features n = 100

Features	**HCV**		**Value of P**
	Positive	**Negative**	
Gender			0.849
Male	25(46%)	10(54%)	
Female	22(47%)	24(53%)	
Socioeconomic status			
Low	35(45.4%)	42(54.4%	0.549
Middle	12(52%)	13(48%)	
Residence			0.469
Rural	25(43%).	32(57%)	
Urban	24(55.8%)	19(44.1%)	
Dialysis duration			0.018*
I year	20(33.3%)	40(66.6%)	
2 years	15(71%)	(28.5%)	
More than 2 years	10(52.6%)	9(47.3%)	
Education status			
Illiterate	26(37%)	44(63%)	0.025
Matric	16(72%)	6(28%)	
Secondary	0(0%)	5(100%)	
Higher	3(100%)	0(0%)	

DISCUSSION

CKD is a significant non-communicable illness and a rising international health problem. In 2017, the Global Burden of Disease (GBD) research identified CKD as the 12th biggest cause of mortality that affect around 9.1% of the global population, or 700 million people and there is a 29.3% rise in frequency since 1990.10HCV is a blood-borne viral illness that remains a major public health concern internationally. Globally, around 58 million people have chronic HCV infection, with 1.5 million infection outbreaks reported annually.11 In Pakistan, the nationwide frequency of hepatitis C has been estimated at 6.8%, with higher rates in rural areas.12 Dialysis patients with CKD face a higher risk of contracting HCV due to frequent vascular access, exposure to blood products, and immunological suppression.13 The presence of HCV with CKD presents distinct clinical problems. Patients on dialysis with HCV infection have a poor prognosis, higher risk of liver problems, and reduced eligibility for kidney transplantation.14 Routine screening and monitoring techniques in dialysis units are variable, particularly in under-resourced settings. HCV may cause glomerular diseases including membranoproliferative

glomerulonephritis, membranous nephropathy, and cryoglobulinaemic vasculitis.15 This study aims to assess the frequency of HCV infection among individuals with chronic kidney disease on maintenance dialysis and its correlation with particular socio-demographic parameters. A total of 100 individuals receiving haemodialysis on regular basis were included in this study out of which male were 54(54%) and female were 46(46%). the mean age of the study group was 48.52 ± 12.90 years and mean duration of dialysis was 1.59 ± 1.80 years. the demographic features of our study are similar to the study conducted by Khan et al 16. Anti-HCV antibodies in our study were seen in 44% of the individuals. Our study findings are similar to the previous study in which the prevalence was 46.6%.16 Previous publications from Pakistan indicate a prevalence of HCV in dialysis patients ranging from 23.7 to 56.6%, which aligns with these findings.17-18 High HCV prevalence in dialysis facilities, despite current standards, suggests inadequate infection management, particularly in resource-limited settings.19 Our study results are not comparable to the study carried out by Sikandri et al in which the frequency of was lower 28.1%.20 The overall rate of the HCV infection was 28.1%. In our study there was not a significant relationship between socioeconomic status and HCV infection; 45.4% participants from the low socioeconomic group, 12 (52%) from the middle income group tested positive (p = 0.549). Similarly, 25 (43%) rural populations tested positive for HCV, compared to 24 (55.8%) urban inhabitants (p = 0.469). These findings are similar to the previous study.16 Patients on haemodialysis for two years or more had the greatest rate of HCV seropositivity (p value = 0.018). Prolonged venous access, recurrent blood contact, and sharing dialysis equipment raise the risk of virus transmission over time.21 Longer dialysis duration is a significant risk factor for HCV infection, according to research in Italy and India.22-23 our study revealed that lower education levels were shown to be substantially linked with HCV positivity. Illiterate exhibited significantly greater infection rates than those with elementary or higher education. Less educated persons may have lower knowledge of infection risks and seek health services less frequently.

Other studies have found a correlation between low literacy and poor compliance with cleanliness and infection prevention practices.24 The study sheds light on the prevalence of HCV among dialysis individuals. The study emphasizes the necessity for integrated infection control techniques, including HCV screening, staff training, & patient education in dialysis units. Due to limited resources, the study relied only on ELISA. This may have resulted in underdiagnoses or misclassification of patients, especially during the period of sero-conversion window. Data on dialysis center infection control policies and transfusion history were not collected, reducing the capacity to assess institutional risks.

CONCLUSION

The current study concluded that individuals with CKD receiving hemodialysis had high frequency of HCV (44%).Significant associations were found between dialysis duration and lower education levels, emphasizing the need for improved infection management, HCV screening, and patient education. Early detection and prevention efforts in dialysis centers are crucial for minimizing transmission risk and improving therapy results in these highly susceptible individuals.

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