

PREVALENCE OF HEPATITIS C VIRUS INFECTION AMONG CHRONIC KIDNEY DISEASE PATIENTS ON REGULAR HEMODIALYSIS

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INTRODUCTION

Chronic kidney disease is a significant health issue affecting 1% of the adult global population.¹ The two main factors contributing to chronic kidney disease are diabetes and hypertension. Renal replacement treatment is typically used for end-stage renal disease or stage 5 chronic kidney disease. Hemodialysis is one of the renal replacement therapies used to remove harmful wastes from the blood, such as urea, to normalize serum bicarbonate and potassium levels and drain the body of excess fluid. For a roughly four-hour session, hemodialysis is advised thrice a week. A dialysis catheter or an arterio-venous fistula removes blood from the body.^{2,3} Hemodialysis patients risk contracting hepatitis C, hepatitis B, human immunodeficiency virus, and many more. Due to a lack of established preventive measures, ineffective vaccinations, and contaminated or cross-contaminated dialysis equipment, patients receiving hemodialysis are at a greater risk of contracting infections. One of the viral infections linked to chronic renal damage in people on

hemodialysis is hepatitis C.^{4,5} The single-stranded RNA virus that causes hepatitis C belongs to the Filoviridae family and is a common pathogen that kills and causes morbidity worldwide.^{6,7} About 170 million individuals worldwide are affected by chronic hepatitis C, which is also one of the main causes of death.⁸ Cirrhosis and hepatocellular carcinoma are two consequences of chronic hepatitis C.⁹ Globally, 1.7 million new cases were reported in 2015, bringing the total number to approximately 143 million.¹⁰ Patients with chronic kidney disease (CKD) receiving hemodialysis are categorized as high-risk populations for hepatitis C infection. HCV infection in CKD patients can cause them to become carriers, which could lead to the virus spreading to the hemodialysis environment. Patients with CKD may have lower life expectancies due to hepatitis C. HCV infections progressing more quickly in persons with advanced CKD. Furthermore, HCV infection independently raised the patients with CKD death rate.¹¹ Chronic hepatitis C infection and kidney disease, particularly those with glomerular origins, have a close and direct association. Hepatitis C is linked to

ABSTRACT

OBJECTIVES

To determine the frequency of the Hepatitis C Virus in patients with chronic kidney disease receiving regular hemodialysis.

METHODOLOGY

At a tertiary care hospital in Peshawar, 211 patients were observed to ascertain the frequency of the Hepatitis C Virus in chronic kidney disease patients receiving regular hemodialysis. The technique of non-probability sequential sampling was employed to acquire samples. SPSS version 26.0 was used.

RESULTS

Among the CKD patients with Hepatitis C Virus (HCV) infection, a higher proportion of males (48.5%) tested positive compared to females (28.1%). Furthermore, the prevalence of HCV infection was significantly higher in CKD patients residing in urban areas (98.5%) compared to those in rural areas (1.5%). The statistical analysis indicated a significant association between the prevalence of Hepatitis and the factors of gender and residency (P value = 0.002). Out of 211, hepatitis C-positive patients 66.2% were diabetics and hypertensive were 77.9%.

CONCLUSION

Hospitalized CKD patients have a considerably higher frequency of hepatitis C infection. To stop the spread of the hepatitis C virus, nephrology wards should undertake strict universal infection control procedures.

KEYWORDS: Hepatitis C, Chronic kidney diseases, Dialysis

several glomerular disorders, including mixed cryoglobulinemia, membranous nephropathy, membranoproliferative glomerulonephritis, and polyarthritis nodosa.¹² Blood transfusions, total time spent on dialysis, intravenous drug use, and a history of kidney transplantation are risk factors for HBV and HCV in dialysis patients. The risk associated with dialysis is approximately 2%, with variations across nations.¹³ Hepatitis C prevalence in hemodialysis patients has been investigated in several epidemiological investigations. Hepatitis C prevalence ranges from 16.4% to 44.1% among hemodialysis patients in Pakistan.^{14,15} A thorough literature search revealed that patients with chronic renal disease receiving hemodialysis also tend to have chronic hepatitis C. This inspired us to consider the goal of figuring out how often the Hepatitis C virus is present in CKD patients receiving routine hemodialysis. This study will give us the most recent and accurate information regarding the number of Hepatitis C Virus patients receiving regular hemodialysis because no similar study had been conducted in our population for the previous five years. Additionally, the findings of this study will be disseminated to other health professionals so that they can develop future research plans.

METHODOLOGY

This study was conducted at the Lady Reading Hospital (MTI), Department of Nephrology and Medicine, from 14 November 2020 to 14 May 2021. Ethical approval was obtained from Institutional Ethical and Review Board. The technique utilized was non-probability consecutive sampling. The sample size was calculated using WHO Software to be 211, with a 16.4% prevalence of hepatitis C in patients with chronic kidney disease receiving hemodialysis, a 95% confidence level, and a 5% margin of error. All patients with stage 5 chronic renal failure who were on hemodialysis twice a week for more than three months and were between the ages of 18 and 60 were included. All patients with haematological malignancies, anaemia (based on history, examination, and studies), and IV drug abusers were among the exclusion criteria. All patients meeting the inclusion criteria were enrolled in the study through Lady Reading Hospital (MTI) Peshawar's OPD, nephrology and Internal Medicine department. Patients were informed of the study's goals and advantages and received assurances regarding its risks and rewards. They were also advised that the study's sole objective was to collect data for publishing and research, and if they agreed, a signed informed consent was obtained. The presence of chronic kidney

disease stage 5 was determined by estimating reductions in glomerular filtration rate (GFR) below 15 mL/min/1.73 m² was calculated using the modification of diet in renal disease (MDRD) study equation for each included patient. All patients provided 5 CC of blood, which was then immediately forwarded to the hospital laboratory for testing to determine the presence of Anti-HCV Antibody utilizing the third generation Enzyme Linked Immuno-Sorbent Assay (ELISA) method with a cutoff value of > 2.00 (Bio kit, Strip Reader). Under the direction of a single pathologist with a minimum of five years of expertise, all laboratory investigations were performed in a single hospital laboratory. Age, gender, weight (KG), height (Cm), BMI, residence (urban/rural), duration of chronic kidney disease, hepatitis C virus status, and other explanatory variables like hypertension, diabetes mellitus, and smoking status were all recorded in a pre-design proforma. The careful application of the exclusion criteria prevented bias in the study's findings. Using SPSS Version 22, data was analyzed. The mean and standard were calculated for quantitative characteristics, including age, height, BMI, and disease duration. For quantitative factors such as gender, residence, hepatitis C virus, hypertension, diabetes, and smoking, frequencies and percentages were calculated. Age, BMI, gender, place of residence (urban/rural), length of chronic kidney disease, and other explanatory variables, including hypertension, diabetes mellitus, and smoking status, were used to stratify hepatitis C virus infections to observe effect changes. The post-stratification chi-square test used a P value of 0.05 or lower to determine significance. Tables and graphs were used to present all the results.

RESULTS

When the age distribution of 211 patients was analyzed, patients between the ages of 18 and 30 were 7 (3.3%), 31 to 40 were 33 (15.6%), 41 to 50 were 86(40.8%), and 51 to 60 were 85(40.3%). The standard deviation was ± 2.16 , and the mean age was 52 years. In 211 patients, the analysis of the illness duration; 2 or less than 2 Years was 149(70.6%), and more than 2 Years was 62(29.4%). Of 211 patients, 68 (32.2%) tested positive for hepatitis C.

Table 1: Prevalence of Hepatitis With Reference to Gender and Residency among CKD Patients

		Gender		Residency Status	
		Male	Female	Urban	Rural
HepatitisC Virus Infection	Yes	68 (48.5%)	20 (28.1%)	67 (98.5%)	01 (01.5%)
	No	72 (51.5%)	51 (71.9%)	85 (59.4%)	58 (40.6%)

*P-Value = 0.002

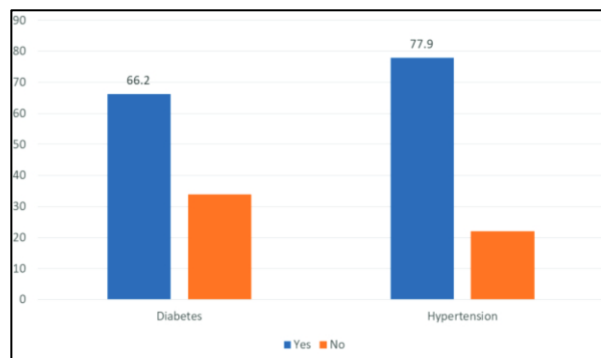


Figure 1: Prevalence of Hepatitis C Infection with Diabetes and Hypertension among CKD Patients

DISCUSSION

International studies have produced a range of outcomes. Hepatitis C incidence was reported to be 6.25 per cent in 320 patients in an Italian study of pre-dialysis CKD patients.¹³ Hepatitis C antibodies were detected in 7.9% of 226 patients with chronic kidney disease (CKD) and 13% with creatinine clearance of less than 30 ml/min in a separate investigation conducted in Spain.¹⁴ 20% of patients with CKD had hepatitis C antibodies, according to research by Fabrizi et al. Hepatitis C antibodies were found in 3.9% and 7.0% of participants in different investigations.^{15,16,17,18} Variations in hepatitis C prevalence among geographical regions, study periods, methods for detecting hepatitis C antibodies, and infection control practices between nations are likely to be the causes of inconsistent results. Despite Pakistan's high hepatitis C prevalence, CKD patients in our study had a much greater frequency of hepatitis C antibodies than the overall population. Hepatitis C prevalence has been determined to range from 3.3% to 30.2% in Pakistani hospitals, with most studies indicating higher prevalence than in the general population.³ Between 23.7% and 56.6% of Pakistani hemodialysis patients have been found to have hepatitis C antibodies.^{8,9,10,11} In one study, 19.7% of patients had hepatitis C antibodies before beginning hemodialysis¹⁰. This suggests that the high incidence of hepatitis C in hemodialysis patients in Pakistan may be partially attributed to the high frequency of hepatitis C antibodies in CKD patients before starting hemodialysis. Because some individuals may have had a prior hepatitis C infection, the use of hepatitis C antibodies by ELISA may lead to an overestimation of hepatitis C diagnoses.³ Due to a lack of follow-up in our trial, hepatitis C PCR data were only available for 39 of 49 patients. 74% of these patients were positive for hepatitis C by PCR, which is still much higher than the overall population. A relatively small sample size may have prevented us

from identifying any unique risk factors for hepatitis C in our patient cohort. Other research in the CKD population has linked hepatitis C to low creatinine clearance, transfusion history, longer duration of CKD, history of intravenous drug use, and increased ALT values.^{14,17,18} The findings of our investigation have various ramifications. First, to stop the spread of infection to other patients and medical personnel, stringent universal infection control measures should be implemented in hospital wards where CKD patients are admitted. Hepatitis C infection is also linked to a higher risk of CKD development and progression. Hepatitis C diagnosis and therapy in CKD patients may slow the course of the disease. However, this needs to be confirmed by randomized controlled trials.

LIMITATIONS

Our study has several drawbacks. This study only included hospitalized CKD patients and had a small sample size. Patients with CKD seen in an outpatient environment may not be eligible for the results. In our CKD cohort, we could not pinpoint any particular risk factor for hepatitis C infection. For most patients with hepatitis C ELISA antibodies, but not all of them, hepatitis C PCR test results were available.

CONCLUSIONS

Hospitalized CKD patients have a considerably higher frequency of hepatitis C ELISA antibodies. To stop the spread of the hepatitis C virus, nephrology wards should undertake strict universal infection control procedures. It will need further research to determine whether diagnosing and treating hepatitis C in people with chronic kidney disease (CKD) will reduce mortality or slow the development of end-stage renal disease.

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