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## The Seroprevalence of hepatitis C infection in multiple hemodialysis patients at tertiary care hospital

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### ABSTRACT:

**Introduction:** HCV infection in hemodialysis units is a significant cause of morbidity and mortality. The risk of HCV infection among dialysis patients is higher compared to the general population due to high potential blood exposures in hemodialysis settings. Multiple transfusions and hemodialysis are associated with complications, such as hepatitis B and C and certain sexually transmitted disease like, HIV infections. This study aimed to determine the prevalence of hepatitis C in multiple hemodialysis patients. **Materials and methods:** This study was carried at the Department of Microbiology, Shri. M. P. Shah Govt. Medical College and Guru Govind Govt. hospital, Jamnagar from 1<sup>st</sup> June 2016 to 31<sup>st</sup> May 2017. Patients with kidney failure or end stage renal disease who received multiple hemodialysis were included in this study. **Result:** Serum samples from 229 patients are collected which including 134(58.5%) male and 95 (41.5%) female, were tested using enzyme-linked immune sorbent assay kits for hepatitis C infection. Out of them 43 (18.8%) were reactive for hepatitis C virus antibodies. **Conclusion:** Sensitive screening tests for hepatitis C infection and strict guidelines for patients with renal failure or end stage renal disease who received multiple hemodialysis are needed for prevention of transfusion related infections. **KEYWORDS:** Hepatitis C virus, ELISA, Hemodialysis, Renal failure

## INTRODUCTION:

Hepatitis C virus (HCV) falls in to the genus *Hepacivirus*, a member of the family Flaviviridae, and is a single stranded RNA virus. An estimated 180 million people are affected by HCV infection, with a worldwide prevalence of 2%, accounting for 3 million people every year.<sup>[1]</sup> HCV is mostly transmitted through the prenatal route, thereby making it a common complication of multiple blood transfusions. It enters liver cells and causes severe inflammation in the liver.<sup>[2]</sup> HCV infection chronically causes cirrhosis and hepatocellular carcinoma.<sup>[3,4]</sup> During 2010–2019, 1.83 million people  $\leq 65$  years of age died from HCV infection.<sup>[5]</sup> As per study done by WHO, 170 million people are affected by HCV all over the world.<sup>[6]</sup>

The prevalence of HCV in multiple hemodialysis patients ranges from 6–60% whereas in India various studies show a prevalence of 4.3% to 45%<sup>(7)</sup>. A number of risk factors have been identified for high incidence of HCV infection in hemodialysis patients; the most important ones being the number of blood transfusions, duration of the hemodialysis treatment, and nosocomial transmissions due to inadequate infection-control measures<sup>(8)</sup>. HCV infection in hemodialysis patients has been associated with high morbidity and mortality<sup>(9)</sup>. The prevalence of HCV infection among hemodialysis patients is generally much higher than that among the general population due to underlying impaired cellular immunity which increases their susceptibility to infection. Also, hemodialysis patients are exposed to prolonged vascular access and exposure to contaminated equipment and handling by medical staff. In addition, hemodialysis patients required blood transfusion, frequent hospitalization, and surgery, which increase opportunities for getting nosocomial infection exposure<sup>[10]</sup>. CDC (Centre of Disease Control) recommends screening for HCV antibody should be performed routinely in patients at increased risk of infection. Most of the laboratories in India depend on HCV antibody detection by ELISA (Enzyme Linked Immuno Sorbant Assay).

## MATERIALS AND METHODS:

This study was carried at the Department of Microbiology, Shri. M. P. Shah Govt. Medical College and Guru Govind Govt. hospital, Jamnagar, from 1<sup>st</sup> June 2016 to 31<sup>st</sup> May 2017. We included all the patients who were on regular hemodialysis, the age group was 18–80 years. During the study, serum samples were collected from 229 patients with renal failure or end stage renal disease who received multiple hemodialysis were included in this study.

All needed history of taken by detailed interviewing of the patient and/or there relative such as age, duration and how many time they received hemodialysis. Total 5ml of blood sample was withdrawn by venipuncture using sterile disposable syringes by aseptic precautions of each patient after that blood inject in to the clot activator red vaccute. Then this whole blood was rotate by 10000rpm for 5min for serum separation. After that clear serum was transferred into sterile vials by using pipette. After that an ELISA test done for qualitative detection of antibodies to hepatitis C virus (Anti-HCV) in human serum as per kit manual. The kit used in testing was Qualisa 3<sup>rd</sup> generation ELISA for detection of antibody to HCV in human serum which was manual ELISA method. The absorbance value was taken in ELISA reader at 450nm with 600-700nm as reference, after that cut-off value was calculated by adding 0.3 to average absorbance

value of negative control ( $COV=Av.NC+0.3$ ) and interpreted result as per manufacturer's kit inserts if sample with absorbance value less than cut-off value considered non reactive and more than cut-off value considered reactive for HCV antibodies. Initially reactive sample retested in duplicate, if these samples that do not react in either of duplicates are consider negative. If sample is repeatedly reactive in either of duplicated are consider repeatedly reactive.

## RESULTS AND DISCUSSION:

Total number of 229 patients of renal failure or end stage renal disease who received multiple hemodialysis were included in this study, out of these 134 (58.5%) male and 95 (41.5%) female. Of them, 43 (18.8%) were positive for anti-HCV antibodies. The HCV seroprevalence in male and female was 19.4% and 17.9%, respectively. Among HCV-positive patients with hemodialysis, the majority cases were found in >75 years and 51-75 years age group at 21 (48.8%) and 13 (30.2%) cases respectively. The majority cases of hepatitis C virus infection detected in who received more number of hemodialysis, 75% cases were found positive for HCV infection who received more than 100 hemodialysis session while the lowest was seen in patients with fewer than 25 transfusions, indicating that the hepatitis C virus infection was directly proportionate with the number of hemodialysis session. (Tables 1–3).

**Table 1: Sex distribution of the prevalence of anti-hepatitis C virus antibodies in multiple hemodialysis**

	No. of patients (n=229)	Reactive to anti-HCV antibodies (n=43)
<b>Male</b>	134	26 (19.4%)
<b>Female</b>	95	17 (17.9%)

**Table 2: Age distribution of the prevalence of anti-hepatitis C virus antibodies in multiple hemodialysis**

Sr No.	Age group (years)	Reactive to anti-HCV antibodies (n = 43)
<b>1</b>	<b>18-25</b>	1 (2.3%)
<b>2</b>	<b>26–50</b>	8 (18.6%)
<b>3</b>	<b>51–75</b>	13 (30.2%)

<b>4</b>	<b>&gt;75</b>	21 (48.8%)
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**Table 3: Association of the number of blood transfusions with hepatitis C virus infection in multiple hemodialysis**

Number of transfusions	No. of patients(n=229)	Reactive to anti-HCV antibodies (n = 43)
0–25	82	02 (2.4%)
26–50	62	06 (9.7%)
51–75	36	10 (27.8%)
76–100	33	13 (39.4%)
>100	16	12 (75%)

#### **CONCLUSION:**

In our study, the high prevalence of HCV among hemodialysis patients (34.8%) and frequency of HCV infection in multiple hemodialysis patients confirm that HCV infection still remains a major health problem among patients on maintenance hemodialysis.

HCV transmission in hemodialysis units is multifactorial and includes modifiable factors; the study showed that blood transfusion and the lack of implementation of infection control measures by the medical staff during the handling of equipment and blood products, in addition to temporary dialysis catheter insertion, are statistically significant risk factors for HCV seroconversion in our community

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**CONFLICT OF INTEREST:** The authors declare that there is no conflict of interest.

**AUTHORS' CONTRIBUTIONS:** All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

#### **REFERENCES:**

- 1) Flint J, Harding RM, Boyce AJ, Clegg JB. The population genetics of the haemoglobinopathies. *Baillieres Clin Haematol.* 1998;11(1):1-51. [https://doi.org/10.1016/s0950-3536\(98\)80069-3](https://doi.org/10.1016/s0950-3536(98)80069-3).
- 2) Viral Hepatitis Prevention Board. Hepatitis A, B and C: Defining workers at risk. *Viral Hepat.* 1995;3. [[Google Scholar](#)]
- 3) Tong MJ, el-Farra NS, Reikes AR, Co RL. Clinical outcomes after transfusion-associated hepatitis C. *N Engl J Med.* 1995;332(22):1463-6. <https://doi.org/10.1056/nejm199506013322202>. PMID: 7739682.
- 4) Di Bisceglie AM, Goodman ZD, Ishak KG, Hoofnagle JH, Melpolder JJ, Alter HJ. Long-term clinical and histopathological follow-up of chronic posttransfusion hepatitis. *Hepatology.* 1991;14(6):969-974. [https://doi.org/10.1016/0270-9139\(91\)90113-a](https://doi.org/10.1016/0270-9139(91)90113-a).
- 5) Wong JB, McQuillan GM, McHutchison JG, Poynard T. Estimating future hepatitis C morbidity, mortality, and costs in the United States. *Am J Public Health.* 2000;90:1562-9. [[PubMed](#)] [[Google Scholar](#)]
- 6) Global surveillance and control of hepatitis C. Report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board, Antwerp, Belgium. *J Viral Hepat.* 1999;6(1):35-47. [[PubMed](#)] [[Google Scholar](#)].
- 7) Agarwal SK, Dash SC, Gupta S, Pandey RM. Hepatitis C virus infection in haemodialysis: the 'no-isolation' policy should not be generalized. *Nephron Clin Pract* 2009;111: c133-c140. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
- 8) Natov SN, Lau JY, Bouthot BA, Murthy BV, Ruthazer R, Schmid CH, et al. Serologic and virologic profiles of hepatitis C infection in renal transplant candidates. New England Organ Bank Hepatitis C Study Group. *Am J Kidney Dis* 1998; 31: 920-927. [[PubMed](#)] [[Google Scholar](#)]
- 9) 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; 65:2335-2342. [[PubMed](#)] [[Google Scholar](#)]
- 10) Khan, S., Attaullah, S., Ali, I. *et al.* Rising burden of Hepatitis C Virus in hemodialysis patients. *Virol J* 8, 438 (2011). <https://doi.org/10.1186/1743-422X-8-438>