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PREVALENCE AND RISK FACTORS FOR HEPATITIS C VIRUS INFECTION IN HEMODIALYSIS PATIENTS

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Abstract:

Objective: We aimed to assess the prevalence and factors associated with positive anti-hepatitis C virus (HCV) antibodies among patients on maintenance hemodialysis (HD) in three centers in Lahore, Pakistan.

Method: The data from 219 patients and their records over the period between 2013-2019, was extracted and analyzed.

Results: The mean ± SD age of the patients was 47.08 ± 13.9 years; 74.4% of them were married and 14.6% were employed. The prevalence of validated anti-HCV-positive cases was 40.2% (95%CI 33.64%-46.73%). The mean ± SD duration on HD of all the patients was 35.09 ± 38 months. On bivariate analysis, the duration on HD and attending more than one center for HD associated significantly with anti-HCV positivity (P <0.05). On multivariate fully adjusted Poisson regression modelling, controlled for age, Patients attending more than one center and those who underwent HD for longer durations were more likely to be positive for anti- HCV antibodies [P = 0.004, adjusted prevalence rate ratio (APRR) = 1.87, 95% confidence interval (CI): 1.22-2.88; P = 0.0005, APRR = 1.01, 95% CI: 1.00-1.02.

Conclusion: In this study sample, the prevalence of HCV was significant. Patients attending more than one center and those who underwent HD for longer durations were found to be more likely to contract HCV. Enhancing existing infection control measures and allocating more resources to HD centers therefore warrants consideration.

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INTRODUCTION:

Infection with hepatitis C virus (HCV) is a common nosocomial occurrence among hemodialysis (HD) patients.[1] it is considered a cause of end-stage liver disease and contributes to high mortality and morbidity among patients on maintenance dialysis. [2] The prevalence of contracting HCV during HD varies from country to country. Tight infection control measures implemented in developed countries has minimized the transmission rate, [3] while the prevalence still remains high in developing countries. [4,5,6,7] Patients with end-stage renal disease (ESRD) receive frequent blood transfusions to correct their chronic anemia.[8] Transfusion of blood or blood products still constitutes an important route of transmission of HCV.[9,10] Although strict measures are in place, both with regard to criteria for the selection of blood donors [11] and sensitive laboratory screening tests, both of which have been proven to diminish the risk of transmission,[12] these measures may be unaffordable in some countries such as Yemen.[13] Additionally, the residual risk of transmission during the window period (the period between contracting HCV infection and detecting the antibodies in the donor's blood) cannot be ignored.[12] Furthermore, the risk of contracting HCV infection is increased with the sharing of dialysis machines among patients. Barril and Traver reported a reduction in the prevalence of HCV among HD patients by practicing standard infection control measures and the isolation of seronegative (anti-HCV negative) patients. [14] This finding was supported by another study, although it demonstrated that patients' isolation *per se* is ineffective in minimizing HCV transmission if it is not accompanied by adequate prophylactic care by the dialysis unit staff. Moreover, performing HD in multiple centers as well as duration on HD have both been reported as risks associated with HCV transmission. Finally, the current literature demonstrates the role of socio-demographic factors such as age in contracting HCV. [13]

A single large study reported data obtained prior to 2006 in East Asia and Oceania. This scarcity of recent articles may fuel the perception that HCV transmission is no longer a problem in patients undergoing HD. Although outbreaks of HCV in HD units continue to be reported occasionally both in Western and emerging countries,the extent of this ongoing transmission in patients undergoing HD is very unclear, and strategies to prevent HCV transmission remain debated. We revisited this important subject with use of the Dialysis Outcomes and Practice Patterns Study (DOPPS), a prospective longitudinal study in patients undergoing HD in 21 countries worldwide. This study was performed to retrospectively assess the prevalence of HCV infection as well as the factors associated with it among patients on maintenance HD.

METHOD:

We undertook a review over the period from May to June 2019 and extracted and analyzed the data from the records of all the patients (n = 243) with ESRD undergoing maintenance HD in the three available centers in Lahore,Pakistan. Patients aged under 18 years, those positive for hepatitis B virus and those with dual infection with hepatitis B and C viruses were excluded from the study. Therefore, this study finally included a total of 219 adult patients' records who underwent HD over the period between 2013-2019 and provided supplementary data. The results of investigations related to anti-HCV positivity and the outcome of interest for this study were obtained from the patients' clinical records and the related laboratory registry. Demographic and socioeconomic data of the patients (age, gender, occupation and marital state), duration on HD, history of blood transfusion(s), surgical intervention, travel, attending more than one HD center and type of vascular access for HD (arterio-venous fistula, catheter or graft) were all obtained from the patients 'clinical records.

DATA ANALYSIS:

Data collected were checked for normality distribution and analyzed using SPSS for Windows version 16. The mean ± SD was considered for normally distributed continuous variables and median (range) if assumption was not met. Proportions were reported for categorical variables. Unpaired T test was employed to compare means of duration on HD and age with anti-HCV positivity. Unadjusted prevalence rate ratio using Poisson regressions (bivariate) was used to explore significant explanatory variables associated with anti-HCV positivity. Multivariate Poisson regression analysis, controlled for age, was used to model the associations between the explanatory variables, detected significant in bivariate analysis, and the anti-HCV positivity. Age, although not significantly associated with the dependent variable, was entered into the model on a theoretical basis as mentioned above. The level of significance was set for all analysis at a *P*-value <0.05.

RESULTS:

A total of 219 patients were studied; their mean age was 47.08 ± 13.9 years (range 18-80 years). The majority of the patients were male [153 (69.9%)], 163 were married (74.4%) and 32 were employed (14.6%). Eighty-eight of 219 (40.2%) patients were anti-HCV positive. The mean ± SD duration on HD

of all the study patients was 35.09 ± 38 months. Other socio-demographic characteristics of the patients are reported in table 1.

Unadjusted analysis revealed that receiving HD at more than one HD center was significantly associated with anti-HCV positivity (*P* = 0.024) table 1 and Unpaired T-Test showed that there was a statistically significant difference in the mean duration on HD between anti-HCV-positive and -negative cases (*P* = 0.0005). On multivariate analysis, both increase in the duration on HD as well as attending more than one center for HD were significantly associated with anti-HCV positivity [*P* = 0.0005, APRR = 1.01, 95% confidence interval (CI): 1.00-1.02; *P* = 0.004, APRR = 1.87, 95% CI: 1.22-2.88, respectively; in table 2. Age was not found to be significantly associated with anti-HCV positivity (*P* = 0.119, APRR = 1.01, 95% CI: 0.99- 1.03).

Table 1: Demographic and socio-economic characteristics and unadjusted Poisson analysis of factors associated with anti-hepatitis C virus positivity (n = 219)**.**

Explanatory variables	N (%)	Unadjusted prevalence rate ratios	P-value
Gender			
Female	66 (30.1)	1	
Male	153 (69.9)	0.97 (0.62-1.54)	0.904
Marital state			
Married	163 (74.4)	1	
Unmarried	40 (18.3)	1.05 (0.45-2.42)	0.914
Widowed/divorced	16 (7.3)	1.20 (0.48-3.02)	0.699
Employment			
Yes	32 (14.6)	1	
No	187 (85.4)	0.67 (0.33-1.32)	0.247
Surgery			
No	170 (77.6)	1	
Yes	49 (22.4)	0.98 (0.60-1.61)	0.937
Blood transfusion*			
No	160 (73.1)	1	
Yes	58 (26.5)	0.86 (0.53-1.1.41)	0.561
Access			
Arterio-venous fistula	205 (93.6)	1	
Catheter	14 (6.4)	0.19 (0.02-3.75)	0.076
Performed HD in >one center			
No	140 (63.9)	1	
Yes	79 (36.1)	1.17 (1.07-2.46)	0.024
Travel			
No	166 (75.8)	1	
Yes	53 (24.2)	0.90 (0.56-1.45)	0.672

*One missing record, HCV: Hepatitis C virus, HD: Hemodialysis.

Table 2: Multivariate analysis of factors associated with anti-HCV positivity.

Explanatory variables	APRR , 95% CI	P-value
Age	1.01 (0.99–1.03)	0.119
Duration	1.01 (1.00–1.02)	0.0005
Attending more than one center	1.87 (1.22–2.88)	0.0004

HCV: Hepatitis C virus, APRR: Adjusted prevalence rate ratio, 95% CI: 95% confidence interval.

DISCUSSION:

This is to our knowledge the first study to report on the prevalence of HCV and its associated risk factors in patients receiving HD in multiple centers in Aden, Yemen. It is well established that maintenance HD renders patients with ESRD at increased risk of contracting blood-borne infections, such as HCV. In this study, an overall prevalence rate of 40.2% of HCV infection was found. Comparable figures have been observed in neighboring Mediterranean countries such as Egypt (42.2%), Libya (31.1%) and Syria (48.9%). However, the figure reported from this study is lower than that reported earlier by Bin Selm (62.7%). One should take into consideration that this latter study had a relatively small sample size (n = 51) and all patients were recruited from a single HD center. With respect to the factors associated with HCV infection, in this study sample, the duration on HD was found to be more commonly associated with HCV. This lends further support to the current literature. It has been reported previously that an increased duration on HD is an important risk factor for acquiring HCV infection. Non-usage of sterile environment, failure to adhere to infection control measures by the patients as well as the health-care professionals may all play a role in viral transmission, especially HCV, in HD centers. Indeed, in one study from Saudi Arabia, no new cases of HCV were seen over a two-year period after strictly following the recommendations of the Kidney Disease Improving Global Outcome (KDIGO) initiative and the Center for Diseases Control and Prevention (CDC). Furthermore, the prevalence of HCV infection among HD patients was significantly associated with history of receiving HD at more than one HD center, which is in accordance with other studies. It is fair to mention here that a number of patients in this study were transferred to other centers within Aden city due to constructive or maintenance work of a particular center, while others opted for other centers for social or surgical interventional reasons. Finally, with respect to the dissociation of age with HCV, our results were not dissimilar from other studies.

STRENGTHS AND LIMITATIONS:

The strength of this study lies in the fact that less time and resources were allocated to investigate HCV among the study patients on maintenance HD. However, one should take into account the fact that the review of patients' records meant that non-availability of data and accuracy of the records was beyond the researchers' control. Documented data for preventive and infection control measures such as screening on a semi-annual basis for isolation of susceptible patients, proper injection-medication practices and cleaning and disinfection in these HD centers were not available. The availability of such data may have elucidated the contribution of these factors to the high prevalence of anti-HCV positivity seen in these centers. Finally, the nature of this study design (cross-sectional) precludes causality.

CONCLUSION:

In this study sample, the prevalence of HCV was significant. Patients attending more than one center and those who underwent HD for longer durations were found to be more likely to contract HCV. Enhancing existing infection control measures and allocating more resources to HD centers therefore warrants consideration.

REFERENCE:

1. Iwasa Y, Otsubo S, Sugi O, et al. Patterns in the prevalence of hepatitis C virus infection at the start of hemodialysis in Japan. Clin Exp Nephrol 2008;12:53-7.
2. Ingsathit A, Kamanamool N, Thakkinstian A, Sumethkul V. Survival advantage of kidney transplantation over dialysis in patients with hepatitis C: A systematic review and meta-analysis. Transplantation 2013;95:943-8.
3. Espinosa M, Martn-Malo A, Ojeda R, et al. Marked reduction in the prevalence of hepatitis C virus infection in hemodialysis patients: Causes and consequences. Am J Kidney Dis 2004;43:685-9.
4. de Jesus Rodrigues de Freitas M, Fecury AA, de Almeida MK, et al. Prevalence of hepatitis C virus infection and genotypes in patient with chronic kidney disease undergoing hemodia-lysis. J Med Virol 2013;85:1741-5.
5. Paniagua R, Villasis-Keever A, Prado-Uribe Mdel C, et al. Elevated prevalence of hepatitis B in Mexican hemodialysis patients. A multi-centric survey. Arch Med Res 2010;41:251-4.
6. Diouf ML, Diouf B, Niang A, et al. Prevalence of hepatitis B and C viruses in a chronic hemodialysis center in Dakar. Dakar Med 2000; 45:1-4.
7. Khattab OS. Prevalence and risk factors for hepatitis C virus infection in hemodialysis patients in an Iraqi renal transplant center. Saudi J Kidney Dis Transpl 2008;19:110-5. [PUBMED]
8. Jenkins K. A review of the updated European Best Practice Guidelines for the Management of Anaemia in Patients with Chronic Renal Failure. EDTNA ERCA J 2005;31:156-9.

9. Ejiofor OS, Ibe BC, Emodi IJ, et al. The role of blood transfusion on the prevalence of hepatitis C virus antibodies in children with sickle cell anaemia in Enugu, South East Nigeria. Niger J Clin Pract 2009;12:355-8. [PUBMED]

10. Northcott MJ, Ong WL, Walsh M, et al. Prevalence of transfusion-acquired hepatitis C in an Australian bleeding disorders population. Haemophilia 2013;19:847-52.

11. de Almeida-Neto C, Sabino EC, Liu J, et al. Prevalence of serologic markers for hepatitis B and C viruses in Brazilian blood donors and incidence and residual risk of transfusion transmission of hepatitis C virus. Transfusion 2013;53:827-34.

12. Diekamp U, Kamutzky K, Windel CD. Anti-hepatitis C prevalence and incidence in 2.8 million blood donors in Lower Saxony-residual transfusion-associated HCV risk. Beitr Infusionsther Transfusionsmed 1997;34:5-10.

13. Bin Selm SA. The seroprevalence of anti-HCV in high-risk dialysis patients. Saudi J Kidney Dis Transpl 2011;22:806-7.   [PUBMED]