

## HEPATITIS C VIRUS PREVALENCE IN HEMODIALYSIS PATIENTS IN KARBALA PROVINCE

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### ABSTRACT

**Purpose:** The study aimed to evaluate HCV infection rates are widespread in hemodialysis patients and identify any potential HCV infection risk factors in this cohort.

**Methods:** Hepatitis C virus statistical information was collected from the publicly accessible Karbala province/ Iraq.

**Results:** All told, 236 dialysis patients, 150 (63.6%) male and 86 (36.4%) female, they are between the ages of 15 and 78 (44.39 + 15.06 S.D.) years. Sampling lasted from May to October 2019-2021. Each HD treatment required three to four hours, and depending on their haemodialysis facility, patients were divided into two shifts for each of their two or three weekly dialyses. Dialysis membranes were single-use, disposable devices.

**Conclusions:** The information in this study indicated that HCV is prevalent in hemodialysis centers are comparatively high and also demonstrated that the greatest risk factor for developing HCV seems to be the duration of time undergoing hemodialysis therapy, which raises the possibility of nosocomial transmission.

## INTRODUCTION

A major development in contemporary virology, the hepatitis C virus (HCV) was the first virus to be found through molecular cloning without the use of direct biologic or biophysical techniques (1). All of the nucleic acid needed for this was extracted, copied into cDNA, and cloned (2). Despite the fact that the hepatitis C virus is an enclosed virus, we still don't fully understand how resistant it is to the environment. The viral particles are between 55 and 65 nm in size, and the virus is spherical in shape (3). The nucleocapsid is created by the interaction of the HCV core protein with the viral single-stranded RNA genome (ssRNA) (4). The viral particle has a nucleocapsid that is encircled by a lipid bilayer that anchors heterodimers between the two envelope glycoproteins E1 and E2. (5).

The viral nucleocapsid is made up of the basic protein known as HCV core, which is extremely conserved. HCV's 191 initial amino acids make up the core, which is subdivided into three domains according on hydrophobicity. Viral RNA can connect to the core protein via domain 1. (amino acids 1 - 74). E1 and E2 are the two "envelop proteins" that make up

HCV. These heavily glycosylated proteins are essential for cell entrance. The HCV envelope's E2 functions as the subunit that binds to receptors, whereas E1 functions as the fusogenic subunit (6).

Viral coils uncoil in the cytoplasm once the virus enters the cell. A cap-independent positive RNA messenger; NS5 RNA polymerase transcribes it. The 3D structure of the HCV IRES attached to the 40S ribosomal subunit exhibits independent-cap translation (7). During transcription, a complementary negative-sense RNA molecule is produced from the viral genome. is used to make offspring positive-strand RNA molecules. RNA-dependent RNA polymerase NS5b performs both phases of RNA synthesis. NS-3 of HCV is a helicase. HCV uses Has no reverse transcriptase activity and is a negative-strand RNA intermediate. (8).

HCV produces up to 1012 virions every day. This rapid rate of replication, along with the RdRP's lack of proofreading, causes genetic diversity in HCV (9). Uncertainty surrounds the mechanisms causing liver damage in both acute and chronic HCV infections. However, the liver was the primary source of HCV-induced harm and reproduction, and it contains a significant amount of HCV RNA (usually 10<sup>8</sup>–10<sup>11</sup> copies per gram of tissue). (10). Many cytokines secreted by T helper 1 (Th1) and (Th2) cells are involved in the immune response to HCV infection and the progression of HCV-related liver disease.

Infection pathways are, Doping Most new infections occur in drug injectors. Anti-HCV antibodies in intravenous (11). HCV was spread mainly through blood transfusions. 90% of patients had hepatitis C. Recombinant clotting factors (12). Sexual transmission is infrequent and linked to high-risk behaviours. Dialysis patients have several risk factors for HCV infection. Transfusions, hemodialysis duration, HCV infection prevalence, and dialysis modality. In-hospital hemodialysis is riskier than peritoneal (11).

## METHODOLOGY

Total of 236 dialysis patients, 150 (63.6%) male and 86 (36.4%) female, Of the 236 HD patients, 96 had no history of blood transfusion. Hypertension (n = 62), diabetes mellitus (n = 32), glomerulonephritis (n = 15), failed Kidney transplant (n = 11), stone kidney disease (n = 10), polycystic kidney (n = 7) and unclear reasons (n = 99) HD individuals had a variety of reasons of ESRD.

A questionnaire was utilised to obtain age, gender, hemodialysis length, numerous hemodialysis treatments or not centers, previous blood transfusions received, history of kidney transplantation, history of the previous tattooing, and HBV marker. Patient records, interviews, and ethical consent for the use of all specimens were used to determine the clinical diagnosis.

## RESULTS AND DISCUSSION

### Study population

The study included 236 dialysis patients, 150 (63.6%) male and 86 (36.4%) female, ages 15 to 78 (mean 44.39 15.06 S.D.). All chronic hemodialysis patients were questioned to collect HCV risk factor data. Sixty-two patients (26%) had a background of hypertension. 32 (14%) had type

2 diabetes, 15 (6%) had a history of glomerulonephritis, 11(5%) had a history of kidney transplantation failure, 10 (4%) had a history of renal calculi, 7 (3%) polycystic kidney, and 99 (42%) chronic renal failure without a clear aetiology Figure (1).

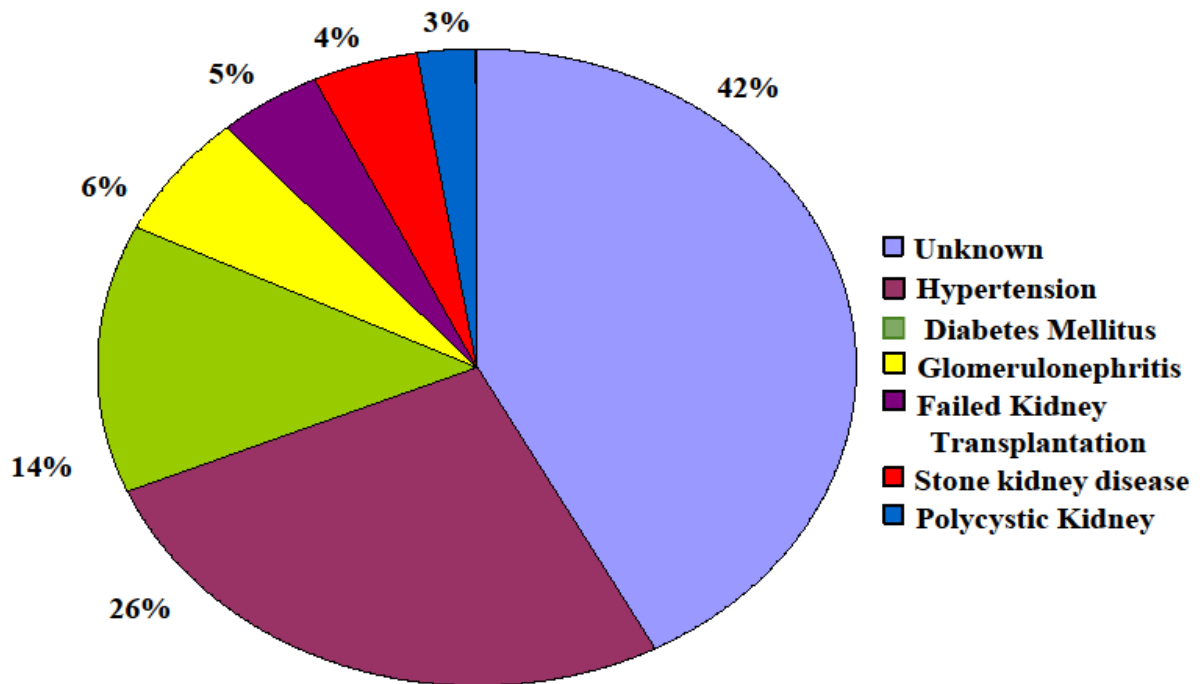


Figure (1): The etiology of renal disease

### Risk factors for HCV infection

According to the study, the average age of hemodialysis patients was (43.7015.23) and (44.8914.96) years in both HCV-positive and negative individuals, respectively. Therefore, There was nothing notable difference between HCV prevalence (classified as anti-HCV antibody and/or HCV RNA positive) and patient age ( $X^2= 46.17$ ,  $P>0.05$ ), as shown in Table 1.

Table 1 show the relationship between the HCV status and the mean age of hemodialysis patients.

HCV-status	No. of patients (%)	Average age (years)	±S.D.	±S.E.	Minimum	Maximum
Positive	100 (42.4)	43.70	±15.23	±1.52	17.00	76.00
Negative	136 (57.6)	44.89	±14.96	±1.28	15.00	78.00
Total	236 (100)	44.39	±15.06	±0.98	15.00	78.00

\*  $X^2 = 46.17$ ,  $P=0.79$

The male HCV prevalence was (44%) and a female HCV prevalence (39.53%). As shown in (Table 2), neither the age nor gender had significant bearing on the subtypes of HCV genotypes ( $P>0.05$ ).

**Table (2): Gender distribution in hemodialysis patients in relation to HCV status.**

HCV-status	No. of patients (%)	Gender (%)		Statistic
		Male	Female	
Positive	100 (42.4)	66 (44)	34 (39.53)	$\chi^2=0.45$ $P= 0.50$
Negative	136 (57.6)	84 (56)	52 (60.46)	
Total	236 (100)	150 (63.6)	86 (36.4)	

Patients with and without HCV experienced hemodialysis for an average of 44.55 28.05 vs. 26.10 20.79 months, respectively, with a difference between the two groups that is statistically significant. ( $T= 5.80$ ,  $P0.01$ ), as seen in (Table 3).

**Table (3): Mean of hemodialysis duration in months in hemodialysis patients in relation to HCV status**

HCV-Status	No. of patients (%)	Mean (months)	S.D.	S.E.	Minimum	Maximum
Positive	100 (42.4)	44.55	$\pm 28.05$	$\pm 2.80$	2.00	132.00
Negative	136 (57.6)	26.10	$\pm 20.78$	$\pm 1.78$	1.00	120.00
Total	236 (100)	33.91	$\pm 25.75$	$\pm 1.68$	1.00	132.00

**\* $T= 5.80$ ,  $P= 0.001$**

## Discussion

In this investigation, HCV prevalence and the likelihood of getting the virus infection and hemodialysate centres was discovered ( $P 0.001$ ). The non-random HCV distribution -positive people among the centres suggests that regional factors may be involved in the epidemiology of the disease. This is consistent with the discovery that the size of a dialysis facility (i.e., Neither the prevalence of HCV infections nor the total number of patients treated) were connected. (13).

All haemodialysis centres participated in the current study by dialyzing HCV-positive patients in a specific area of a dialysis facility, disinfecting the hemodialysis equipment at conclusion of each session, the and discarding filters and tubees after each usage. When interacting with patients, nurses frequently wear gloves. Despite these fundamental precautions, it is still likely that dialysis-related cross contamination with minute amounts of contaminated blood account for rare occurrences. This is especially true given that we have

noticed a cluster of HCV infection among our patients who use the same dialysis machines (14).

The study population consisted of 150 men (63.6% of the population), 86 women (36.4%), and was aged from 15 to 78 years (mean 44.39 15.06 years). the determination of depending on whether anti-HCV antibodies or HCV RNA were found in the sera of patients with PD. In accordance with other researchers' findings, our findings demonstrated no the statistically significant that differences in age or gender the between the HCV positive and negative groups (both  $P>0.05$ ) (15, 16).

## CONCLUSION

The data given in this study demonstrated that HCV prevalence in hemodialysis centres is relatively high and also suggested that the main risk factor appears to be the amount of time receiving hemodialysis that treatment, pointing to that nosocomial transmission of HCV.

## FUNDING

None.

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