# Seropositivity of Hepatitis B&C in Haemodialysis Patients at Two Tertiary Care Centers in Lahore

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**ABSTRACT**

***Background and Objectives:*** *Immunocompromised state developing due to irreversible renal compromise promotes Hepatitis B and C seropositivity in haemodialysis patients. Direct contact and contamination of machines are the main source. The present study was designed to assess the seropositivity of Hepatitis B and C in haemodialysis patients in Tertiary care hospitals of Lahore. The secondary aim was to assess the perception of haemodialysis patients regarding Hepatitis B and C.*

***Methods:*** *Cross sectional study was conducted on 78 haemodialysis patients of Fatima Memorial and Sheikh Zayed Hospital within four months. Seropositivity and perception regarding Hepatitis B and C was assessed using a structured questionnaire by interviewing after fulfilling ethical considerations. SPSS was used to analyze the data.*

***Results:*** *Out of 78 patients, 47 (60.3%) were male and 31 (29.7%) patients were female. Awareness amongst haemodialysis patients was mediocre, 40 (51.2%). Seropositivity for Hepatitis B and C was 45 (57.6%) with 12 (26.7%) being declared as Hepatitis B and C positive during dialysis. Active screening was being done for haemodialysis patients, 70 (89.7%) with 45 (57.6%) being vaccinated for Hepatitis B. Patients 69 (88.4%) thought cleanliness and hygiene were best control measures to avoid the spread of Hepatitis B and C, contrary to 31 (39.7%) believing in spread through contamination of blood. Testing for Hepatitis B and C was more in public sector ($x^2$ 4.62, P-value 0.03). A significant difference between public and private sector patients with opinions that these diseases could be prevented in dialysis clinic ($x^2$ 6.48, P-value 0.01) by applying preventive measures was recorded.*

***Conclusion:*** *Majority haemodialysis patients are seropositive for Hepatitis B and C. Perception of patients regarding mode of transmission, safety measures, and hazards of dialysis was average. Health education and routine disinfection can be considered to be the major measures to be adopted for reduction of spread of Hepatitis B and C.*

**KEYWORDS:** *Hepatitis B, Hepatitis C, Haemodialysis, Seropositivity.*

## INTRODUCTION

Hepatitis, a debilitating viral disease is a major challenge for health care providers worldwide. Viral Hepatitis comprises of five types; Hepatitis B Virus and Hepatitis C Virus are the most disastrous, exhibiting a unique and significant relationship with patients of kidney disease and haemodialysis. Multiple blood transfusions and prolonged vascular exposure during dialysis makes these patients more prone to HBV, HCV positivity and infections. Nosocomial transmission is attributed to contaminated hospital devices, equipment, supplies, environmental surfaces and attending personnel.

In addition, immune compromised state developing due to irreversible renal compromise further promotes HBV, HCV positivity and infections in haemodialysis patients.[1] multiple deficiencies in standard precautions such as proper disinfecting of devices between patients, sharing of single used vial for infusion, poor sterilization techniques, and poor cleaning of dialysis machines can all lead to risk of developing HBV, HCV positivity and infection.[2]

HCV positivity and infection can be associated with intravenous drug abuse and organ transplantation.[3] In transplanted patients use of long term immunosuppression to prevent graft rejection favours HBV reactivation.[4] Prior to effective screening of blood donations, HCV, HBV positivity and infection were attributed to blood transfusions used as management of anaemia due to kidney disease. During haemodialysis chances of patient to patient transmission of HBV increases when same machines are used for different patients without being sterilized.[5] Prevalence of HCV and HBV positivity in haemodialysis patients varies markedly from country to country even negligible in case of Iran.[6]

Worldwide it is estimated that about 2 billion individuals are infected with hepatitis B virus and 350 are living with chronic HBV infection, while HCV infection is about 3% occurring in 180 million

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carriers.[7] Prevalence of HBV in patients on haemodialysis is 1.79% and that of HCV in patients of haemodialysis is 21% in a study conducted in Argentina.[8] According to national studies held in Iran between 2001 and 2008, the reported seroprevalence of HCV infection was reported to be 0.16 percent. In Iranian haemodialysis patients, prevalence of HCV infection was found to be as high as 30% to 90%.[9] Pakistan is located geographically in intermediate endemic areas of HBV infection.

In a study conducted in Lahore, prevalence in a sample of chronic kidney disease patients was estimated to be 8.06%.[10] About 25.6% patients were positive for HCV and 10.6% were positive for HBV during haemodialysis as reported by a study conducted in Children's Hospital Lahore.[11] Based on health screening camps and community, prevalence of chronic kidney disease in Pakistan is reported to be around 125% to 25%.[12]

Hepatitis B and C positivity in long term haemodialysis patients can be attributed to risk of nosocomial infections as they are at maximal exposure to unsafe drug injection practices, multiple transfusions, contaminated dialysis systems and improper handling of equipment. Improper preventive measures during parental medication by the health care staff is a contributing factor.[13] Among various risk factors such as repeated transfusions, immune compromised state of patients, contaminated devices and the attending staff, long duration of haemodialysis has significantly been associated with HBV, HCV positivity and infections due to non-adherence to the universal infection control measures.[13]

The main objective of our study is to determine the seropositivity of Hepatitis B and C in haemodialysis patients. The secondary objective of the study is to assess the perception of haemodialysis patients regarding Hepatitis B and C.

## METHODS

A cross sectional study was conducted at Fatima Memorial and Sheikh Zayed Hospitals, Lahore on a total of 78 haemodialysis male and female patients. Ethical considerations were fulfilled by taking permissions from institutional review board approval (vide letter No. FMH-04-2019-IRB-606-M) and informed consents from all of the participants of research. This study was completed within 4 months (Dated 16th of January till 16th of April 2018). Sample size was calculated on the basis of latest prevalence 28% of Hepatitis B and C in haemodialysis patients at 95% confidence interval and alpha 5%.[11] Convenient sampling technique was employed 39 patients each (50% sample) were taken from Fatima Memorial and Sheikh Zayed Hospital, Lahore.

Convenient sampling technique was employed. A structured, closed ended questionnaire was used and data was collected by interview method from patients. Patients undergoing haemodialysis and willing to participate in the study were enrolled. Haemodialysis seropositivity was verified from the records of the participants.

## STATISTICAL ANALYSIS

Data was analysed using Statistical Package for the Social Sciences (SPSS) version 20. Means, standard deviations, frequencies, percentages and proportions were calculated respective to the variables. Chi square was the test of significance used and P-value of less than 0.05 was considered significant, Frequency tables, bar charts and pie diagrams have been used to present the data.

## RESULTS

This cross-sectional survey was conducted in tertiary care hospitals of Lahore, Fatima Memorial, and Sheikh Zayed Hospital to find out the perception about Hepatitis B & C seropositivity of haemodialysis patients. Male predominance was observed, 47 (60.3%) males and 31 (39.7%) females. Mean age was 47.58 ± 15.09, 41 (52.6%) unemployed and 37 (47.4%) were employed.

Awareness of Hepatitis B and C was average, 40 (51.3%) with 31 (39.7%) having awareness of their mode of transmission. Majority 70 (89.7%) were screened for Hepatitis B and C with 45 (57.6%) being vaccinated for Hepatitis B. Most 55 (70.5%) had a view the-se are potential diseases which they acquire during dialysis, while 47 (60.2%) thought that this disease can be prevented in dialysis clinics. (Fig: 1).

Testing of majority participant 60 (76.9%) was being done with 7 (0.9%) positive for Hepatitis B and 38 (48.7%) for Hepatitis C whilst 33 (42.3%) were diagnosed as positive before dialysis and 12 (15.4%) during dialysis. More than half 44 (56.4%) were aware of the screening status and 19 (24.3%) of the Hepatitis B vaccination status of other patients. Screening schedule was as follows, monthly screening 55 (70.5%), six monthly 18 (23.1%) and annually 5 (0.6%). Majority 62 (79.4%) were of the opinion that regular screening of high risk patients should be conducted. (Table-1 Perception of Haemodialysis Patients regarding Hepatitis B and C).

Majority participants 43 (55.1%) were aware of the protective measures undertaken by their dialysis clinic to prevent Hepatitis B and C infection. They 69 (88.4%) were of the opinion that cleanliness and hygiene needed maintenance at the centre. Majority 69 (88.4%) agreed that the staff thoroughly and periodically cleaned and disinfected the machines regularly. In the total sample, 73 (93.5%) had a view that separate machines should be provided for normal and infected patients. In total 66 (84.6%) were of the view that implementation of all the above mentioned

factors play a role in preventing Hepatitis B and C infection during dialysis (Table-2 – Perception of patients regarding protective measures taken by the hospital staff at Dialysis centres of Tertiary Care Setups).

The current study revealed that there are significantly more number of Hepatitis B and C positive patients in public as compared to private sector $x^2$ 5.6, P-value 0.0001. Diagnosed Hepatitis B and C cases before dialysis were more in public compared to private sector $x^2$ 27.8, (*P-value 0.0001*). Patients from private sector had more awareness regarding the vaccination status of other patients $x^2$ 5.64, P-value 0.02. Testing for Hepatitis B and C was more in public sector $x^2$ 4.62, P-value 0.03. There was a significant difference between public and private sector patients with opinions that these diseases could be prevented in dialysis clinic $x^2$ 6.48, P-value 0.01 by applying preventive measures. Screening was a major feature in both public and private sector $x^2$ 5.01, P-value of 0.03. (Table-3-Knowledge regarding Hepatitis B and C in Public and Private Tertiary Care Hospitals).

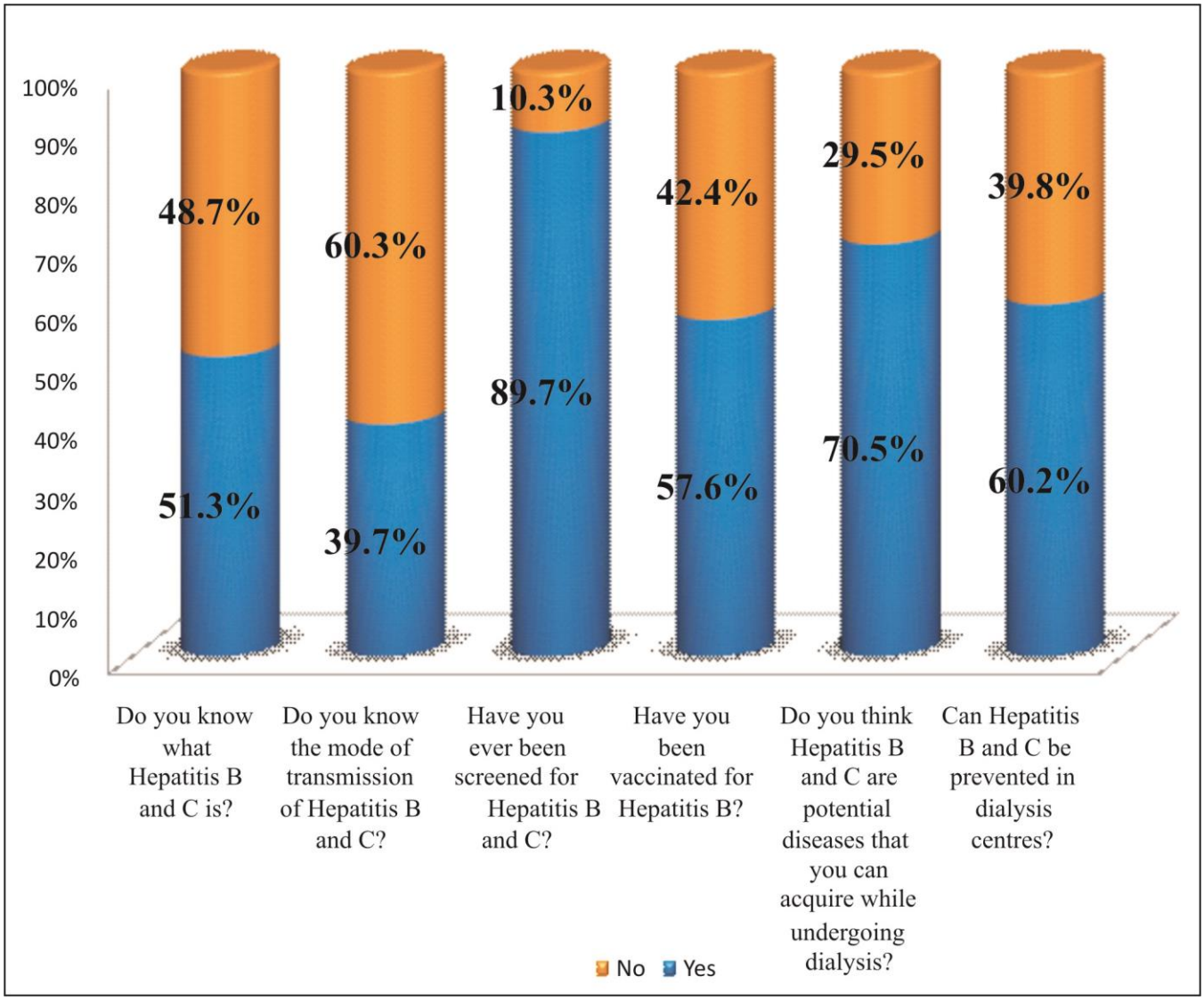


**Fig: 1.** Awareness Status.

**Table-1:** *Perception of Haemodialysis patients regarding Hepatitis B & C.*

| *Sr. No.* | *Perception* | *Yes* | | *No* | |
|---|---|---|---|---|---|
| | | *n* | *%* | *n* | *%* |
| 1. | Have you been tested for Hepatitis B and C positivity | 60 | 76.9 | 28 | 23.1 |
| 2. | Seropositivity Status | 45 | 57.6 | 34 | 42.4 |
| | Hepatitis B | 7 | 0.9 | - | - |
| | Hepatitis C | 38 | 48.7 | - | - |
| 3. | Diagnosed | | | | |
| | Before Dialysis | 33 | 42.3 | - | - |
| | During Dialysis | 12 | 15.4 | - | - |
| 4. | Awareness regarding Hepatitis B and C screening | 44 | 56.4 | 34 | 43.6 |
| | status of other patients at the dialysis clinic | | | | |
| 5. | Awareness regarding Hepatitis B vaccination status of | 19 | 24.3 | 59 | 75.7 |
| | other patients at the dialysis clinic | | | | |
| 6. | Screening Schedule for Hepatitis Band C at the | | | | |
| | dialysis centre | | | | |
| | Monthly | 55 | 70.5 | 23 | 29.5 |
| | Six Monthly | 18 | 23.1 | 60 | 76.9 |
| | Annually | 5 | 0.6 | 73 | 99.4 |
| 7. | Screening of high risk patients should be done | 62 | 79.4 | 16 | 20.6 |
| | regularly at the clinic | | | | |

**Table-2:** *Perception of patients regarding protective measures taken by the hospital staff at Dialysis centres of Tertiary Care Setups.*

| *Sr. No.* | *Protective Measures* | *Yes* | | *No* | |
|---|---|---|---|---|---|
| | | *N* | *%* | *N* | *%* |
| 1. | Awareness regarding measures undertaken by your dialysis clinic for prevention of Hepatitis B & C seropositivity/infection | 43 | 55.1 | 35 | 44.9 |
| 2. | Maintenance of cleanliness and hygiene at the dialysis centre | 69 | 88.4 | 9 | 11.6 |
| 3. | Blood or other stains on patient chairs, chairs in the waiting area or in the patients' bathrooms that were not cleaned | 18 | 23.1 | 60 | 76.9 |
| 4. | Medical and paramedical staff at your dialysis centre wear gloves | 72 | 92.3 | 5 | 7.7 |
| 5. | Usage of different machines without changing gloves or using Un-gloved hands after touching machines | 31 | 39.7 | 47 | 60.3 |
| 6. | Staff observes good hand hygiene especially during vascular access procedures and parenteral medication handling | 73 | 93.5 | 5 | 6.5 |
| 7. | Staff thoroughly and periodically cleans and disinfects the surfaces and machines between shifts and at the end of the day | 69 | 88.4 | 9 | 10.6 |
| 8. | Implementing of all these factors play a role in preventing Hepatitis B and C positivity/infection during dialysis | 66 | 84.6 | 12 | 15.4 |
| 9. | Provision of separate machines to normal and hepatitis B and C positive/Infected patients | 73 | 93.5 | 5 | 6.5 |

| | | | | | |
|---|---|---|---|---|---|
| 10. | Hepatitis B and C positive/infected patients be placed in separate rooms and asked to come at different time schedules | 72 | 92.3 | 6 | 7.7 |
| 11. | Isolated practice of dialysis at home rather than at the clinic can reduce the risk of potential hepatitis B and C positivity/infection amongst dialysis patients | 35 | 44.8 | 43 | 55.2 |
| 12. | Patients of renal transplant have reduced risk of getting infected/positive with Hepatitis B and C | 38 | 48.7 | 40 | 51.3 |

**Table-3:** *Knowledge regarding Hepatitis B and C in Public and Private Tertiary Care Hospitals.*

| *Sr. No.* | *Question* | *Chi Square Value* | *P-value* |
|---|---|---|---|
| 1. | Have you ever been screened for Hepatitis B and C? | 5.01 | 0.03 |
| 2. | Do you think this disease can be prevented in dialysis clinic? | 6.48 | 0.01 |
| 3. | Have you been tested for Hepatitis B and C seropositivity? | 4.62 | 0.03 |
| 4. | Are you aware of Hepatitis B vaccination status of other patients? | 5.64 | 0.02 |
| 5. | Does medical and paramedical staff at your dialysis center wear gloves? | 6.50 | 0.01 |
| 6. | Do you think the staff observes good hygiene [washes hand periodically] especially during vascular access procedures and parenteral medication handling? | 5.34 | 0.02 |
| 7. | Were you diagnosed as Hepatitis B or C positive before or during dialysis? | 27.8 | 0.0001 |
| 8. | Are you positive for Hepatitis B and C? | 15.6 | 0.0001 |

## DISCUSSION

Awareness, perception and precautionary measures play a pivotal role in preventing the occurrence of Hepatitis B and C in patients undergoing haemodialysis. It has been reported via various relevant studies con-ducted that haemodialysis increases risk of spread of blood borne viral infections.[14] The occurrence of such incidents is variable and differs among different centres and different countries.[15] This study identified the Hepatitis B and C seropositive haemodialysis patients in addition it also witnessed the awareness and perceptions of patients regarding Hepatitis B and C and the precautionary measures taken by various haemodialysis centres to prevent their spread. According to our results, awareness status (51.3%) of HCV and HBV infections was average. It is documented that prevalence rate of Hepatitis C infection is very high in patients with end stage renal disease.[15] Lack of screening programs, exposure to blood and blood products and nosocomial transmission of virus in haemodialysis units all act as major contributing factors for spread of hepatitis B & C.[16]

In this study awareness of patients regarding Hepatitis B and C was average corroborated by an Indian study, where less than half of the country's North-Western population had poor awareness regarding Hepatitis B and C in contrast to another Indian study that witnessed higher levels of awareness of the participants which may be attributed to many factors like literacy levels.[17,18] According to the present study, patients undergoing haemodialysis at a public health centre were more aware than those at private centres regarding hepatitis and the risk haemodialysis poses to its occurrence. In this study, 46.2% private and 74.4% patients in the public sector had the opinion that Hepatitis B and C transmission can be prevented if proper precautionary measures were taken.

Majority of the patients in the current study were found positive for either Hepatitis B or C, a major concern. Seropositivity was higher for HCV than HBV as showed by a Chinese study.[19]

Seropositivity after initiation of dialysis in the current study was less as compared to a prevalence study conducted in China and India.[14,19] In a Romanian study, the link between the duration of haemodialysis and HBV and HCV prevalence proved nosocomial trans-mission thus emphasizing the fact that procedural and hygiene practices at dialysis centre are of utmost importance for controlling the transmission of Hepatitis B and C transmission.[20] Furthermore, most of the patients considered preventive measures (hand hygiene, wearing of gloves and cleanliness of the unit and equipment) helpful in regards to preventing Hepatitis B and C as supported by a study conducted in Belgium.[21] Proper maintenance of hygiene by paramedical stuff was thought to be important by the patients as showed by another study.[13] Awareness regarding the effective-ness of preventive measures is imperative, as reported by a Brazilian study.[22]

Separating Hepatitis positive patients from seronegative patients had a major imp-act in reducing the prevalence as showed by a study supported by the findings of current study as participants were of the opinion of using separate machines or home facility provision for seropositive patients.[23]

According to current study, despite awareness regarding hepatitis, screening and vaccination for the disease, public sector patients were less screened and vaccinated compared to the private sector. This can be attributed to the fact that awareness needs to be substantiated with proper preventive practices in the form of vaccination and screening and healthcare providers in both sectors need to emphasize upon these essential preventive tools.

## CONCLUSION

Majority haemodialysis patients are seropositive for Hepatitis B and C. Perception of patients about Hepatitis B and C, it's mode of trans-mission, safety measures, and hazards of dialysis was average which needs to be prioritized and emphasized upon.

## LIMITATIONS OF STUDY

This study has some limitations; it was conducted in only two tertiary care hospitals as it was self-funded. Recall bias regarding the seropositivity for Hepatitis B and C was verified from the patient's records. The study urges further investigations in low and middle income countries to bring forth the detrimental health effects of dialysis.

## RECOMMENDATIONS

Vaccination being a major prevention tool for Hepatitis B should be made mandatory for all haemodialysis patients in addition to high risk groups. Importance of Routine Disinfection of dialysis machines and personal hygiene should be promoted.

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## AUTHOR'S CONTRIBUTION

**AM:** Conception of work and design.
**AH:** Acquisition of data and substantial contribution and design.
**NO:** Drafting article and receiving critically.
**MJ:** Reviewing critically important intellectual content.
**JJ:** Final approval of version.
**SH:** Final approval of version.

## CONFLICT OF INTEREST

None to declare.

## GRANT SUPPORT AND FINANCIAL DISCLOSURE

None to disclose.

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