

Research Article

Spectrum of HBV & HCV Among Blood Donors and Dialysis Patients at Tertiary Care Center of Northern India.

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Abstract

Introduction: Chronic hepatitis B virus (HBV) and C Virus (HCV) infection are important cause of cirrhosis of liver and Hepatocellular carcinoma (H.C.C). Majority of patients are asymptomatic and are detected incidentally before surgery, pregnancy, blood donation, dialysis and thalassemia treatment.

Aims and Objectives: To determine prevalence of HBV & HCV among blood donors and dialysis patients.

Materials & Methods: It was prospective study conducted at Department of Medical Gastroenterology, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak, over a period of one year from 1st April, 2024 to 31st March, 2025 during which 40266 blood donors and 17474 dialysis patients were screened for HBV and HCV infections by HbsAg and anti HCV antibody test who were further confirmed by HBV DNA Quantitative and HCV RNA Quantitative test and treated as per scientific protocol.

Results: Out of the 40266 blood donors, 354 (0.88%) were HBV positive and 476 (1.18%) were HCV positive. On analysis of 17,474 dialysis patients, 130 (0.88%) were HBV positive and 476 (1.18%) were HCV positive.

Conclusion: In view of asymptomatic nature in majority of HBV and HCV patients, manoeuvres to detect at early stage should be taken on broader front. The awareness regarding blood donation is one of them, as it is beneficial for both donor and recipient. The patients on dialysis are also at risk of getting these infections, hence are screened regularly for the same, so that extra care regarding strict infection control practices can be taken to reduce transmission to other patients.

Key words: Hepatitis C virus, Hepatitis B virus, Blood Donation, Dialysis, HCV RNA Quantitative test; Anti HCV antibody, HbsAg, HBV DNA Quantitative

INTRODUCTION

The prevalence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) among blood donors varies by region and study. Globally, HBV prevalence in blood donors can range from around 0.19% to 10.8%, while HCV prevalence can range from 0.07% to 1.2%. Studies in various countries and regions highlight the importance of continuous monitoring and implementing strategies to reduce the risk of transmission through blood transfusions. HBV prevalence can be influenced by factors such as sex, age, and geographic location. For instance, some studies show a higher prevalence in males and younger age groups. Similar to HBV, HCV prevalence can vary by region and demographics. One study found a significant

association between HCV prevalence and the residence of blood donors. Studies have identified factors like male sex, younger age, unmarried status, and certain geographic locations as potentially increasing the risk of HBV and HCV infections in blood donors. The prevalence of HBV and HCV among blood donors emphasizes the critical need for robust blood screening programs using sensitive and specific assays. Continued monitoring of transfusion-transmissible infections (TTIs), optimization of donor recruitment strategies, and promotion of voluntary blood donation are essential to minimize the risk of transmission. The presence of HBV and HCV in blood donors underscores the broader public health challenge of viral hepatitis and the need for vaccination and treatment initiatives. In dialysis patients, the prevalence of

Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections is generally higher than in the general population, though it can vary widely based on location and specific dialysis centres. HBV and HCV infections are significant concerns in this population due to increased risk from bloodborne transmission during dialysis procedures. Dialysis patients are at higher risk of contracting HBV and HCV compared to the general population due to the nature of haemodialysis and potential exposure to infected blood. The prevalence of these infections varies significantly across different regions, countries, and even within different dialysis units in the same region. The implementation of HBV vaccination programs, regular screening, and strict infection control measures have significantly reduced the prevalence of HBV in dialysis units. While HBV infection rates have decreased, HCV remains a concern in dialysis patients due to a lack of effective vaccination and the difficulty of preventing transmission through strict infection control measures. Coinfection with both HBV and HCV can lead to more aggressive liver disease in dialysis patients.

AIMS AND OBJECTIVES

To determine prevalence of HCV in family members of HCV patients confirmed on anti HCV antibody and HCV RNA quantitative viral load testing.

MATERIAL AND METHODS

It was prospective study conducted at Department of Medical

Gastroenterology, Post Graduate Institute of Medical Sciences (PGIMS), Rohtak, over a period of one year from 1st April, 2024 to 31st March, 2025 during which 40266 blood donors and 17474 dialysis patients were screened for HBV and HCV infections by HbsAg and anti HCV antibody test who were further confirmed by HBV DNA Quantitative and HCV RNA Quantitative test and treated as per scientific protocol.

Statistical Analysis

All the data was entered in Microsoft Excel and was analysed using SPSS 15.0 version.

OBSERVATIONS & RESULTS

Out of the 40266 blood donors, 354 (0.88%) were HBV positive and 476 (1.18%) were HCV positive. On analysis of 17,474 dialysis patients, 130 (0.88%) were HBV positive and 476 (1.18%) were HCV positive. This analysis was done on monthly basis on data obtained from blood bank and Dialysis centre and then compilation was done at the end of year. In final analysis whole twelve months data was used for calculating HBV and HCV prevalence among blood donors and dialysis patients. There was almost uniform pattern throughout the year regarding blood donations and dialysis patients, thus taking care of largescale variations. Moreover, it is well proven fact that HCV is more transmissible through blood transfusion and in dialysis patients and same was observed in our data also. Moreover, for HBV there is availability of preventable vaccine which is not in case of HCV till date.

Table 1. Showing Distribution of HBV and HCV in Blood Donors and Dialysis Patients

Month Year	Blood Donations	Hepatitis B Positive	Hepatitis C Positive	Dialysis Patients	Hepatitis B Positive	Hepatitis C Positive
April 24	3455	35	40	1792	22	8
May 24	3765	55	48	1325	7	20
June 24	3137	35	32	1567	12	19
July 24	3250	40	45	1452	10	16
August 24	3346	28	27	1520	13	19
Sept 24	3625	21	41	1360	9	12
Oct 24	3733	28	60	1460	11	16
Nov 24	2596	14	39	1519	14	39
Dec 24	3400	21	30	1315	7	9
Jan 25	3659	32	49	1560	8	14
Feb 25	3280	19	28	1213	8	10
March 25	3020	26	37	1451	10	15
Total	40266	354(0.88%)	476(1.18%)	17474	130(0.74%)	197(1.12%)

DISCUSSION

Haemodialysis (HD) requires blood exposure to infectious materials through the extracorporeal circulation for a prolonged period, and exposure to risk factors for nosocomial infections is always there. In the renal dialysis units, hepatitis B (HBV) and hepatitis C (HCV) viral infections are significant causes of morbidity and mortality in haemodialysis (HD) patients, and management of such patients becomes complicated in lieu of these infections [1]. Most of the patients undergo dialysis for prolonged periods of time and are exposed to the various side effects occurring as a consequence of this procedure. The transmission of the virus to HD patients is generally nosocomial and potential risk factors include failure to disinfect devices between patients, sharing of single-use vials for infusion, improper aseptic techniques, contaminated dialysis equipment, and supplies and contamination by attending personnel. However, long-standing vascular exposure and manifold blood transfusions can also be major contributors [2]. Also, HD patients are already immune-compromised due to irrevocable renal compromise, which contributes to infection by these viruses [3]. In one study done on 60 subjects, an anti-HCV antibody was detected in 31.68% of patients and 11.66% of patients were positive for HbsAg [4]. In our study group HBV (0.74%) and HCV (1.12%) prevalence was very low as compared to other studies and most important reason for it can be two different sets of dialysis units under one department. HBV, HCV and HIV patients are always dialyzed on separate and dedicated HD machines for these patients whereas viral screen negative patients are dialyzed on separate HD machines. HBV and HCV infections are the major etiological agents of morbidity and mortality among patients undergoing HD and entail many challenging situations in the management of patients in the dialysis units, the identification of potential risk factors and proper counselling of such patients by the primary care physicians should be the priority when they attend such patients. Emphasis on implementation of preventive measures for HBV infection, such as HBV vaccination and periodic test for hepatitis B surface antigens (HBsAg) and anti-HBV antibodies, an understanding of significant risk factors involved imparted to these patients by primary care physicians can go a long way. Blood transfusion and its components [5] are essential for therapeutic process and life-saving humans [6]. Blood transfusion secures millions of people globally each year [5] and is rising worldwide [6]. World Health Organization (WHO) global database on blood safety showed that worldwide, more than 92 million blood samples are donated annually [7]. Despite the benefits of blood transfusion, it is essential to note that it is not without risks. Transfusion-transmitted infections, including viral infections such as HBV, HCV, human immunodeficiency virus (HIV), and other related diseases [8].

Blood transfusion-related viral hepatitis, especially HBV and HCV, remains a significant concern in transfusion practice [9,10] and big problem in developing countries where safe blood transfusion has not been established until recently [11]. Our present study found that 1.12% blood donors were positive for anti HCV antibody whereas other studies have shown to 0.82%, 0.19%, 0.6%, 0.62%, 1.2% and 1.3% [12-17]. Although the reports on the prevalence of HBV and/or HCV infections among blood donors [18] and in patients with certain clinical conditions [19,20] are available, the prevalence of these infections in the general Indian population is sparse. Thus, studies on the prevalence of HBV and HCV infections are warranted to understand their epidemiology and to formulate public health strategies for improving disease prevention and control. Based on the blood bank data, an Indian study reported prevalence rates of HBsAg and anti-HCV antibody positivity were 0.80% and 0.81%, respectively [21]. There are various kind of new innovations and ideas are required to increase voluntary donation of blood which is also one of the target of National Viral Hepatitis Control Program[22].

CONCLUSION

In view of asymptomatic nature in majority of HBV and HCV patients, manoeuvres to detect at early stage should be taken on broader front. The awareness regarding blood donation is one of them, as it is beneficial for both donor and recipient. The patients on dialysis are also at risk of getting these infections, hence are screened regularly for the same, so that extra care regarding strict infection control practices can be taken to reduce transmission to other patients. Moreover, steps have to be taken to use HBV DNA Quantitative and HCV RNA Quantitative testing as screening test instead of HbsAg and anti HCV antibody test, for detecting occult infections.

Limitation of Study

In the present study, basic screening test was HbsAg and anti HCV antibody test and those who were found positive for the same were subjected to HBV DNA Quantitative and HCV RNA Quantitative testing. It is proven fact, that in minimal number of patients of HBV & HCV, HbsAg and anti HCV antibody test can be negative, thus our current data may have some under reporting. The limitation of not using HBV DNA Quantitative and HCV RNA Quantitative as screening test is due to financial reasons and limited resources.

Conflict of Interest

The authors declare that there was no conflict of interest and no funding was taken from any source to conduct this research.

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