

## Original Research Article

# A Retrospective Study on the Sero-prevalence of Hepatitis C Infection in a Tertiary Care Hospital in Kolkata, India

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## ABSTRACT

The purpose was to establish the current sero-prevalence of HCV among patients attending Microbiology department in a tertiary care hospital. 12117 serum samples were tested for detection of IgM anti HCV using commercially available kits, from November 2013 to October 2014. The study highlighted on different epidemiological aspects such as age groups, sexes, likely mode of transmission and probable cause for undergoing screening procedure. During the study period, the sero-prevalence rate of HCV infection was 1.5 % & was significantly more prevalent (71.6 %) in male patients. IgM anti HCV reactivity was highest (56.8%) in <15 yrs of age group. Most cases were detected during routine screening of multi-transfused patients attending Hematology OPD (51.6%). Multi-transfusion was the most common risk factor associated (80.22%). Only 3 thalassemic children and 2 HIV sero-positive adults suffered from dual infections by HBV & HCV. Eighteen patients tested positive for HIV among Hepatitis C infected patients. This study highlights blood transfusion as the commonest modality for disease transmission of HCV which mostly presented as asymptomatic cases, thereby indicating further need for epidemiological studies for better prevention of disease transmission.

## Keywords

Hepatitis C,  
IgM anti-HCV,  
Viral Hepatitis,  
Chronic  
hepatitis,  
Sero-prevalence

## Introduction

Hepatitis C is a parenterally transmitted hepatotropic virus which is more commonly associated with chronic active hepatitis whereas acute phase of the disease mostly remain unnoticed due to paucity of symptoms. Hepatitis C virus (HCV) impacts the global health system to a large extent being responsible for significant morbidity

& mortality as HCV can lead to chronic liver disease causing cirrhosis, hepatocellular carcinoma and end-stage liver disease among 5-20 per cent of infected persons (Touzet *et al.*, 2000). HCV-associated liver disease progression tends to be accelerated among individuals who are older, drink alcohol and are co-infected with

HIV (Fabrizi *et al.*, 1999; Poynard *et al.*, 1997). Symptomatic acute hepatitis with jaundice is seen in only 25% of patients and this virus usually does not cause fulminant hepatitis in immunocompetent individuals. The only acute life threatening illness caused by hepatitis C is a variant called fibrosing cholestatic hepatitis which is seen in liver transplant recipients (Taga *et al.*, 1998). The worrying aspect of acute hepatitis C infection is that spontaneous viral clearance is unusual with nearly 54%-86% of the infected individuals progressing to chronic hepatitis (Alter *et al.*, 1992; Missiha *et al.*, 2008). Approximately a fifth of the patients with chronic hepatitis C progress to cirrhosis over a time spanning nearly a decade (Panigrahi *et al.*, 1997).

Serologic evidence for HCV infection occurs in 90% of patients with a history of transfusion-associated hepatitis. A specific serologic diagnosis of hepatitis C can be made by demonstrating the presence in serum of anti-HCV. When contemporary immunoassays are used, anti-HCV can be detected in acute hepatitis C during the initial phase of elevated aminotransferase activity. This antibody may never become detectable in 5–10% of patients with acute hepatitis C, and levels of anti-HCV may become undetectable after recovery (albeit rare) from acute hepatitis C. In patients with chronic hepatitis C, anti-HCV is detectable in >95% of cases. Comparable frequencies of HCV infection occur in most countries around the world, with 170 million persons infected worldwide (Mukhopadhyaya, 2008).

There is still paucity of data related to the epidemiological aspects of HCV infection and previous studies mostly concentrated on the professional blood donors. The present study was undertaken to focus upon the current prevalence of hepatitis C virus among patients attending a tertiary care

hospital in Kolkata, India. Our objective was to assess the demographic profiles of the sero-positive persons and to highlight the most probable mode of transmission of the disease. Our study looked for the prevalence of HIV and/or HBV also, if any among the HCV infected persons.

## **Materials and Methods**

The present study was undertaken in the Microbiology department of a tertiary care hospital in Kolkata, India. Blood samples were collected at the Serology laboratory in the Dept. of Microbiology from November 2013 to October 2014 for detecting the presence of Hepatitis C infection among patients admitted or attending OPD in our hospital and was undergoing these laboratory procedures as part of routine pre-operative screening or for diagnostic purposes.

At least 5ml of blood was collected aseptically by venepuncture into sterile, disposable vials without anticoagulants & labelled with patient identification details. Sample was allowed to clot at room temperature for about 1 hour for clot retraction. Serum separation was done by centrifugation at a speed of 3000 rpm for 10 minutes & stored up to 48 hours at 2°–8°C. Patient's sera were subjected to qualitative detection of IgM Anti-HCV antibody by indirect third generation ELISA method using ErbaLisa Hepatitis C kit. All samples were tested as per the manufacturer's instructions with adequate quality control & the absorbance value were read at 450nm as reference wavelength by ELISA reader. All HCV reactive patients were analyzed on the basis of their demographic profiles, probable cause for testing, symptomatic evidence & probable mode of transmission. All positive samples were further subjected to test using CombAids kit for the presence of HIV

infections. Serum showing positive result by CombAids test, were further tested using Triline & Trispot kits as second & third line tests. The samples reactive for all of the three tests were counted as HIV seropositive in the study. All HCV positive samples were also subjected to determine the co-presence of HBsAg by sandwich ELISA method using ErbaLisa Hepatitis B kit.

## Results and Discussion

A total of 12117 serum samples were tested for detection of IgM anti-HCV antibody. During the study period, prevalence rate of HCV infection was 1.5% (n=182) (Table 1, Figure 1).

HCV was mostly prevalent in patients <15 yrs. of age (56.8%) (Table 2, Figure 2). Sero-prevalence of HCV was significantly higher in male (71.6 %) patients in comparison with the females (28.4%) (Table 3, Figure 3).

HCV mostly (51.6%) presented itself in patients attending Hematology OPD & requiring frequent blood & related product transfusion for diseases such as Thalassemia & Haemophilia. 21.4% of HCV seropositive cases were advised to undergo the test because of hepatitis & other related gastro-intestinal symptoms (Table 4).

Multiple blood transfusions was reported to be the most significant risk factor associated with HIV infection in our study. 18 patients tested positive for HIV among these Hepatitis C seropositive patients. Only 3 thalassemic children and 2 HIV seropositive adult suffered from dual HCV & HBV infections (Table 5).

Hepatitis C accounting for 40% of chronic liver disease, is the most frequent indication

for liver transplantation, and is estimated to account for 8000–10,000 deaths per year in the United States. In Europe, general prevalence of HCV is about 1% but varies among the different countries (Wasley *et al.*, 2000). The population prevalence of HCV is estimated to be 1% in India which is in concordance with our study. HCV infection is transmitted predominantly by the parenteral route. Sexual and vertical transmission is infrequent except when HIV co-infection is present (Jain *et al.*, 2009; Tseng *et al.*, 2008).

Blood transfusion is an effective mode of transmission of hepatitis C infection as it allows a large quantum of infective virions into the susceptible patient. In India, transfusion of blood or blood products is considered as most common route for HCV transmission (Perez *et al.*, 2005; Amarapurkar *et al.*, 2001). 50% of the chronic hepatitis C patients had received blood transfusion(s) reportedly in a north Indian study (Mehta *et al.*, 2010). Blood transfusion was responsible for 61% of 90 patients with chronic HCV infection according to a study from Vellore (Seeff *et al.*, 1992).

The prevalence of HCV was 21% in thalassemia patients and correlated with advancing age as per a study in 2001 (Jaiswal *et al.*, 2001). Studies from Mumbai reported the prevalence of HCV in thalasemics to be 16.7% and 17.5%, respectively (Amarapurkar *et al.*, 1992; Agarwal *et al.*, 1993). In multiple transfused haemophiliac patients the prevalence of HCV was around 23.9% (Ghosh *et al.*, 2000). In a study from Kolkata the prevalence of HCV was 13% in multi-transfused patients (Neogi *et al.*, 1997).

Our study re-confirms blood transfusion as the most significant route of HCV

transmission. We observed that 18.68% of patients had history of multiple sexual partners. Two female patients co-infected with HIV & HCV contracted infection from their respective spouse.

Though the role of sexual activity in the transmission of HCV remains unclear, NHANESIII study showed that number of sexual partners (OR 2.54 for 2–49 partners) and age at first sexual intercourse (OR 2.94) had significant correlation with HCV Antibody and this has been confirmed in other studies (Alter *et al.*, 1999; Poynard *et al.*, 1997). They reported 6% of patients to have contracted HCV from their spouse (Mahanta *et al.*, 2008).

Three patients tested positive for anti-HCV antibody had undergone hemodialysis in our study but all of them had received blood transfusions previously. Patients on haemodialysis are at an increased risk for acquiring hepatitis C infection as a result of cross contamination from the dialysis circuits as well as multiple blood transfusions required for therapeutic purposes. A study from Delhi, noted that the prevalence of HCV in 208 patients undergoing haemodialysis was 4.3% (Agarwal *et al.*, 1999). The rate of seroconversion among hemodialysis patients with no other risk factors has been reported 1.38–1.9%/year (Hazari *et al.*, 2004; Halfon *et al.*, 1998).

Injection drug users (IDUs) are at high risk for blood-borne infections, including hepatitis C virus (HCV) (Mishra *et al.*, 2002). India is estimated to have 168,000 - 1.1 million IDUs with HCV antibody prevalence ranging from 5 to 93 per cent (Magder *et al.*, 2005; Mehta *et al.*, 2010; Kumar *et al.*, 2000). 3.85% patients had history of intravenous drug abuse as per our study.

The pathogenesis of HBV and HCV co-infection is incompletely understood; it is not clear whether HCV leads to increased clearance of HBV or vice-versa (Tseng *et al.*, 2008). Patients co-infected with HBV & HCV in our study mostly had additional risk factors such as multiple blood transfusion or HIV co-infection. Our study detected dual infection with HCV & HIV in 18 patients. Co-infection of HIV and HCV infection is common as modalities of transmission are mostly similar. The prevalence of hepatitis C infection in HIV patients has been variable. Two studies from Lucknow and Chennai that showed relatively low rates of co-infection of 1.61% and 2.2%, respectively (Saravanan *et al.*, 2007; Tripathi *et al.*, 2007) were conducted in patients with low incidence (Panigrahi *et al.*, 1997).

## Conclusion

The magnitude of HCV infection among chronic hepatitis patients continues to rise in India despite the mandatory anti-HCV screening in blood bank system coming into effect. Our study highlights that significant decrease in HCV prevalence will require stricter actions curbing professional blood donations along with measures for restricting improperly sterilized instruments for therapeutic interventions as these remain the main modalities of transmission of infections. This study also points out that social measures to reduce the problem of intra-venous drug abuse are required to improve the current scenario. Our study re-emphasizes the need of adequate public awareness to tackle this silent epidemic by improving the prevailing health care practices, proper counselling and treatment of those affected, thus resulting in reduction of transmission of the virus.

**Table.1** Prevalence of Hepatitis C infection among patients in a tertiary care hospital

	Total number of sample received	No. of positive samples	Percentage of positive sample
IgM Anti HCV antibody	12117	182	1.5

**Table.2** Percentage prevalence of Hepatitis C among patients of different age groups

Age groups	<5years	5-15years	15-45years	45-60years	>60years
Total no. of anti-HCV Ab positive cases (n=182)	12.2%	44.6%	24.3%	13.5%	5.4%

**Table.3** Sex prevalence of HCV infection in percentage

	Male	female
Total no. of anti-HCV Ab positive cases (n=182)	71.6%	28.4%

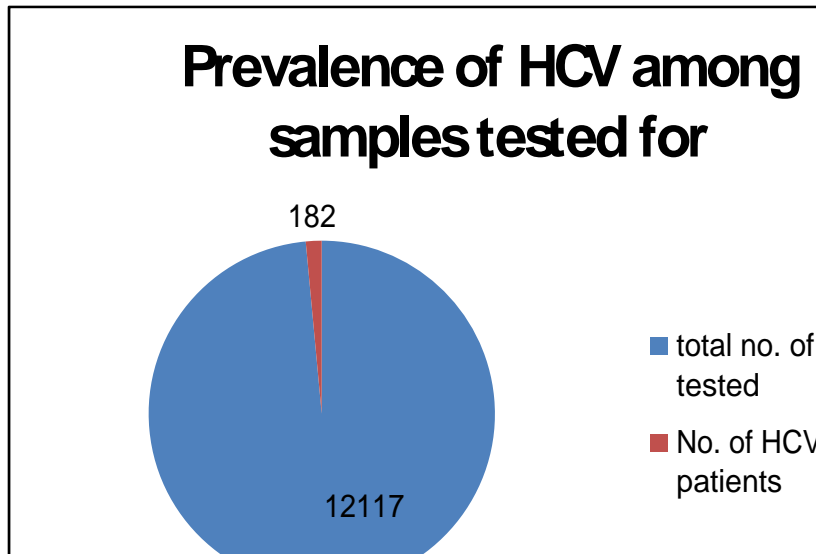
**Table.4** Categorization of Hepatitis C patients depending upon the probable cause for undergoing investigations

Indication	No. of HCV infected patients	Percentage of HCV infected patients
Hepatitis & GI symptoms	39	21.4
Patients attending Haematology OPD	94	51.6
Pre-operative screening	40	21.9
Antenatal screening	9	4.9

**Table.5** Categorization of Hepatitis C patients according to the risk factors associated

Associated RISK FACTORS	No. of HCV infected patients	Percentage of HCV infected patients
Multiple blood transfusion	146	80.22
Multiple sexual partner	34	18.68
IV drug abuse	7	3.85
Hemodialysis patients	3	1.65
Infants born to HCV infected mothers	10	5.49
Associated HIV/HBV infection	21	11.54

**Figure.1** Prevalence of Hepatitis C among patients in a tertiary care hospital



**Figure.2** Percentage prevalence of HCV positive patients in different age groups

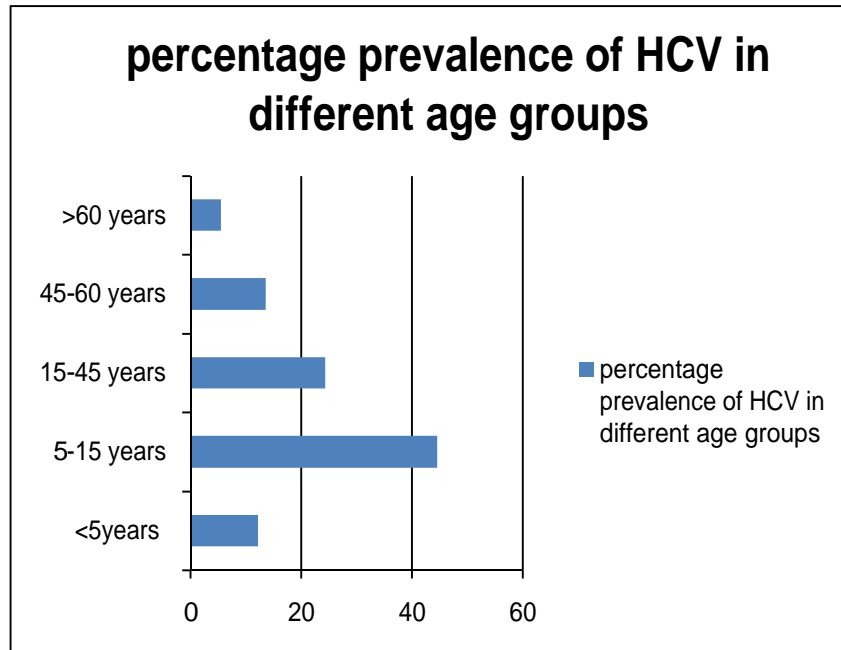
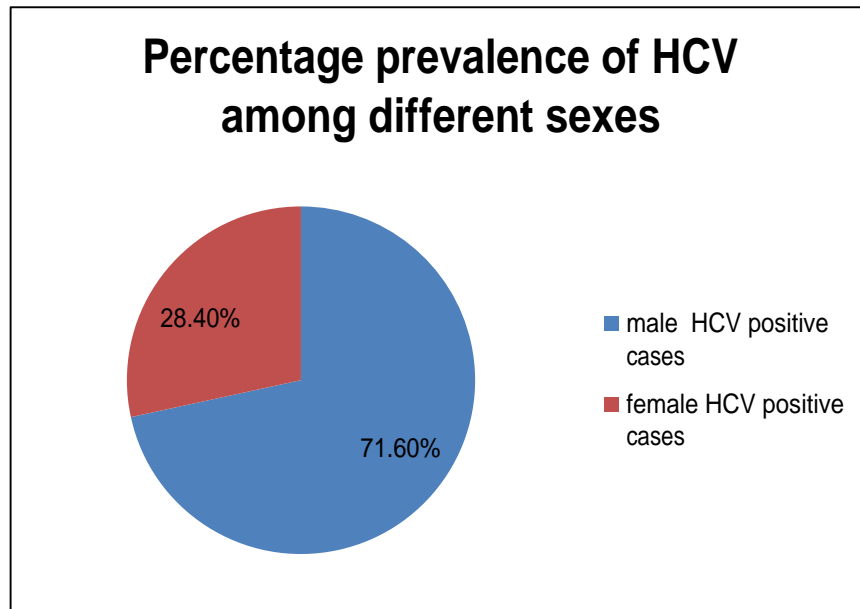


Figure.3 Sex prevalence of HCV infections in percentage



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