

## SEROPREVALENCE OF HEPATITIS-C VIRUS IN BLOOD DONORS AND HIGH RISK INDIVIDUALS

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**ABSTRACT:** Hepatitis C virus (HCV) continues to be a major disease burden affecting about 200 million people in world. Using blood donors as a prevalence source may underestimate the real prevalence of the virus because the donors are highly selected population. Presently more evidences support intravenous drug use as leading risk factor for the spread of virus. **OBJECTIVES:** The study aims at finding out the seroprevalence of Hepatitis C virus in high risk individuals as well as healthy blood donors. **SETTINGS AND DESIGN:** The study group comprise of 350 subjects which included 150 healthy voluntary donors as control group and 200 subjects taken from different high risk population like intravenous drug abuser (50), patients on long term haemodialysis (40), patients with chronic liver disease (50), HIV positive cases (30), health care workers (30). **STATISTICAL ANALYSIS USED:** Percentage. **RESULTS:** Seropositivity for anti HCV antibody was found to be 12% (24/200) among high risk population and 0.66 % (1/150) in healthy voluntary blood donors. Among different high risk groups, maximum prevalence rate 28% (14/50) was found in I.V drug abusers. Fifty percent (7/14) of the seropositive parenteral drug abusers were male in the age group of 21-30 years followed by 35.7% (5/14) in 31-40 years of age group. Only one female (7.14%) between 21-30 years was found to be sero-reactive for antiHCV antibody. In HIV co-infected cases 13.33 % (4/30) were seropositive for antiHCV antibody. In chronic liver disease (two hepatocellular carcinoma, one cirrhosis and one chronic hepatitis) and long standing haemodialysis, the prevalence rate for anti HCV was found to be 8% (4/50) and 5% (2/40) respectively. None of the health workers (0/30) found to be sero-reactive for antiHCV antibody. **CONCLUSIONS:** HCV poses a serious worldwide health problem affecting people from all walks of life in every country. In the present study 12% and 0.66% HCV prevalence was noticed in high risk group and healthy blood donors respectively. Among high risk group maximum prevalence (58.33%) was found in IV drug abusers. Prevention should target the reduction of virus transmission by health education, risk reduction counseling and thorough HCV screening following the suggestion of CDC, Atlanta, USA.

**KEY WORDS:** Hepatitis C virus, Intravenous drug use, Blood transfusion, Liver disease.

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**INTRODUCTION:** Hepatitis-C is a global disease. It has been estimated that the global prevalence of Hepatitis-C virus (HCV) infection is around 3.3% with 200 million persons chronically infected with the virus and 3 to 4 million persons newly infected added every year<sup>[1]</sup> Where as in 2011, it was found that the global prevalence of HCV was found to be 2.35% affecting 160 million chronically infected individuals<sup>[2]</sup>. Hepatitis-C, in combination with hepatitis-B, now accounts for 75% of all cases of liver disease around the world.

HCV can lead to chronic liver disease causing cirrhosis, hepatocellular carcinoma and end stage liver disease among 5-20% of infected persons.<sup>[2]</sup> India is estimated to have 168,000-1.1 million IDUs (intravenous drug users) with HCV antibody prevalence ranging from 5 to 93%; among HIV+ IDUs it is as high as 100percent.<sup>[3,4,5,6,7,8]</sup>

India's blood banking system has serious shortcomings. Professional blood donation continues to flourish despite stringent law. Improperly sterilized needles are reused for drawing blood or pushing drugs. It has been well documented that the dialysis patients have a higher rate of HCV infection. The rate of seroconversion among haemodialysis patients with no other risk factors has been reported 1.38-1.9%/year.<sup>[9,10]</sup>

The present study aims at finding out the seroprevalence of Hepatitis-C virus in high risk individuals as well as healthy blood donors.

**MATERIALS AND METHODS:** A prospective case control study was carried out in the department of Microbiology, S.C.B. medical college and hospital, Cuttack in collaboration with departments like Gastroenterology, Nephrology, Drug de-addiction cum rehabilitation centre and ICTC (Integrated counseling and testing centre) for a period of 15 months from march 2005 to June 2006.

The study group comprise of 350 subjects which included 150 healthy voluntary blood donors as control groups and 200 subjects taken from different high risk population like IV drug abuser (50), patient on long term haemodialysis (40), with chronic liver disease (50), HIV positive cases (30), Health care workers exposed to HCV positive blood by accidental needle stick injuries or sharp exposure (30). The informed consent was obtained from the patients before collecting the sample.

3.5 ml of venous blood was collected from each patient using disposable needle and syringe in a sterile dry and labelled vial and was allowed to clot. The blood samples were centrifuged at 1000 rpm for 15 minutes and the separated serum was preserved at 4-8° C for one week.

Micro well ELISA was done by using third generation HCV microlisa (J. Mitra and Co. ltd.) for the detection of antibodies to hepatitis C viral antigens such as Core, NS3, NS4 and NS5 in human serum. All the samples and reagents were brought to room temperature (20-30° C) before use.

**STATISTICAL ANALYSIS USED:** Percentage

**RESULTS:** Out of 150 healthy voluntary blood donors screened, only 01 (0.66%) male in the age group of 31-40 was found to be positive for antiHCV antibody. (Table-1)

Amongst 200 high risk individuals screened, 24 (12%) were found to be positive for antiHCV antibody. Amongst the positive cases for HCV antibody, the seropositivity in IV drug abusers, patients with chronic liver disease, HIV positive individuals and haemodialysis cases were found to be 58.33% (14/24), 16.66% (4/24), 16.66% (4/24) and 8.33% (2/24) respectively. Health care personnel were negative for antiHCV antibody 0% (Table 2). Seropositivity, among

IV drug users, was seen more in males in the age group of 21-30 (50%) and 31-40 years (35.7%). Only one female in the age group of 31-40 was positive for antiHCV antibody (Table 3). Co-infection of HCV with HIV was found to be 13.33%. Out of which 10% had the history of parenteral drug abuse and the rest with multiple sexual contact. (Table-4)

**DISCUSSION:** Transfusion of blood and blood products has been a leading cause of transmission of HCV, however due to improved screening, transmission through transfusion decreased in developed countries. The incidence of transfusion related hepatitis C infection dropped from 4.9% to 1.9% in Japan, 3.84% to 0.57% in USA.<sup>[11]</sup> However, the highest incidence (54%) of transfusion related HCV infection was found in a study of 147 Chilean patients with chronic hepatitis- C.<sup>[12]</sup> In New Delhi and Kolkata, in India, the prevalence of antiHCV antibody in healthy blood donors was 1.85% and 2% respectively.<sup>[13],[14]</sup> In a previous study in early 2002 at cuttack, the prevalence of antiHCV antibody in healthy voluntary blood donor was 2.12%.<sup>[15]</sup> In contrary to this result, in the present study the seroreactivity for HCV was 0.66%(1/150) only. The low prevalence in the present study may be due to mandatory screening for HCV infection introduced in late 2002. In 2010, a study at Kolkata, revealed still lower prevalence 0.35% for HCV antibody.<sup>[16]</sup>

Out of the total 200 high risk group 12% (24/200) were ELISA positive for antiHCV Ab. Parenteral drug abusers showed a higher infection rate of 58.33% (14/24) followed by patients with chronic liver disease 16.66% (4/24) and 16.66% (4/24) in HIV co-infected cases. Transmission of Hepatitis C virus has been strongly associated with intravenous and percutaneous drug and needle use. Reported cases of Hepatitis C from intravenous drug use are on the rise in different parts of the globe. Study at Baltimore in Maryland and Antwerp & Limburg in Belgium reported a prevalence of HCV in IV drug abuser is 30.3%, 71% and 46% respectively.<sup>[17],[18]</sup> A recent study in London England, on 428 IV drug abusers, revealed 44% seroreactivity for HCV antibody compared to 4% for HIV.<sup>[19]</sup> Seroprevalence of HCV among IV drug abusers was an alarming 92% and 71.2% at Manipur and Mizoram of India, respectively.<sup>[20],[21]</sup> In a recent study at Chennai, HCV antibody prevalence was 5.5% (63/1158) among Intravenous drug users (10/15)<sup>[22]</sup>. The importance of intravenous drug use cannot be over-emphasized. The prevalence of HCV among people who acquired HIV through intravenous drug use reaches 90%.<sup>[23]</sup> Co-infection of the two viruses can make treatment more difficult. In our study co-infection of HCV with HIV is found to be 13.33% (4/30), out of which 10.3% (3/40) had history of parenteral drug abuse and 3.3% (1/30) with history of multiple contact. The seroprevalence of hepatitis C in chronic liver disease in India has ranged from 3-31%.<sup>[24]</sup> The studies at Chandigarh and Tamilnadu reported seroreactivity for antiHCV antibody to be 48% and 5.6% respectively.<sup>[25],[26]</sup> In the present study, the seroreactivity for antiHCV antibody in patients with chronic liver disease was found to be 8%(4/50). Equal number of males and females (two each) had antiHCV antibody. Both the females were diagnosed as hepatocellular carcinoma. A significantly high prevalence of co-infection (HCV and HBV) rate of 24.7% was also reported from Punjab.<sup>[27]</sup>

Patients on haemodialysis are at an increased risk for acquiring hepatitis C infection, as a result of cross contamination from the dialysis circuits. In the 90's at many places of the world the prevalence rate of HCV infection in dialysis patients was 10-50%.<sup>[28], [29], [30]</sup> Previously in Europe the prevalence rate was as high as 20-30%. By 2000, the rate of seroconversion among haemodialysis patients with no other risk factors has been reported 1.38-1.9% /year.<sup>[31],[32]</sup> In India there is much variation in the prevalence rate of HCV, in dialysis

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patients varying from 4.3% at Delhi to as high as 13.23% and 46% at Hyderabad.<sup>[33],[34],[35]</sup> Stringent blood testing and isolation of dialysis machines have helped in reduction of hepatitis C transmission. In present study, 5% (2/40) patients with chronic renal failure on long term haemodialysis were found to be positive for anti HCV antibody.

Health care workers are at a higher risk for acquiring hepatitis infection as they come in contact with potentially infected subjects. Prevalence of hepatitis C among health workers range from 0-4% in this population.<sup>[36],[37]</sup> In our study none out of 30 health workers, found to be seroreactive for antiHCV antibody.

Hepatitis C is an emerging infection whose long term implications will be felt in the decades to come. In the absence of vaccine, primary prevention of hepatitis C should target reduction of the transmission of the virus.

Prevention should target those at risk of acquiring virus and therefore should involve providing education, risk reduction counseling, substance abuse treatment and HCV screening following the centre of disease control (CDC) guidelines such as screening drug abusers, receiver of blood and its products (clotting factor concentrates) and organs, screening persons with long term dialysis, children of HCV positive women, health care workers and persons with evidence of chronic liver disease.<sup>[27]</sup>

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**Table-1: Seroprevalence of antiHCV Ab in control group**

CONTROL GROUP	NUMBER	ELISA +VE	PERCENTAGE (%)
HEALTHY BLOOD DONOR	150	1	0.66%



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**Table-2: Seroprevalence of antiHCV Ab in different high risk group**

HIGH RISK GROUP	NUMBER	ELISA+VE	% IN RESPECT OF TOTAL ELISA POSITIVE
IV DRUG ABUSER	50	14	58.33%
HAEMODIALYSIS	40	2	8.33%
CHRONIC LIVER DISEASE	50	4	16.66%
HEALTH CARE PERSONNEL	30	0	0%
HIV+VE CASES	30	4	16.66%
TOTAL	200	24	100%

**Table-3: ELISA positive cases of IV drug abusers in relation to age and sex**

AGE	MALE	FEMALE	TOTAL M+F	MALE POSITIVE	FEMALE POSITIVE	TOTAL M+F POSITIVE
10-20	6	0	6	1(7.14%)	0	1
21-30	20	3	23	7(50%)	1(7.14%)	8
31-40	17	0	17	5(35.7%)	0	5
41-50	4	0	4	0	0	0
TOTAL	47	3	50	13(92.85%)	1(7.14%)	14

**Table-4: Coinfection of HIV and HCV**

HIV+VE	NO.	ANTI HCV Ab+VE
WITH H/O PARENTERAL DRUG ABUSE	15	3(10%)
WITH H/O MULTIPLE SEXUAL CONTACT	15	1(3.33%)
TOTAL	30	4(13.33%)