

## Seroprevalence of Hepatitis C Infection in Donated Blood and its Implications in Safe Blood Practices

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### Abstract

**Background:** Blood transfusion has become one of the important modalities of treatment in hospitals these days. Transfusion transmissible infections (TTI) remain one of major complications of blood transfusion. This study is aimed at assessing the seroprevalence of Hepatitis C virus (HCV) among healthy blood donors in our region and its implications in safe blood practices. **Materials and Methods:** This is a retrospective study done over a period of 3 years from August 2015 to July 2018 in two blood banks of Gadag i.e. Gadag Institute of Medical Sciences (GIMS) blood bank and Indian Medical Association (IMA) blood bank. A total of 20,144 blood donors were included in the study. It included both voluntary donors and replacement donors. Donors were screened using donor questionnaire form followed by general physical examination for medical and surgical illness. The blood samples of eligible blood donors were subjected to a test that detected the presence of antibodies to HCV by using Qualisa 3<sup>rd</sup> generation ELISA kit. **Result:** In the present study, the total number of donors is 20,144. Out of this, 19,676 (97.67%) were males and 468 (2.33%) were females. Out of 20,144 donors, 16,541 (82.1%) were voluntary donors and 3603 (17.9%) were replacement donors. Total number of seropositive cases of hepatitis C was 9. The overall seroprevalence was 0.045%. All the seropositive cases were males. The prevalence of seropositive cases among voluntary donors was 0.03% and among replacement donors was 0.14%. **Conclusion:** Seroprevalence of Hepatitis C infection in the region of Gadag is 0.045%.

**Keywords:** Seroprevalence; Replacement donors; Voluntary donors

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## Introduction

Hepatitis C is one of the global health burdens these days. It accounts for about 15-20% of cases of acute hepatitis [1]. The prevalence of HCV in India is around 0.5-1.5% and has around 12-15 million HCV infected people [2].

HCV is an enveloped single stranded RNA virus belonging to the family Flaviviridae and genus hepacivirus. HCV is known for its chronicity and leads to cirrhosis in about 10-20% of patients which may further progress to hepatocellular carcinoma (HCC) [1].

The spread of infection is by sexual contact, exposure to contaminated blood products or vertical transmission i.e. from mother to foetus during the perinatal period. It has an incubation period of 2-26 weeks [3].

In the year 2004, Castillo and colleagues reported Occult HCV infection (OCI) for the first time, in patients with chronic hepatitis C infection. OCI is defined as the presence of HCV -RNA in hepatocytes or peripheral blood mononuclear cells (PBMC) with undetectable plasma or serum anti-HCV or HCV-RNA. OCI is observed to be high in high risk groups such as in patients with cryptogenic liver disease, the prevalence is 74.2% [4].

The tests for diagnosis include screening tests and confirmatory tests. The screening tests comprise of detection of IgM antibodies by 3<sup>rd</sup> generation ELISA. The confirmatory tests are done by Recombinant immunoblot assays (RIBA), quantitative and qualitative detection of HCV RNA and detection of viral core antigen by chemiluminescent microparticle immunoassay [1].

## Materials and Methods

This is a retrospective study done over a period of 3 years from August 2015 to July 2018 in two blood banks of Gadag which are attached to Gadag Institute of Medical Sciences (GIMS) and Indian Medical Association (IMA) respectively. 20,144 blood donors were included in the study. It included both replacement donors and voluntary donors. Family members, relatives or friends of the patients were grouped as replacement donors. People who donated either in blood bank or blood camps voluntarily without any favour in return were grouped as voluntary donors. Donors were given a questionnaire form that comprised of

donor register form which included donor's name, gender, address, occupation, date of previous donation, pregnancy status. It also included various risk factors such as hypertension, diabetes, surgery, hospitalisation, blood transfusion. General physical examination and haemoglobin screening were performed.

### *Inclusion criteria*

Clinically healthy individuals between the age 18 to 65 years with the body weight of above 45 kg and haemoglobin >12.5g/dl, with no apparent medical or surgical illness, were included in the study.

### *Exclusion criteria*

Individuals having chronic diseases, sexually transmitted diseases, drug abusers, sex workers, pregnant women were excluded from blood donation.

After blood donation, the samples were obtained for serological testing. Donor samples were processed for the detection of antibodies to HCV by Qualisa 3<sup>rd</sup> generation ELISA kit, as per the procedure given by the manufacturer.

### *Statistics*

Microsoft Excel sheet was used to enter the data and the seroprevalence was calculated with respect to age, gender and type of donor. The statistical significance was determined by calculating p value using chi-square test.

## Results

The overall seroprevalence of Hepatitis C infection among blood donors was 0.045%. Seroprevalence was higher among replacement donors when compared to voluntary donors, accounting for about 0.14%, which was statistically significant (p value -0.0120). Prevalence was high among male donors accounting for about 0.046% and in females it was 0%. The difference of seroprevalence among gender was statistically insignificant (p value-0.6436). The seroprevalence was high in the age group 31-35 years accounting for 0.12% (Table 1).

Seroprevalence of Hepatitis C infection among donors showed an increasing trend from 2015 to 2018 (Graph 1).

**Table 1:** Seroprevalence of Hepatitis C infection among blood donors by demographic Characteristics.

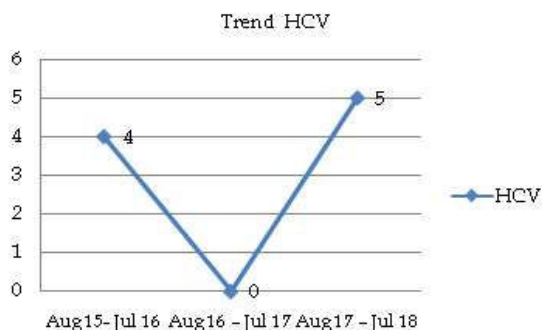
Variable	No. of Donors	Seropositive cases	Seroprevalence (%)
<i>Type</i>			
Voluntary	16541	4	0.03
Replacement	3603	5	0.14
<i>Gender</i>			
Male	19676	9	0.046
Female	468	0	0
<i>Age</i>			
18-25	7753	5	0.06
26-30	5283	0	0
31-35	3287	4	0.12
36-40	1788	0	0
41-45	1088	0	0
46-50	523	0	0
>50	422	0	0
Total	20144	9	0.045

**Discussion**

Hepatitis C infection is known for its chronicity and complications. Hence, preventing the spread of infection is very important step.

**Table 2:** Seroprevalence of HCV among blood donors in various various of India.

Place	Seroprevalence (%)
Ludhiana [5]	1.09
Delhi [6]	0.66
Lucknow (UP) [7]	0.85
Southern Haryana [8]	1.0
West Bengal [9]	0.31
Banglore [10]	1.02
Ahmedabad [11]	0.101
Present study	0.045



**Graph 1:** Yearwise trend of seroprevalence of HCV infection among blood donors

Our study shows an overall seroprevalence of

0.045% which is considerably low compared to various other studies done all over India.

The variation in seroprevalence could be attributed to many reasons-the type of test kit (different test kits have different sensitivity and specificity) and the awareness among blood donors [12].

In our study, highest seroprevalence was seen in the age group 31-35 years. In a study done by Makroo *et al.* in New Delhi, the highest seroprevalence was observed in the age group 18-30 years [13]. This may be due to high risk factors such as drug abuse and others which are prevailing in this age group.

In the present study, highest prevalence of seropositivity was seen among males accounting for about 0.046% and that among female donors was 0%. The difference of seroprevalence between them was statistically insignificant (p value-0.6436). In a study done by Mwambungu *et al.*, in Zambia, the seroprevalence was higher among male donors accounting for 2.72% and that among female donors was 2.18% [14]. The reason for high seroprevalence among males is due to low participation by female donors due to cultural norms, anemia and low body weight.

In our study, replacement donors showed more seroprevalence (0.14%) when compared to voluntary donors (0.03%) and the difference was statistically significant (p value -0.0120). In a study done by Shah *et al.* [11], prevalence among voluntary donors was 0.101% and that among replacement donors was 0.123%. Voluntary donors donate blood out of awareness and free will. Therefore, there is high chance of donating safe blood. It is observed that voluntary donation is the best method of blood donation and it is therefore recommended that every blood donation should be on voluntary intension.

**Conclusion**

We conclude that the seroprevalence of HCV infection among blood donors in our region is low. The seroprevalence is high among economically productive age group and replacement donors. Much emphasis is to be laid on prevention of the infection and encouraging voluntary donation. Practising safe blood transfusion methods is the need of the hour and it can be achieved by bringing awareness of the disease among individuals of the society, ensuring higher rates of vaccination among people, discouraging reuse of needles and syringes and encouraging 100% voluntary donation.

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