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## Hepatitis C Virus Seroprevalence among Blood Donors in a Tertiary Hospital in Manipur

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### **Abstract:**

Blood transfusion is an integral part of patient management in medical and surgical practices. But it is also an ideal mode of transmission of blood-borne infections to the recipients. Hepatitis C virus (HCV) infection is one of the transfusion transmissible infections, which is a major cause of morbidity and mortality worldwide. The infection rarely produces symptoms until the patient is complicated with cirrhosis and liver cancer. The aim of this study was to analyse the seroreactivity of HCV antibody among blood donors and to assess the level of blood safety in a three year period from January 2010 to December 2012. The study was conducted at the department of Immunohaematology and Blood Transfusion, Regional Institute of Medical Sciences, Manipur, a tertiary care centre in the North-Eastern India. A total of 39,395 blood units collected from 19931(50.59%) voluntary blood donors(VBD) and 19464(49.41%) replacement/relative blood donors(RBD) were tested for the mandatory transfusion transmissible infection markers by NACO approved ELISA / Rapid kits. The total seroreactivity of HCV antibody was 1.52%, out of which 0.40% belonged to VBD and 1.11% belonged to RBD. The lower rate of seroreactivity in VBD reflects to encourage and motivate voluntary blood donation. The introduction of more advanced Nucleic acid testing (NAT) in the screening will contribute to blood safety with more sensitivity and specificity.

**Key words:** Hepatitis C virus, Blood Donors, Transfusion transmissible infection

### **1. Introduction**

Blood transfusion is life-saving in many instances, but it also has the potential risk of transmitting infections to the recipients. There is a 1% chance of transfusion related infection in each unit of blood, even if the standard procedures are followed.<sup>1</sup> Hepatitis C virus (HCV) infection is a major cause of morbidity and mortality worldwide. The WHO has estimated that almost 170 million people, equivalent to 3% of the world's population have been exposed to hepatitis C virus.<sup>2</sup> The global prevalence rate is around 2% and 3-4 million persons are newly infected each year.<sup>3</sup> Blood transfusion is one of the effective modes of HCV transmission as most of the infected persons/donors are asymptomatic and appear physically fit at the time of donor selection. HCV is a silent killer as it rarely

produces clinical manifestations until complicated by the dreaded cirrhosis and liver cancer. The seroprevalence of HCV in the general population and among the blood donors varies in different geographic locations.

The study was taken up to analyse the seroprevalence of HCV among blood donors in a tertiary teaching hospital and to assess the level of blood safety.

## 2. Materials and Methods

This was a retrospective and cross sectional study conducted in the Department of Immunohaematology & Blood Transfusion, Regional Institute of Medical Sciences, Imphal, Manipur over a period of three years between January 2010 and December 2012. The blood samples from the collected blood units of voluntary and replacement blood donors who have fulfilled the criteria as per the guidelines of the National AIDS Control Organisation (NACO), Government of India were screened for the mandatory transfusion transmissible infection markers.<sup>4</sup> The tests were performed by NACO approved 3<sup>rd</sup> generation ELISA and/or Rapid (immunochromatographic) methods. The seroreactivity of HCV antibodies was selected and analysed. All reactive samples were retested to confirm before labelling them seroreactive and the respective units were discarded

## 3. Results

During the study period, a total of 39395 blood units were collected, out of which 19931 (50.59%) belonged to voluntary blood donors (VBD) and 19464 (49.41%) belonged to replacement blood donors (RBD). Male donors constituted 90.56% and female donors 9.43%. The overall HCV seroreactivity was 1.52% comprising 0.40% in VBDs and 1.11% in RBDs. The year-wise trend of seroreactivity was 1.64% in 2010, 1.75% in 2011 and 1.09% in 2012. (Table 1).

YEAR	TOTAL SCREENED	VBD (%)	RBD (%)	TOTAL (%)
2010	13668	58(0.42)	167(1.22)	225(1.64)
2011	14114	62(0.43)	186(1.31)	248(1.75)
2012	11613	41(0.35)	86(0.74)	127(1.09)
TOTAL	39395	161(0.40)	439(1.11)	600(1.52)

Table 1: HCV reactivity  
VBD -Voluntary blood donor; RBD- Replacement blood donor

## 4. Discussion

The seroprevalence rate of HCV varied in different regions. The rate among the blood donors may be different from the rate of the general population as the donors represent a selected group of population. However, studies in Pakistan have shown a close relationship of seroprevalence among the general population with those of blood donors. In their report, anti-HCV seroprevalence among the general population varied from 6.6% to 7%, whereas the rate varied from 6.2% to 6.52% among the blood donors.<sup>5</sup> about 20-40% of HCV seropositive cases are acute and majority of them progress to chronic infection. The long term risk of developing cirrhosis and hepatocellular carcinoma is greater in HCV than HBV positive patients.<sup>6</sup> A high prevalence rate has been reported among multiple transfused patients of Haemophilia, thalassaemia and sickle cell anaemia.<sup>7</sup> HCV nosocomial infection among haemodialysis patients remains a major problem globally with a high seroprevalence ranging from 13% to 46% in different countries.<sup>8</sup> The seroprevalence rate of 1.52% in the present study is within the range of other studies in India, which varied from 0.12% to 4.0%<sup>9,10</sup> A recent study report has revealed a low seroprevalence rate of 0.1% among blood donors of Central Karnataka.<sup>11</sup> The higher rate of seropositivity among replacement blood donors (1.11%) than the voluntary blood donors (0.4%) in this study is comparable with other Indian studies.<sup>9,10</sup> A high prevalence rate of 13.6% among blood donors have been reported from Egypt.<sup>12</sup> and 4.8% from Cameroon.<sup>13</sup> Our rate of 1.52% is very close to the report of 1.5% from Tanzania.<sup>14</sup> The higher seroprevalence in replacement/relative blood donors than the voluntary blood donors in the present study reflects to encourage voluntary blood donation and to implement strict donor selection criteria as per the guidelines of NACO. We should also remember that blood collected during the window period of infection may be infectious despite a negative antibody test. Introduction of Nucleic acid testing (NAT) in the screening protocol will help in detecting very low levels of viral nucleic acids (DNA or RNA) in the donated blood.

## 5. Conclusion

The seroreactivity of HCV was more in replacement /relative blood donors as compared to voluntary blood donors in the present study of three-year period. The study suggests a need for careful selection of blood donors and to increase the number of VBDs which will ensure safe blood supply. Moreover, introduction of NAT testing in the screening will help to detect the infections during the window period. A larger study will be necessary to give a better picture of the trend.

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