



## SEROPREVALENCE OF HEPATITIS B, HEPATITIS C AND HIV IN HEALTHY BLOOD DONORS - A RETROSPECTIVE TERTIARY CARE HOSPITAL BASED STUDY IN KASHMIR, NORTH INDIA.

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### ABSTRACT

**Objective:** To determine the prevalence of HBV, HCV and HIV infection in voluntary blood donors in SMHS hospital Kashmir - North India, during 2011-2013. **Material and methods:** A Retrospective, descriptive and analytic study was conducted at Blood transfusion centre, Department of Medicine -Government Medical College Srinagar, in which data were obtained from the Blood Bank Registry of SMHS hospital. The total number of 3650 healthy blood donors were screened for detection of HBsAg, anti-HCV and anti-HIV markers in blood samples using 3rd generation ELISA Kits and Western blotting. **Results;** Out of 3650 donors, only 21 (0.57%) were HBsAg positive, 28 (0.76%) were Anti HCV positive, and 3 (0.08) were HIV positive. One male donor was co-infected by HCV and HBV. The majority of HBsAg + donors (17/21) were in the age group of 18 to 35 years, and most of Anti HCV positives (14/28) were in age group of 36-45 followed by (7/28) in age group of 26-35 years. but this was not statistically significant (p value =0.95). Majority of serology positive blood donors were males. 12/21 HBsAg + donors and 16/28 Anti HCV + donors were of low socioeconomic status, & this difference was statistically significant with p value of < 0.001. **Conclusion:** This study suggests the need to investigate risk factors and risk groups for these infections and provides direction for setting new goals in developing preventive strategies in transfusion transmitted infections. It also provides a means for reviewing an outcome of the preventive measures which are already in place and in the light of these results, an effective control and training program should be implemented.

**KEYWORDS:** Blood donors, Hepatitis B virus, Hepatitis C virus.

### INTRODUCTION

Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immune deficiency virus (HIV) infections are among the most important world public health problems representing a significant cause of morbidity and mortality, especially in developing countries. It is estimated that 350 million people worldwide (7%) are chronic HBV carriers<sup>[1,2]</sup> and 600,000 die each year from HBV-related liver disease or hepatocellular carcinoma.<sup>[3,4]</sup> HCV infection is found in approximately 160 million people (3%) out of the world population and is the most common chronic blood borne infection in the world.<sup>[5-7]</sup> In addition, prevalence of human immunodeficiency virus (HIV) is increasing everyday and it has become a disaster for humankind in some areas.<sup>[4]</sup>

Their transmission occurs, mainly, through direct contact with blood, intravenous injections, transfusion, and sexual relations.<sup>[8]</sup> Over many years, hepatitis was the main cause of transfusion associated chronic disease, liver cirrhosis, hepatocellular carcinoma, and death.<sup>[9]</sup>

HCV and HBV infections are also of major public health concern and the prevention of these two viral diseases is important. The infected individuals are at risk of chronic liver disease (5 to 10% of HBV and more than 50% of HCV).<sup>[10]</sup> HIV infection is one of the most important public health concerns. A number of risk factors such as needle sharing and drug injection have been identified for HIV infection.<sup>[11]</sup>

For more than a decade, the screening of blood donors for HBV and HCV and HIV infection became obligatory in North- India, as part of the control program, leading to a tighter control of blood samples used in transfusion. Therefore, the aim of this study was to determine the prevalence of HBsAg, anti-HCV antibody and anti-HIV antibody in healthy blood donors at blood transfusion centre SMHS hospital, Government Medical college Srinagar. The information gained by such studies provides direction for setting new goals in developing preventive strategies in transfusion transmitted infections. They also provide a means for reviewing an

outcome of the preventive measures which are already in place.

### MATERIAL AND METHODS

A Retrospective, descriptive and analytic, hospital based study was conducted at Blood transfusion centre Department of Medicine, SMHS hospital-Government Medical College Srinagar, in which data were obtained from the Blood bank Registry of SMHS hospital. The study was approved by the hospital administration and local ethical committee. To the best of our Knowledge, it is the first study from Kashmir – North India to study the seroprevalence of Hepatitis B, C and HIV in healthy blood donors involving both recipient donors as well as voluntary blood donors.

The data includes detection of HBV markers (HBsAg, anti HBc), anti-HCV and anti-HIV markers in blood samples obtained from 3650 healthy blood donor from March 2011 - April 2013. The family members, relatives and friends of the patients were categorized as Replacement donors and the people who donate blood without expecting any favour in return or in voluntary blood donation camps were classified as Voluntary blood donors. 2ml blood sample was taken from each donor for screening and these samples were analyzed using immuno-enzymatic tests (3<sup>rd</sup> generation ELISA Kits) and Western blotting. All HIV and HCV positive samples were confirmed by Western blotting. The HBsAg positive samples were confirmed by HBcAb. Those patients who turn to be serology positive were subsequently, counselled and advised to visit Gastroenterology OPD for further evaluation and management. Chi-square test was used to calculate the significance of difference between the groups.

### RESULTS

The results of our study showed that out of the total 3650 Blood donors, 3500 (95.8 %) were males and 150 (4.2%)

were females with M: F ratio of 23.3:1. Majority of the Blood donors belonged to age group of 26-35 years (1820/3650). Most of the blood donors were literate and from Middle class socioeconomic status (2500/3650). By occupation 44.51% were government Employees, 31.63% were farmers and 15.47% were students. Maximum number of donors belonged to blood group A (39.6 %), followed by Blood group O (29.8 %).

Out of 3650 donors, only 21 (0.57%) were HBsAg positive, 28 (0.76%) were Anti HCV positive and 3 (0.08%) were HIV positive. One male donor was co-infected by HCV and HBV. The majority of HBsAg + donors (17/21) were in the age group of 18 to 35 years, but this was not statistically significant (p value =0.95). All of the HBsAg + donors were males, but statistically this was not significant (p=0.66). 12/21 HBsAg + donors were of low socioeconomic status, & this difference was statistically significant with p value of < 0.001.

In our study 28 blood donors were Anti HCV positive, with sero-prevalence of 0.76%. Most of them, 14/28 were in age group of 36-45 followed by 7/28 in age group of 26-35 years. 16/28 Anti HCV + donors were of low socioeconomic status, & this difference was statistically significant with p value of < 0.001.

There were only three donors which were positive for HIV antibodies, with prevalence of 0.08%. Two out of three HIV + donors were from other states, (Non-local). One was young unmarried male in age group of 26-35 years, working as labourer in Brick kiln, another in age group of 36- 45 years, an army personnel by occupation and 3<sup>rd</sup> one was a widow female > 45 years. All of them were properly counselled about the modes of disease transmission and were referred to AIDS centre of the institute for further management.

**TABLE: 1 Demographic Characteristics of the Study Population**

| Total number of Blood donors (N) | MALES | Percentage (%) | FEMALES | Percentage (%) |
|----------------------------------|-------|----------------|---------|----------------|
| 3650                             | 3500  | 95.8%          | 150     | 4.2%           |

**TABLE: 2 Age wise distribution & Seroprevalence of HBsAg, Anti HCV & HIV in Healthy blood donors**

| Age group (yr) | Number of Blood Donors | HBsAg Positive (+) | Percentage (%) | Anti HCV Positive (+) | Percentage (%) | HIV Positive (+) | Percentage (%) |
|----------------|------------------------|--------------------|----------------|-----------------------|----------------|------------------|----------------|
| 18-25          | 950                    | 5                  | 0.52           | 2                     | 0.21           | 0                | 0.00           |
| 26-35          | 1820                   | 12                 | 0.65           | 7                     | 0.38           | 1                | 0.05           |
| 36-45          | 680                    | 3                  | 0.44           | 14                    | 2.05           | 1                | 0.14           |
| >45            | 200                    | 1                  | 0.5            | 5                     | 2.50           | 1                | 0.50           |
| <b>Total</b>   | <b>3650</b>            | <b>21</b>          | <b>0.57</b>    | <b>28</b>             | <b>0.76</b>    | <b>3</b>         | <b>0.08</b>    |

**TABLE: 3 Socioeconomic status in Seropositive (+) Healthy Blood donors**

| Socioeconomic status | No. of Donors | HBsAg (+) | Anti HCV (+) | HIV (+)  |
|----------------------|---------------|-----------|--------------|----------|
| Middle class         | 2500          | 9         | 12           | 2        |
| Lower class          | 1150          | 12        | 16           | 1        |
| <b>TOTAL</b>         | <b>3650</b>   | <b>21</b> | <b>28</b>    | <b>3</b> |

## DISCUSSION

The present study was aimed at estimating seroprevalence of 3 major transfusion transmissible diseases- Hepatitis B, C and HIV. Seroprevalence of Hepatitis B in our study was found to be relatively lower (0.57%) in comparison to other states of India. Singh B *et al* from Delhi (12) found HBsAg seroprevalence to be 2.76%. Bhattacharya *et al* from west Bengal (13) found it to be 1.66% and Mathai J *et al* from Kerala (14) found it to be 3.5%. Our results were close to studies done by Karandeep singh *et al* from coastal Karnataka (15) and Chatteraj A, from Dehradun (16) who found HBsAg seropositivity to be 0.62% and 0.99% respectively. The seroprevalence of HBV is lower in united states and western Europe (0.1 - 0.5%) and is higher in southeast Asia and China (5-15 %).<sup>[17]</sup> In our study 12/21 HBsAg + donors were of low socioeconomic status and 9/21 were from middle class. This predominance of seropositivity among low socioeconomic groups was also seen by Nandi J *et al*<sup>[18]</sup> This may be due to poor hygiene status and lack of awareness about Hepatitis B infection and its spread in donors from low socioeconomic status.

The seroprevalence of Anti HCV positivity in our study were 28 donors (0.76%). Most of them (14/28) were in age group of 36-45 followed by 7/28 in age group of 26-35 years, The majority of Anti HCV + blood donors (16/28) belonged to low socioeconomic status, which was statistically significant. The anti-HCV prevalence found in our region was higher than in developed countries like United States (0.25% in 2002).<sup>[19]</sup> Germany (0.1% in 1997/2002).<sup>[20]</sup> Canada (0.017% in 2000).<sup>[21]</sup> and Italy (0.002% in 1994/1997).<sup>[22]</sup> Most of the hepatitis C positive blood donors were from remote peripheral areas, where health and medical facilities were almost lacking. Second on revealing their history, there was a significant past history of blood transfusion almost 20-30 years back and possibly because of non-availability of blood screening test facilities in our hospitals. Third it may be due to poor hygiene status and lack of awareness about Hepatitis C infection and its spread in donors from low socioeconomic status. This study also demonstrates that HCV infection is a serious problem in our region, which requires further study and greater attention on the part of federal government health authorities.

For HIV, India has second highest number of HIV positive individuals after south Africa. The Indian National AIDS control organization (NACO) suggested an overall prevalence of 0.91% in India (13). In our study we found HIV seroprevalence to be 0.08%, which is very very low as compared to studies done in other states of India. In our study we found three HIV + blood donors and 2/3 of them were from other states (Non local). Kaur H *et al* from Punjab (14) reported HIV seroprevalence to be 0.26%, Parikh S *et al* from Ahmadabad (15) reported it to be 0.26% and Joshi SR from Surat (16) found it to be 0.47%. The highest HIV seroprevalence has been reported from Sub-saharan

Africa at 7.4%. The reason for very low prevalence in our part of world i.e (Kashmir region), is a Muslim dominant state where illegal sexual contact is strictly prohibited because of social and religious obligations.

The seroprevalence of HBV, HCV & HIV in Kashmir region of North India could have been better studied in the non pre – screened samples and with bigger sample size. These issues are possible limitations of our study. Transfusion transmissible diseases have a definite impact on the development of countries. There is a need for methods to ensure a safe blood supply and centralized blood collection system having better personnel and equipment.

## CONCLUSION

This study suggests the need to investigate risk factors and risk groups for these infections and provides direction for setting new goals in developing preventive strategies in transfusion transmitted infections. It also provide a means for reviewing an outcome of the preventive measures which are already in place and in the light of these results, an effective control and training program should be implemented.

## DISCLOSURE

The authors report no conflicts of interest in this work.

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