

Sero- prevalence of HIV and Hepatitis B surface antigen (HbsAg) among voluntary blood donors in a tertiary care centre of Puducherry

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Abstract

Background: Transfusion of blood and blood components remains the main stay of treatment for hematological and comorbid conditions. They also serve the purpose of saving life during accidental blood loss and also during elective and emergency circumstances. **Aims and Objectives:** The main objective of the present study was to find the prevalence of HIV and HbsAg among the voluntary blood donors in a tertiary care hospital [SBV UNIVERSITY] and to find its association with age, gender, and alcohol consumption. **Materials and Methodology:** The prospective study (prevalence study) included 100 voluntary blood donors with inclusion and exclusion criteria with a standard protocol. Blood grouping was performed in the blood samples obtained through this voluntary blood donation and were screened for HbsAg and HIV serology using ELISA. Data analysis was done by SPSS software. **Results and Observations:** Among 100 voluntary blood donor studied, 92 were male donors and 8 were female donors. Out of the 100 voluntary blood donors, 65 were in the age group of 16-25 while 25 were in the age group of 26-35 years of age. 78 donors were found to be non alcoholics. Only 22 of the voluntary blood donors gave history of alcohol consumption. Out of the 100 voluntary blood donors, 31 had O +ve blood group and 29 had B +ve blood group. 81 of the voluntary blood donors had Rh +ve blood group while only 19 had Rh-ve blood group. Of the 100 voluntary blood donors, only 4 were found to be sero-positive for HbsAg while there were no donors who were found to be sero-positive for HIV. All 4 HbsAg positive cases were found to be male with age group of 16-25 years. Of the 4 HbsAg positive donors, 3 were non alcoholics and only one was an alcoholic. During the course of the present study, HbsAg positive donors were found to be distributed among different blood groups. Hence an analysis was done. It was found that of the 4 HbsAg positive donors, 2 belonged to 'B' blood group, 1 belonged to 'O' blood group and 1 had 'A' blood group. All 4 HbsAg positive donors had Rh +ve blood group. **Conclusion:** This study emphasizes the importance of donor screening among voluntary donors in all blood banks of hospitals. Significant association was found between HbsAg positivity and Rh blood grouping. HbsAg positivity was significantly high in Rh +ve blood groups. The study also show alcohol consumption has no impact on HbsAg positivity. **Keywords:** Formaldehyde, Carcinogenicity, Nasal mucosa.

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INTRODUCTION

Transfusion of blood and blood products is the main stay of treatment for hematological conditions. They also serve the purpose of saving life during accidental blood loss and also during surgeries. In contrast to life saving, blood transfusion can also cause deleterious effects and can lead to life threatening problems. Every unit of blood carries 1% risk of transfusion related problems including Transfusion Transmitted Infections (TTIs) such as HIV, HbsAg, Syphilis etc¹. Among all infections HIV and hepatitis are the most dreadful². Blood transfusion has been the transmission mechanism in 15 per cent of total

patients infected with human immunodeficiency virus (HIV)³. Among the cases studied in India, 25% to 30% of multiple-transfusion recipients show evidence of infection with both HBV and non-A non-B hepatitis or HCV⁽⁴⁾. In order to avoid these TTIs, it is suggested that extensive donor selection and a voluntary donor service would reduce the number of infectious donors significantly. Non-remunerated repeat voluntary donor services are urgently required to lower the prevalence of transmissible infections³. Also non judicious use of unscreened blood products can lead to transfusion related problems. Hence an effective screening of blood is essential prior to transfusion of blood and its products. In spite of effective screening there is always a possibility of transfusion related TTIs in the following circumstances - i) the window period, ii) assay failures and iii) human and technical errors in testing and processing⁵. The improved screening and testing of blood donors has significantly reduced transfusion transmitted diseases in most of the developed countries. This has not been so in developing nations⁵ like India. Thus developing countries account for more than 90 percent of all newly reported HIV cases⁶. The main aim of the present study is to find out the seroprevalance of TTIs since the incidence is still constantly increasing in INDIA.

AIMS AND OBJECTIVES

1. To study the prevalence of HIV and Hepatitis B surface antigen (HbsAg) among voluntary blood donors in Mahatma Gandhi Medical College and Research Institute (MGMCandRI), SBV UNIVERSITY.
2. To correlate the prevalence of HIV and Hepatitis B surface antigen (HbsAg) with Age and Gender.
3. To compare the prevalence of Hepatitis B surface antigen (HbsAg) among Alcoholics and Non-Alcoholics.

REVIEW OF LITERATURE:

A study conducted on 10386 blood donors who came to Dhiraj general hospital, showed sero prevalence of HIV, HBV to be 0.25%, 1.35%, respectively. Infections were common among replacement donors than voluntary donors. A study of 11,340 blood donors in south haryana, India showed a 1.32% HBsAg positivity over 5 years. A study of HBV infections among 200 blood donors in Erode district, Tamilnadu showed a prevalence of 3.5%, 10.9%, 5.7% and 3% of HbsAg, AntiHBC, Total anti HBC IGM and HBs respectively. A study of 3026 blood donors over two years in tertiary care hospital in India showed the prevalence of HIV, HBV, HCV to be 0.1%, 1.82%, 0.83%. Significant difference was seen in between voluntary and replacement donors in infections.

A study of HIV, HBV, HCV among 6361 blood donors in Gondor university hospital, North West Ethiopia over a period of 5 years showed 9.5% donors had at least one pathogen and 0.8% had multiple infections. Overall seroprevalance was 3.8%, 4.7%, 0.7% respectively. A study conducted among 6751 donors in a blood bank of a tertiary care hospital of the Armed Forces over three years showed the prevalence of HIV, HBV, HCV, Syphilis to be 0.13%, 0.99%, 0.19%, 0.62% respectively. No significant difference was seen in infections between voluntary and replacement donors. A study conducted by the department of pathology, LadyHardinge medical college, Delhi showed prevalence of HIV, HBV, HCV to be 0.56%, 2.33%, 0.66% respectively among 28,805 blood donors. It also showed decreasing trend in prevalence over 4 years. A study of HBV and HCV among 3574 blood donors in Madurai, South India showed HbsAg in 4% blood donors and AntiHCV in 0.75% blood donors. These were found predominately in age group of 15-45 years and the remaining in the age group 5-14 years. A study of seroprevalance of HIV, Hepatitis B and HCV virus in blood donors of Jammu province: A tertiary care centre experience showed reports, Out of total donors 91.9% (voluntary-88,855) and 8.1% (replacement-7850). In that HIV 0.08% in replacement and nil in voluntary. HBV and HCV is 0.65% and 0.5%, 0.2% and 0.17% in replacement and voluntary donors. A study of seroprevalance and trends in Transfusion transmitted Infections Among blood donors in a University Hospital blood Bank: 5 year Study reported a total of 39,060 apparently healthy donors were screened during the study period. Among them 38,215 were males and 845 were females. In that voluntary donors (25,303) and replacement donors (13,757). Overall prevalence of HIV, HbAg, HCV and syphilis were 0.44%, 1.27%, 0.23% and 0.28% respectively. A study of seroprevalance of Transfusion transmitted infections in Blood donors at Western Ahmedabad. A total of 5,316 were accepted (voluntary (95.56%) and replacement 4.44%). Among them the highest prevalence was for HBV (0.30%), followed by HCV (0.09%). A study conducted by Rose *et al* studied prevalence of HIV among blood donors at vellore, who were from 18-54 years of age. A total of 52,467 donors were tested, over 90% were male and replacement donors.

MATERIALS AND METHODS:

The present descriptive prospective study was carried out in Mahatma Gandhi Medical College and Hospital, SBV UNIVERSITY, Puducherry. The voluntary donors are examined with routine standard protocol as proposed by WHO association of Transfusion Medicine. All the clinical data are collected including physical examination

and history of any prior chronic diseases. An informed written consent was obtained from each donors subjected to this study. The criteria followed for donating blood included:

1. Weight : > 50 kg- Weight is measured using standard adult weighing machine
2. Hemoglobin: : > 12.5 gm/dl - Hemoglobin is measured using Sahli's Hemoglobinometer
3. Blood pressure: BP is measured using a sphygmomanometer.
4. Temperature: Measured using a thermometer.

Donors eligible with above criteria, whole blood is withdrawn from the eligible candidates and the blood is screened for HIV-1, HIV-2 and HbsAg by ELISA method. The parameters analyzed are Hemoglobin concentration, serology status including HIV and HbsAg viral markers. A total of 100 cases were examined in this study with inclusion and exclusion criteria.

INCLUSION CRITERIA:

- Age: > 18 – 60 years.
- Weight: > 50 kg.
- Hemoglobin: > 12.5 gm/dl.
- Pulse rate: 50 – 100/minute. with normal volume, rhythm
- Blood Pressure: Systole: 100 -130mmHg and Diastole: 50 - 100mmHg.
- Temperature: 98.5F

EXCLUSION CRITERIA:

- Age: < 18 – > 60 years
- Weight: < 50 kg.
- Hemoglobin: < 12gm/dl.
- If person with history of:
- Diabetes mellitus.
- Hypertension.

- Chronic kidney disease.
- Hemophilia.
- History of alcohol consumption 24 hours prior to transfusion.
- History of malarial infection within a period of 3 months.

RESULTS AND OBSERVATIONS

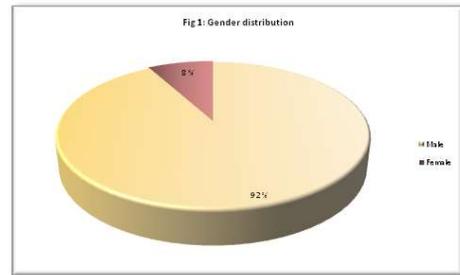


Figure 1: Majority of the voluntary blood donors are males. Only very few females came forward for voluntary blood donation

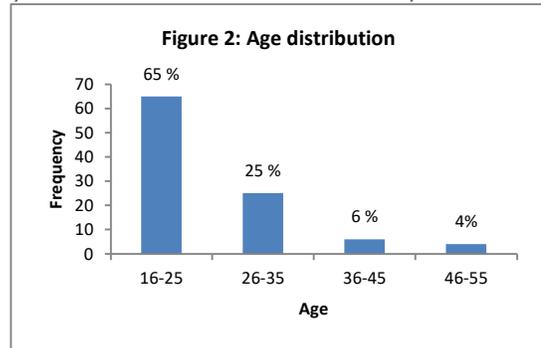


Figure 2: Among the cases studied, 65% of the voluntary blood donors belong to the young age group ranging from 16 – 25 years of age

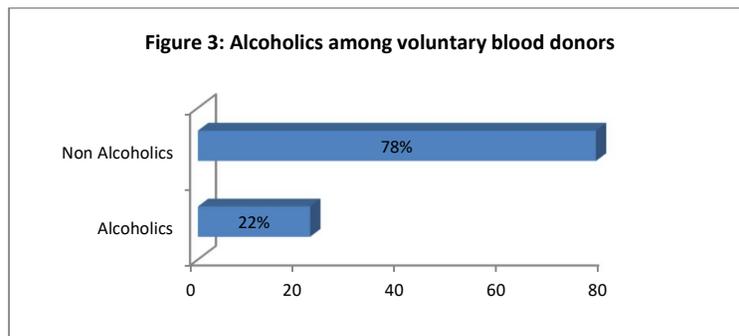


Figure 3: About 78% of the voluntary blood donors are said to be non alcoholic

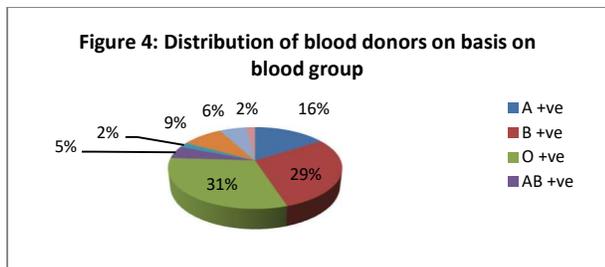


Figure 4: Majority of the voluntary blood donors studied belong to O +ve blood group

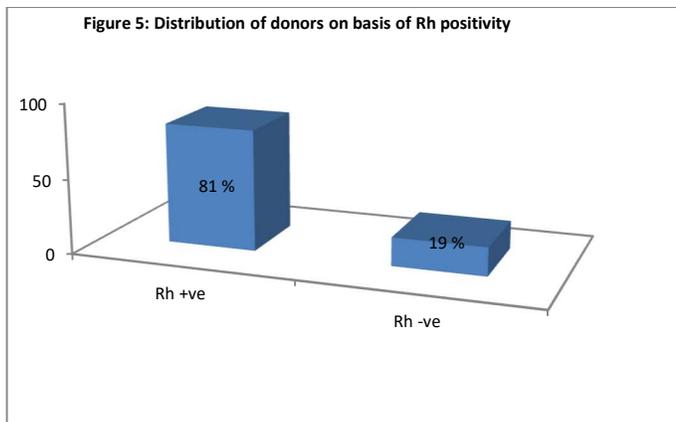


Figure 5: Most of the voluntary blood donors have Rh +ve blood group

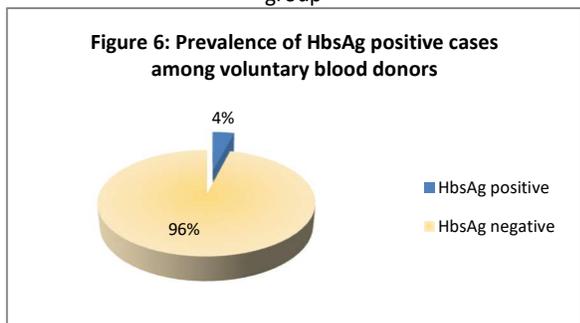


Figure 6: Among the voluntary blood donors 4 persons are found to be HbsAg positive

Table 1: Prevalence of HIV among the cases studied

HIV status	Total number of cases
Positive	0
Negative	100
Total	100

No cases of HIV reported among the voluntary blood donors in the present study.

Table 2: Correlation of HBsAg with Gender

Gender	HBsAg		Total
	Positive	Negative	
Male	4	88	92
Female	0	8	8
Total	4	96	100

Asymp significance: 0.547 df: 1 p value: 0.362 (Not significant)

All 4 HbsAg positive cases were found to be males.

Table 3: Correlation of HBsAg with Age

Age	HBsAg		Total
	Positive	Negative	
16-25	3	62	65
26-35	1	24	25
36-45	0	6	6
46-55	0	4	4
Total	4	96	100

Asymp significance: 0.923 df: 3 p value: 0.481 (Not significant)

Most of the HbsAg positive cases belong to age group of 16-25 years of age.

Table 4: Correlation of HBsAg with Alcohol consumption

Alcohol consumption	HBsAg		Total
	Positive	Negative	
Alcoholic	1	21	22
Non alcoholic	3	75	78
Total	4	96	100

Asymp significance: 0.882 df: 1 p value: 0.022 (Not significant)

Out of the 4 HbsAg positive donors only one male was found to be an alcoholic. Remaining 3 donors were said to be non alcoholics.

Table 5: Correlation of HBsAg with Blood Group

Blood group	HBsAg		Total
	Positive	Negative	
A +ve	1	15	16
B +ve	2	27	29
O +ve	1	30	31
AB +ve	0	5	5
A -ve	0	2	2
B -ve	0	9	9
O -ve	0	6	6
AB -ve	0	2	2
Total	4	96	100

Asymp significance: 0.966 df: 7 p value: 1.893 (Not significant)

4 HbsAg positive donors were distributed among the A +ve, B +ve and O +ve blood groups.

Table 6: Correlation of HBsAg with Rh factor

Rh	HBsAg		Total
	Positive	Negative	
Positive	4	77	81
Negative	0	19	19
Total	4	96	100

Asymp significance: 0.323 df: 1 p value: 0.977 (Not significant)

All 4 HbsAg positive donors belong to Rh +ve blood group.

DISCUSSION

Blood transfusion is a major source of transfusion transmitted infections (TTIs) such as HBsAg and HIV. Voluntary blood donors donate their blood in blood bank which was screened for HBsAg and HIV serology. A Study conducted by Rose D., *et al* in Vellore showed 90% of voluntary blood donors were male and only 10% were female donors⁷. Yet another study conducted by Deshpande RH, *et al* also shows predominance of male voluntary blood donors (91.41%) when compared to female donors (8.59 %) ⁸. The present study also showed more number of male voluntary donors (92%) in comparison to female voluntary donors (8%) which is in concordance with previous research studies. A study conducted by Dongdem JT., *et al* showed prevalence of 10.79% of voluntary donors and 11.59% of replacement donors were HBsAg positive⁹. In another study done by Chandrasekaran S *et al* showed the positivity of HBsAg as 4% whereas anti HCV was positive only in 0.75% of blood donors.¹⁴ In yet another study done by Neeraj Shah *et al* showed the prevalence of transfusion-transmitted infections (TTIs) such as HCV, HIV, and HBsAg was respectively 45%, 2%, and 2%.¹⁰ The present study showed only 4% of donors found to be HBsAg positive. A study conducted by Sonia Garg., *et al* at jodhpur, in 5 years period, showed 0.44% prevalence of HIV among the entire population of voluntary blood donors, more in replacement donors (0.461) whereas in voluntary donor it was found to be 0.279%.¹¹ Yet another study done by Singh B, Kataria SP, Gupta R showed 0.8% Seropositivity of HIV among the donors¹². In the present study period there is no donors with seropositive for HIV. A study conducted by Abel Girma Ayele, *et al* showed that incidence of Hepatitis B virus infection was higher in males (68.2%) compared to (31.8%) females¹³. In another study done by Le Viet, *et al* showed the prevalence of HBsAg and anti-HBc in the study population was 11.4 % (95% CI 9.6 - 13.2) and 51.7 % (95% CI 48.8 - 54.5) respectively, the prevalence being higher in males than females¹⁶. In the present study there were no females found to be seropositive for HbsAg. All 4 HbsAg positive cases were found to be males. A study conducted by Julius Tieroyaare Dongdem, *et al* showed that the 20-29 year age group of voluntary donors was >2 times more likely to be HBsAg positive compared to 40-60 years of age group.. Also the 20-29 year category of replacement donors was >4 times as likely to be HBsAg positivity than 50-69 years of age⁹. In the present study, most of the HbsAg positive cases were found to be in the age group of 16-25 years. The 16-25 year age group of voluntary donors were >3 times more likely to be HBsAg + than 26-35 years. A study conducted by Emanuele Calabrese, *et al* showed incidence of HBsAg is higher in

patients with alcoholic liver disease compared to non alcoholic group. But no statistically significant difference was found in the incidence of any HBV marker between alcoholic group patients with non – alcoholic patients¹⁵. In the present study out of 4 HbsAg positive donors studied, only 25% were found to be alcoholic indicating that most of the HbsAg positive donors were non alcoholics. A study conducted by Deshpande R H and Kolhe Shirish M showed the commonest ABO blood group present was B (31.25 %) followed by O (29.64 %), A (29.35 %) and AB (9.74 %) in blood donors while in Rhesus system, (93.10%) donors were Rh-positive and (6.9%) donors were Rh negative⁽⁸⁾. In this study, the commonest ABO blood group was B (38%) followed by O(37%), A(18%) and AB(7%) while in Rhesus system 81% were Rh positive and 19% were Rh negative blood donors correlating with previous research studies. A study conducted by Omar, Noor, Mohamood showed that among voluntary blood donors percentage of HBs Ag and HCV Ab were found to be higher in donors with blood group of O and lowest in blood group of AB donors.¹⁷ But the present study there are 4 HBsAg positive donors were distributed among A+ve(25%), B+ve (50%) and O+ve (25%) blood groups. In a study conducted by M. Saeed Anwar, *et al* there was no significant difference of RhD positive and RhD negative donors for HBsAg positivity (2.79% vs 2.85%). However, significantly higher number of RhD positive donors had HCV infection as compared to RhD negative donors (8.25% vs 3.66%)¹⁸. The present study contradicts the previous studies showing that all HBsAg positive donors had Rh +ve blood groups.

CONCLUSION

1. There is a male predominance among the voluntary blood donors.
2. Majority of the voluntary blood donors falls under 16-35 years age group (90%). This could probably be due to absence of chronic diseases in this age group.
3. There is no donors sero-positive for HIV serology.
4. Of the donors sero-positive for HbsAg serology, there is a male predominance and all falls under 16-35 years of age.
5. No significant association was found between alcohol consumption and HbsAg positivity.
6. Significant association was found between HbsAg positivity and Rh blood grouping. HbsAg positivity was significantly high in Rh +ve blood groups.

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