



## Seroprevalence of HIV and HBsAg among blood donors of a tertiary care hospital: a cross sectional study from Khammam, Andhra Pradesh

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## Abstract

### Background

Blood transfusions save lives of many people if they are properly screened. Blood transfusions are the major mode of transmission of infections such as HIV, Hepatitis B, HCV, Syphilis, malaria and many viral infections. This may be due to the lack of awareness and poor educational status of donors.

### Methods

A cross-sectional study was conducted among 2510 blood donors in a blood bank at a tertiary care hospital for a period of one year. All the donor samples were screened for detection of antibodies for HIV and surface Ag of hepatitis B by micro well ELISA.

### Results

Majority of them were males 2488(99.13%) and were in the age group of 18-25, 897were belonging to O+ve blood group (35.75%). Only one (0.04%) HIV positive case was found and 16 donors were positive for Hepatitis B (0.64%).

### Conclusion

The seroprevalence of HIV and Hepatitis B in our area is less and voluntary donors must be motivated by proper health education and high quality screening programs.

### Key words

Blood bank, Hepatitis B, HIV, Seroprevalence.



## Background

Blood transfusion as a whole or transfusion of its components plays crucial role in different medical emergencies, which saves million lives worldwide. A large number of complications associated with blood transfusion. Although some are minor, but others could interfere with health, in worst conditions it becomes life threatening, termed as transfusion transmissible infections (TTIs) [1]. The only challenge of blood transfusion is the TTIs (Transfusion transmissible infections) [2]. More than 75 million units of blood transfused every year all over the world. Unfortunately a large number of units of blood are not screened, increases the risks for TTIs [3]. Transfusion of unscreened blood is always risky to the patient because many TTIs like hepatitis viruses (HBV, HCV), Human immune deficiency virus (HIV), syphilis and malaria are acquired. According to a report of Lavanchy, India is second for risk of HBV infections (HBsAg carriage 2-7%) [4]. Ministry of health and family welfare, Government of India set up guidelines, under the drug and cosmetic act 1945, for the proper screening of blood donations to combat with TTIs [5, 6].

According to the reports, in India, estimated 36 million HBV carriers (4%) and 2.27 million of HIV cases [7, 8]. Unsafe blood transfusions not only affect health, also impact economically. Blood transfusion associated risk factors are not confined among the recipients, consequences are far reaching, affecting communities and society. WHO recommends the screening of all blood donations includes HIV, HBV, HCV and syphilis. Serologic screening implementation in different countries dramatically reduced TTIs [9, 10]. In recent years there has been public concern regarding the safety of blood and blood products with respect to TTIs mainly HBV, HCV and HIV [11].

In, Asia, Middle East and Africa Hepatitis B virus is considered as a major health concern, having strong impact on liver, causing chronic liver disease, cirrhosis and hepatocellular carcinoma. Vaccination programme reduced HBV infection rate, still a risk factor for 2.8% in developed and 7.6% in developing countries [12]. Although there are several reports from India [13], but relatively less from Andhra Pradesh [14], and no reports from Khammam.

The main objective of this study was to estimate the seroprevalence of TTIs among voluntary blood donors at a tertiary care hospital in Khammam, Andhra Pradesh. This present research outcome could give us an idea of prevalence and the basic epidemiology of TTIs in the community to extend safety measurements for the blood banks.

## Material and Methods

### Study Period

This cross sectional study was conducted on blood donors from January 2013 to January 2014 who attended blood bank at Mamata General Hospital, Khammam, Andhra Pradesh, India.

### Study design, participants

The Blood sample were collected from voluntary blood donors of different age groups and screened for HIV, hepatitis B surface antigen (HBsAg).

### Data collection

The blood donors filled a form containing demographic information, medical history, previous hospitalizations, blood transfusions, tattooing *etc.* History of exanthematous fevers in the last 6 months, history of rabies vaccine, immunoglobulin last 1year, history of allergies, bleeding tendency, abortion and menstrual history, weight loss, pulse, B.P, temperature were recorded. Pre-blood donation counseling about the procedures and blood donation was done

Total 2510 donors were included in the study. All the donor samples were screened for detection of antibodies for HIV and surface Ag of hepatitis B by micro well ELISA [TRANSASIA BIO-MEDICAL LTD, Daman]. The test kit has specificity and sensitivity of 100%. The procedure was performed according to manufacturer instructions. All the reactive samples were repeated in duplicates.

### Inclusion criteria

All blood donors were included in this study.

### Exclusion criteria

Recent medication history, surgical interventions, serious illness, previous blood transfusions, weight <50 kg, age <18 years, pregnant and lactating women.

### Ethical committee approval

Approval was taken from the ethical committee of Mamata General Hospital, before the study (Memo number - (IRB)IEC/ IRB No. 67). A written informed consent was also obtained from each donor before blood donation and samples were collected under strict aseptic conditions. This study was done according to the declaration of Helsinki (Latest version).

### Outcome variable

Serological status of the selected individual, whether positive or negative for any TTIs, which was determined from a blood sample.



### Explanatory variables

The sociodemographic detail was considered as explanatory variable.

### Data management and statistical analysis

Data was analyzed by using Statistical Package for the Social Sciences (SPSS) for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA). The associations between different variables (blood group, age, gender, TTIs etc.) were tested using the Chi-square test. A p value less than 0.05 was considered statistically significant.

## Results

Out of 2510 blood donors 1434(57.13%) were from rural and 1076(42.87) from urban areas. 915(36.45%) were private workers, followed by 713(28.45%) were students, 315 (12.54%) were employees, 183(7.29%) were business people, 149 (5.93%) were farmers, 143(5.69%) were drivers, 88(3.50%) were laborers and 4(0.15%) were house wives.

**Table -1 Gender and age distribution of the participants**

		n(%)	P value
Gender	Male	2488(99.13)	0.03
	Female	22(0.87)	
	Total	2510(100)	
Age	18-25	1316(52.43)	NA
	26-35	1016(40.47)	
	36-45	175 (6.98)	
	46-55	3(0.12)	
	Total	2510(100)	

Table – 1 explains, among the donors, 2488 were males (99.13%) and 22 were females (0.87%). Majority of the participants 1316(52.43%) were in the age group 18-25, followed by 1016(40.47%) were in the age group 26-35. A relatively less population 175(6.98%) and 3(0.12%) were in the age group 36-45 and 46-55years respectively.

**Table – 2 Blood group distributions of participants**

Blood group	n(%)
A+	443(17.65)
A-	20(0.8)
B+	704(28.05)
B-	30(1.20)
AB+	110(4.38)
AB-	278(11.08)
O+	897(35.75)
O-	28(1.12)
Total	2510(100)

Table – 2 reveals most of the blood donors 897(35.75%) were O +ve blood group followed by 704(28.05%) were B +ve blood group, 443(17.65%) were A +ve blood group, 278 (11.08%) were AB –ve ,110(11.08%) were B-ve, 28(1.12%) were O –ve and 20(0.8%) were A-ve blood group.

**Table - 3 Showing TTI status (HIV and HBsAg) of participants**

		TTI status	n(%)
HIV	HIV positive		1(0.04)
	HIV negative		2509(99.96)
	Total		2510(100)
HBsAg	HBsAg positive		16(0.64)
	HBsAg negative		2494(99.36)
	Total		2510(100)

Table – 3 shows that only one case was HIV Positive (0.004%) and 16 cases were 0.64% HBsAg positive, 2494 (99.36%) were HBsAg negative.

**Table - 4 Showing the correlation between TTIs and blood group**

		Blood group	n
HIV positive (1)	'O' positive		1
	'B' positive		7
HBsAg positive (16)	'O' positive		5
	'A' positive		3
	'AB' positive		1

Table – 4 shows that in HBsAg positive cases most of the donors blood group was 'B' positive, followed by 'O' positive, and 'A' positive.

## Discussion

Blood transfusion is risky due to a chance of infection, which is about 1% with every unit of blood [15]. Recently the risk has decreased to some extent in developed countries but in low socioeconomic countries it is still high. Blood transfusion services in India are hospital based and fragmented, which follows National policy guidelines [12]. Transfusion transmitted infections risk is more in replacement donors [15]. Replacement donors should be accepted only in case of emergencies and also in life saving situations. In this present research, all the donors were replacement donors. Earlier reports showed that replacement donors were 69.8%, to 99.4% [16-19]. In India replacement donors are more. The probable reason could be lack of awareness.

### Gender and age distribution of the participants

We observed majority of the donors were males 2482(99.13%). The probable reason may be due to the



illiteracy and culture in the society, preventing women from blood donation. Dominancy of male blood donors were also found in a study conducted in North India, which was in accordance with our study [20]. There are some other reports supported this outcome [19-23]. There could be another possibility that, females due to their poor nutritional status may be anemic, so they were unwilling to donate blood. Out of 2510 donors majority (52.42%) were in the age group of 18-25 years, followed by 26-35 years (40.47%). Earlier report by Kumar S and colleagues stated that 18-30 years of age groups were the major blood donors [24]. Another report by Bhawani *et al.* showed that common age group was between 18-40 years [14]. Young generations are more aware of blood donation. Sometimes they take parts in awareness programmes in schools and colleges so this could be reason of higher number of volunteers.

#### **Blood group distributions of participants**

We observed that most of the donors (35.75%) had O +ve blood group, followed by B +ve (28.05%) and the lowest (0.8%) were A-ve. This may be due to fact that O +ve is the most common blood group and A -ve is rare. In a multicentric blood group distribution study of India and another study from Nepal shows similar pattern where O was the most common blood group (37.12%), followed by B (32.26%)[ 25,26].

#### **TTI status (HIV and HBsAg) of participants**

The prevalence of HIV in Indian blood donors range from 0 – 3.87% [27]. Out of 2510 donors, we got only 1 positive case of HIV (0.04%) and 16 positive cases of HBsAg. In a report of NACO, India, showed that an overall prevalence of HIV 0.91% in 2005, where Men were more sufferer [6].

Prevalence rate of adult females was comparatively less (0.29%) [18]. In our study males were more in number and one positive case of HIV was male. Some researches shows seroprevalence of HIV was 0.44%, 0.54% and 0.56% [22, 28,29]. Makroo *et al* in 2011 reported 0.24% among blood donors [30]. In this study we observed relatively less case (0.04%) of HIV. Our results are also correlating with other studies by Chatteraj A *et al* [31]. Safe transfusion practices like avoidance of single donors and practices of autologous blood transfusion should be encouraged [22]. In our study, seroprevalence of HBsAg was seen in 16 cases (0.64%). There were several reports regarding the prevalence rate of HBsAg among blood donors (1.8%, 1.6%, 1.7%, 3.75%) which were more comparing with our findings [17,27-29]. According to WHO, India is in the intermediate zone of prevalence of Hepatitis B with a HBsAg prevalence rate of 1-2% [32]. Some factors can be pointed out in this connection, namely, prolonged potential exposure, unawareness about

HBV infection *etc.* Despite the availability of safe vaccine, the HBsAg prevalence in India is high [31].

In this research, seroprevalence of HBsAg was seen in males. Males were more in number and many of them were IV drug users, so it could be a reason for this. Although blood banks are taking care of preventive measures such as proper medical history of infections, introducing screening tests for various infections, still transfusion transmissible infections (TTIs) are inevitable in blood donations. Another important finding of this research was blood group correlation with TTIs. HBsAg positive cases most of the donors blood group was 'B' positive, followed by 'O' positive. Some other studies confirmed this relationship amongst O "positive" blood group & TTIs [33].

#### **Conclusion**

The present study showed that seroprevalence of HIV and HBsAg was relatively low among blood donors. All the positive cases were males. So more importance is required for the screening of the male blood donors specially B and O positive blood groups. Proper implementation of donor selection criteria, blood donation guidelines could improve TTIs. Introducing other testing methods such as antigen detection for HIV and nucleic acid amplification tests may reduce the risk of transfusion of HIV and Hepatitis B to large extent. It is also safe to encourage voluntary donors than replacement donors.

#### **Limitations & future scope of the study**

As our study was a cross-sectional study, so the main drawback was the limited number of study population. It strongly recommended, conducting a broad spectrum multicentric study in future including other districts hospitals to get the complete picture. Although we have collected the sociodemographic details, but still more insight is required regarding the factors responsible for HBsAg and HIV infection. It is also recommended that VDRL test for syphilis and Geimsa stain for the malarial parasite to be considered in future studies as screening criteria.

#### **Abbreviations**

Enzyme-linked immunosorbent assay (ELISA), hepatitis B surface antigen (HBsAg), hepatitis C virus (HCV), Human immune deficiency virus (HIV), transfusion transmissible infections (TTIs)



## Competing interests

Authors declare that they do not have any competing interest.

## Authors' contribution

Dr. B. Anuradha designed the study, constructed the questionnaire, interpreted the data, drafted the manuscript, and revised it. Mr. Ramu kota and Mr. M. Praveena conducted the research under the guidance of Dr. B. Anuradha, formulated and analyzed the data. The manuscript was critically revised and approved thereafter by all authors.

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