

## Prevalence of HIV, HBV, HCV and SYPHILIS in Blood Donors in Adilabad Region

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### Abstract

**Background:** Transfusion Transmitted Infections (TTIs) acquired through therapeutic blood transfusion is a universal health problem and an area of major concern in transfusion medicine. Worldwide safe blood transfusion is still a considerable challenge despite all efforts to minimize risk of TTIs. Hepatitis B [HBV] and Human Immunodeficiency Virus [HIV] are most serious complications with long term morbidity and mortality. **Methods:** This three year retrospective from 2012 to 2014 study will examine the Blood bank records of the Blood donors both replacement donors as well as voluntary donors for the presence of HIV 1/2, HBV, HCV and Syphilis positive cases. **Results:** the prevalence of TTIs combined during all three years. Total numbers of donations received during all the three years were 19415 out which TTIs were found in 213 samples and the prevalence percentage of each infection was identified. The Highest prevalence was of HBsAg which was 0.83% of the donors followed by HIV which was about 0.21%. HCV and ELISA were minimal with 0.05% and 0.01% each. **Conclusions:** Transfusion Transmitted Infections TTIs are important consideration for safe blood transfusion. The precise estimate of prevalence of viral infections in a group will help to monitor transfusion safety, to analyze the effects of current safety measures, and to assist in developing public health policy. Furthermore, an accurate estimate of residual risk can help inform evidence-based decisions in terms of prioritizing limited resources in India.

**Keywords:** HIV, HBV, HCV, Syphilis, Transfusion Transmitted Infections (TTIs).

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### Introduction

Blood transfusion is an integral part of medical and surgical therapy. Blood transfusions carries risks of transmitting infections like HIV, Hepatitis, Syphilis, Brucellosis, Malaria and other viral infections. With every unit of blood transfusion there is 1% chance of transfusion associated problems including transfusion-transmitted diseases. [1] Among all infections HIV and Hepatitis are serious complications due to the potential serious clinical sequelae associated with these readily transmitted agents. First case of transfusion associated AIDS was described in an infant given transfusion for erythroblastosis fetalis. [2] According to the

United Nations Joint Program on HIV/AIDS (UNAIDS), at the end of 2010, an estimated 34 million people with AIDS living within the world. [3] The highest number of patients (22.9 million) is reported from sub-Saharan Africa (31.6-35.2 million) [4] India harbors the third largest number of HIV infected individuals in the world. [5] Several States in India have now reported the presence of HIV-2 after the first case was reported from Mumbai in 1991. [6] Over the past three decades, the risk of TTIs has been dramatically reduced by the introduction of routine donor laboratory screening of blood-borne pathogens. [7, 8] However, small risks of infection transmission persist due to several factors such as genetic variations of infectious

agents, presence of an immunologically silent carriage, laboratory errors, and variations in the window period of an infectious agent as well as limitations in screening testing.<sup>[9]</sup> Poor health education and lack of awareness in developing nations also results in the reservoir of infections in the population. Most of the studies conducted on the prevalence of the HIV, HBV and HCV in blood donors have been so far conducted in urban and semi urban population of the country. Where as in the Tribal population no such data exists and there is an urgent need to take this kind of research in predominantly tribal population because the results will provide us with epidemiology of infections in this tribal region of Adilabad. The aim of the present study was to know the seroprevalence of transfusion transmitted infections in donors in this area as the incidence of transfusion-transmitted HIV and hepatitis is increasing in India<sup>[10]</sup>.

## Materials and Methods

This three year retrospective from 2012 to 2014 study examined the Blood bank records of Blood bank Unit of Rajiv Gandhi Institute of Medical Sciences (RIMS) Adilabad. Ethical clearance was obtained from institutional Ethical Committee. Blood samples of donors both replacement donors as well as voluntary donors were examined for the presence of HIV 1/2, HBV, HCV and Syphilis positive cases. For detection of HIV 3<sup>rd</sup> Generation anti HIV, (SD HIV 1/2 ELISA 3.0) kit manufactured by SD Bio Standard Diagnostics Ltd, Gurgaon Haryana, approved by NACO was used the same sample obtained from the donor at the time of blood donation was used for testing. For HBsAg testing ELISA test HEPALISA which is based on direct sandwich principle which is a microwell ELISA test for the detection of hepatitis B surface antigen in human serum / plasma. For HCV test third generation of anti-HCV ELISA (SD HCV ELISA 3.0) kit manufactured by SD Bio Standard Diagnostics Pvt, Ltd. Gurgaon Haryana was used. All ELISA results were analyzed using (LabSystems Multiskan EX) Microplate Reader manufactured by thermofisher Scientific USA. Screening of syphilis was done by RPR card test

where carbon antigen is used for detection of antilipoidal antibodies (Tulip, India).

## Results

This retrospective study was based on the records obtained for the preceding three years from 2012 to 2014 from the blood bank unit of Rajiv Gandhi Institute of Medical Sciences Adilabad. A total of 19415 donors (replacement as well as Voluntary) were recorded out of which Seroprevalence of TTIs which includes HIV, HBsAg, HCV and Syphilis was found in 213 cases it is about 1.10 percent of the total Donors. Table 1 shows the distribution of cases with seroprevalence in each year and the calculated percentage.

**Table- 1: showing the Number of donors (replacement and voluntary) with Seroprevalence of TTIs and percentage in each year.**

Year	Total number of donors	Seroprevalence of TTIs No of cases	Percentage
2012	5025	23	0.46
2013	6125	76	1.24
2014	8265	114	1.38
<b>Total</b>	19415	213	1.10

Table 2 shows the data obtained in the year 2012 and distribution of various TTIs in donors a total of 23 TTIs were identified from a total of 5025 samples received. The calculated percentages with total are shown in the table.

**Table- 2: Showing the distribution of Transfusion Transmissible Infections TTIs in year 2012**

Transfusion Transmissible Infections	Number of Cases	Percentage
<b>HIV</b>	05	0.1
<b>HBsAg</b>	16	0.32
<b>HCV</b>	00	00
<b>SYPHILIS</b>	02	0.04
<b>Total</b>	23	0.46

Table 3 shows the data pertaining to records of year 2013 the total number of donations received by the blood bank unit in this year were 6125 and the calculated percentage of all the

TTIs were noted and their relevant percentages are calculated and given in table

**Table- 3: Showing the distribution of Transfusion Transmissible Infections TTIs in year 2013**

Transfusion Transmissible Infections	Number of Cases	Percentage
HIV	16	0.26
HBsAg	59	0.96
HCV	01	0.016
SYPHILIS	00	0.00
Total	76	1.24

Table 4 shows the calculated data that was obtained during the year 2014 where as the total recorded number of donations received in this year were 8265 and total numbers of individuals with TTIs were 114. The distribution and calculation of which are given in this table.

**Table- 4: Showing the distribution of Transfusion Transmissible Infections TTIs in year 2014**

Transfusion Transmissible Infections	Number of Cases	Percentage
HIV	19	0.23
HBsAg	86	1.04
HCV	09	0.11
SYPHILIS	00	0.00
Total	114	1.38

**Table- 5: Showing the prevalence of Transfusion Transmissible Infections TTIs in all cases during 3 years**

Transfusion Transmissible Infections	Total Number of cases	Prevalence percentage
HIV	40	0.21
HBsAg	161	0.83
HCV	10	0.05
SYPHILIS	02	0.01
Total	213	0.46

Table 5 shows the prevalence of TTIs combined during all three years. Total numbers of donations received during all the three years were 19415 out which TTIs were found in 213 samples and the prevalence percentage of each infection was identified. The Highest prevalence was of HBsAg which was 0.83% of the donors followed by HIV which was about 0.21%. HCV

and ELISA were minimal with 0.05% and 0.01% each.

## Discussion

Blood transfusion carries the risk of Transfusion associated TTIs. Risk of transmission of infection depends on the sensitivity of the method, incidence of disease among population, duration of immunological window and lab errors during selection screening and transfusion processes<sup>[11]</sup> thus screening of donor blood for TTIs is one of the most important parameter in safe blood transfusion. Although risk of Transfusion associated TTIs is reduced by vigorous screening methods of donors but potential risk remains especially in developing countries. WHO states that the viral load of HIV transfusion through blood is so large that one HIV positive Transfusion leads to death on average after two years in children and after 3 to 5 years in adults.

In the present study we calculated the prevalence of HIV to be about 0.21%. There are several reports of prevalence of HIV in India as less as 0.084% to as high as 3.87%<sup>[12]</sup>

Our finding was similar to findings by I.S Chaitanya Kumar et al<sup>[13]</sup> who reported the same 0.21% prevalence of HIV in Urban Andhra Pradesh Although our population is also from the erstwhile Andhra Pradesh but the population here is from the north most area which is now in Telangana and mostly rural and tribal population but I.S Chaitanya Kumar et al<sup>[13]</sup> reported prevalence of 0.41% in rural population our finding is lesser then their finding but that could be due to year in which the study was conducted was 2011 as there is general trend of decreasing pattern in TTIs because of better screening and general public awareness of health. Prevalence of HBsAg in our study sample was 0.83% the highest among the recorded TTIs in this population. Gupta N et al (2004)<sup>[14]</sup> reported the lowest prevalence in Ludhiana 0.66% (Table 6) a similar study conducted in Surat (Gujrat) by Rinker VS et al<sup>[15]</sup> showed a prevalence of 0.96% slightly higher then our finding. Much higher findings were reported by Pahuja S et al (2007)<sup>[16]</sup> in Delhi to be about 2.23%. We found much less prevalence of HBsAg in our area. Interestingly Delhi being the National capital recorded higher cases of HBsAg positive cases it appears the HBsAg is

slightly more prevalent in more urbanized areas of the country. Overall prevalence of HCV in our study was 0.05% well below the national average of Indian studies who have shown prevalence of HCV in the range of 0.4% to

1.09% (see table 6). Also it could be due to the fact the majority of Blood received in our Blood Bank Unit of Rajiv Gandhi Institute of Medical Sciences Adilabad is by Voluntary Donations [VD].

**Table- 6: showing the prevalence of TTIs in comparison with other studies in India**

Studies	Place	HIV %	HBsAg %	HCV %	Syphilis %
Gupta N et al (2004) <sup>[14]</sup>	Ludhiana	0.084	0.66	1.09	0.85
Pahuja S et al(2007) <sup>[16]</sup>	Delhi	0.56	2.23	0.66	---
Chandra T et al (2009) <sup>[17]</sup>	Lucknow	0.23	1.96	0.85	0.01
Arora D et al (2010) <sup>[18]</sup>	South Haryana	0.3	1.7	1.0	0.9
Bhattacharya P et al (2007) <sup>[19]</sup>	West Bengal	0.28	1.46	0.31	0.72
SriKrishna A et al (1999) <sup>[20]</sup>	Bangalore	0.44	1.86	1.02	1.6
Present study (2015 )	Adilabad Telangana	0.21	0.83	0.05	0.01

Second reason is the year of study we have seen that there is gradual tendency of decrease in TTIs as the years are passing on due to improvement in health care facilities and also increasing awareness in the general population regarding adverse affects of transfusions.

One more reason could be due fact that certain voluntary donors may have been counted more than once because of their habit of regular donation as the retrospective study spanned over three years.

Prevalence of Syphilis recorded in our study is 0.01% which is very low as compared to some national studies that have been conducted so far (Table 6) however our finding matched with the finding of Chandra T et al <sup>[17]</sup> who reported 0.01% of Syphilis positive cases in Lucknow (U.P). Syphilis is a promiscuity marker although transfusion transmitted syphilis is not a major hazard but it detects high risk donors. It is believed that syphilitic lesions make transmission of other infections like HIV easier. Hence screening out such individuals is important for safe transfusion. The over all picture of Adilabad is satisfactory and most of the TTIs reported here are well below the national average. This could be due to fact that Teaching Medical college is present here and

health care facilities are improving a lot and in general public at large are becoming more aware of their health. Also regular conduction of blood donation camps has provided opportunity for collection of blood from quality donors.

## Conclusion

Transfusion Transmitted Infections TTIs are important consideration for safe blood transfusion. The precise estimate of prevalence of viral infections in a group will help to monitor transfusion safety, to analyze the effects of current safety measures, and to assist in developing public health policy. Furthermore, an accurate estimate of residual risk can help inform evidence-based decisions in terms of prioritizing limited resources in India.

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