

ORIGINAL ARTICLE

Demographic profile of syphilis among blood donors at a tertiary care hospital

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ABSTRACT

BACKGROUND AND OBJECTIVES: Syphilis is a sexually transmitted disease (STD) caused by *Treponema pallidum*, which can also be transmitted via accidental direct inoculation, transplacental during pregnancy, and, rarely, via blood transfusion. Although the value of routine serologic screening of blood donors for syphilis has been a question in debate for years as refrigerated blood components are less infective for syphilis. Transmission through blood components still occur therefore syphilis is included as one of the mandatory transfusion transmissible infection to be tested in any unit of blood for transfusion. This study was carried out to determine the prevalence of syphilis among blood donors in vadodara. **METHODS:** A 5 year Retrospective study was carried out at Department of Immunohaematology and Blood Transfusion of Govt Medical College, Baroda from April 2012 to March 2017. Before donation each potential donor was made to fill a detailed health history questionnaire, which included data regarding age, gender, address, occupation and other questions concerning the donor's general health, lifestyle and risk behavior. All the donors were tested for syphilis using RPR test. **RESULTS:** Data for analysis included a total of 42,266 valid blood donation, out of which 187(0.44%) were found to be seropositive. Voluntary and replacement donors were 30,737(72.7%) and 11,529(27.2%) respectively. Out of which 98(0.31%) of voluntary and 89(0.77%) of replacement donors were found seropositive. The age group among donors with maximum seropositive rate was 30-39 years with prevalence rate of 38.24% and minimum in donors <20 years. The rates were found to be high among labourers (27.8%). 11 cases of co infection were noted. 7 with Hepatitis B, 2 with HIV and 2 with Hepatitis C. 74.2 % seropositive donors had educational qualification of middle school or less. **CONCLUSION:** Prevalence of syphilis among blood donors was in raising trends in this region and was more in replacement donors. It is equally more prevalent in middle aged individuals. It is more commonly present in labourers which may be attributed to high risk behaviour of these individuals. Most common co infection was Hepatitis B. Proper counseling prior to blood donation and awareness about syphilis among blood donors may increase the safety of blood as well as community.

Keywords: Syphilis, Sero-Positive, Replacement donors

INTRODUCTION

Syphilis is a chronic infectious disease caused by the spirochete bacterium *Treponema pallidum* (T. pallidum) and is characterized by alternating symptomatic and asymptomatic periods and possibly long latency periods.¹ Syphilis transmission can occur through sexual intercourse, blood transfusion and vertical transmission.

Cases of infection through blood transfusions are rare due to the serological screening of blood donation candidates and because of the limited survival of *T. pallidum* in collected blood, whereby it is rapidly destroyed within a few minutes of exposure to drying, heat or air. Further, *T. pallidum* loses its viability after approximately three days of storage at refrigerated temperatures. Serological screening for syphilis and other infectious diseases is an important blood safety measure to avoid transfusion-transmitted infections. However, this procedure does not guarantee complete elimination of transmission risk because of the difficulty in detecting serologic markers in the early

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infection phase. To further reduce the risk of infection, a donor selection that effectively screens for behavioral risks is also necessary.

MATERIALS AND METHODS

A 5 year Retrospective study was carried out at Department of Blood Transfusion and Immunohaematology of Govt Medical College, Baroda from April 2012 to March 2017. Before donation each potential donor was made to fill a detailed health history questionnaire, which included data regarding age, gender, address, occupation and other questions concerning the donor's general health, lifestyle and risk behaviour. All the donors were tested for syphilis using RPR test. Written informed consent was obtained from each donor.

OBSERVATIONS

Data for analysis included a total of 42,266 valid blood donation, out of which 187(0.44%) were found to be seropositive. Voluntary and replacement donors were 30,737 and 11,529 respectively.

Table 1 shows the distribution of blood donors. Majority of donors in our study were voluntary male donors constituted about 72.7% of total donors, while replacement male donors constituted about 27.2%. Out of which 98(0.31%) of voluntary and 89(0.77%) of replacement donors were found seropositive.

Table 1: Distribution of blood donors

Year	Total Units Screened		RPR Positive
	Voluntary Donors	Replacement Donors	
2012-13	5046	1732	29
2013-14	5823	2340	33
2014-15	9579	3540	36
2015-16	8428	3125	41
2016-17	1861	729	48
Total	30737	11529	187

The age group among donors with maximum seropositive rate was 30-39 years with prevalence rate of 38.24% and minimum in donors <20 years. The rates were found to be high among labourers 27.8%. 74.2 % seropositive donors had educational qualification of middle school or less.

Table 2: Distribution of blood donors according to Age, Type of donation, Education and Occupation wise

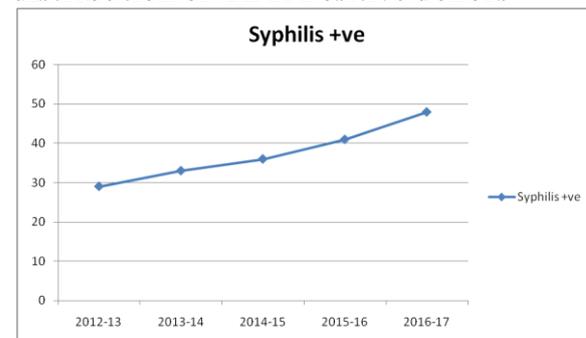
Characteristics		RPR +ve (%)*
Age group	18-20	9 (4.8)
	20-29	56 (29.9)
	30-39	68(36.3)
	40-49	39(20.8)
	50-59	15(8.02)
Type of donation	Replacement	89 (0.77)
	Voluntary	98 (0.31)
Education	Middle school or less	139 (74.2)
	Secondary school	23 (12.3)
	Higher secondary school	15 (8.1)
	Graduate	10 (5.4)
Occupation	Service	41 (21.9)
	Business	35 (18.7)
	Student	22 (11.7)
	Labourer	52 (27.8)
	Driver	27 (14.4)
	other	10 (5.3)

Table 3: Distribution of blood donors according to co-infection with syphilis.

SR.No	Co- Infection	Total No.
1	HBV& SYPHILIS	7
2	HCV&SYPHILIS	2
3	HIV &SYPHILIS	2
Total		11

11 cases of co infection were noted. 7 with Hepatitis B, 2 with HIV and 2 with Hepatitis C.

Figure 1: The trend of year wise distribution of RPR Positive donors



DISCUSSION

Majority of donors in our study were voluntary male donors constituted about 72.7% of total donors, while replacement male donors constituted about 27.2%. Syphilis positive were more common among replacement donors compared to voluntary donors in our study. We identified increasing trend of seroreactivity for syphilis that was found to be significant.

Donor selection is based on information about the donor, identifying risk factors in the donor's behaviour, the medical history collected using a questionnaire and physical examination of the donor in order to find clinical signs of the infection. Donor selection is important because donors with high-risk behaviours compromise the safety of blood used for transfusion. Donors can be deferred during selection, which is particularly useful in the early period of infection when laboratory tests are not efficient^{2,3} In developed countries, the prevalence of *T. pallidum* infection has dropped both in the general population and in blood donors. However, the scenario is different in developing countries where the prevalence is raising because of the poor quality of laboratory screening due to the lack of equipment, trained personnel, reagents and standard procedures. In India, most blood donors are first-time donors. The prevalence of syphilis among blood donors in India was recently reported to be 0.7%.⁴ The global incidence of syphilis among blood donors is variable. In a study by Adjei et al.⁵, the incidence of syphilis was 7.5% among Ghanaian donors whereas an incidence of 12.7% was noted among Tanzanian donors by Matee et al.⁶ and Bhatti et al.⁷ found an incidence of 0.75% among Pakistani donors. There are published data indicating that the prevalence of this disease is higher in replacement donors than in voluntary blood donors.⁴ The donor history questionnaire includes questions particularly related to past infection with syphilis. It is also focused particularly on sexual behaviour (past history of sexually transmitted diseases) and sometimes on specific signs observed during the clinical examination. Donors who are reactive for syphilis sometimes persistently continue to donate blood even after post-donation counselling. Certain lacunae remain in donor selection. These could be attributed to difficulty in understanding the questions due to a low level of education and ignorance about infections transmissible

by blood transfusion. Furthermore, cultural taboos sometimes prevent donors from disclosing information in response to some kinds of questions. Identified safe donors must be retained as repeat donors and educated regarding high-risk behaviour and its impact on the safety of the blood supply. In India, according to the Drug and Cosmetics Act & Rules 1945, it is mandatory to screen donated blood for transfusion-transmitted infections: the blood should be non-reactive for anti-HIV antibodies, hepatitis B surface antigen, anti-hepatitis C virus antibodies, syphilis and malaria. Currently, only one screening test for syphilis is mandatory. According to the WHO, blood banks may choose VDRL, RPR or treponemal-based EIA due to cost constraints. The traditional approach to the diagnosis of syphilis begins with a non-treponemal assay, either VDRL or RPR. Since these antibodies are not specific for syphilis, reactive non-treponemal tests must be confirmed with an assay that detects antibodies against *T. pallidum*. The traditional method has several advantages including the fact that it is reliable, especially in high prevalence settings. In addition, this is a rapid, inexpensive screening method that is economical and easily implemented in most hospitals and small clinics. However, this approach also has several limitations, including a low specificity and subjective interpretation of results of non-treponemal assays, which can translate into higher rates of false positive results, especially in low incidence settings. Many factors favor mixed infections including a high degree of epidemiological similarity between the HIV and hepatitis viruses. They have similar routes of transmission, risk factors such as high-risk sexual behavior and a higher prevalence with other sexually transmitted diseases such as syphilis. Syphilis infection can increase the susceptibility to HIV infection.⁸ In a study by Kaur et al.⁸ observed association of syphilis and hepatitis B with HIV infection in blood donors. Prevalence of co-infection was high in many studies.⁹⁻¹³ A

trend toward higher co-infectivity also prevails in replacement donors compared to voluntary donors.⁸ Compared with the above studies, prevalence of co-infection in our study was low and the most common co-infection associated with syphilis was hepatitis B infection. A study was done by Sultan et al.¹⁴ observed higher prevalence of TTIs in replacement donors compared with regular voluntary donors. In a study done by Pallavi et al.¹⁵ observed the prevalence of TTI (HIV, HBV, HCV, venereal disease research laboratory [RPR] and malaria) was higher in replacement donors compared with voluntary donors. Studies^{5,7,17} have showed high seropositivity rate in replacement donors compared to voluntary donors. Compared with above studies, in our study, high seropositivity for TTIs was also found in replacement donors compared to voluntary donors. In a study done by Pallavi et al.¹⁵ the prevalence of TTI showed a decreasing trend among voluntary donors, a similar finding was noted by Singh et al.¹⁶ in RPR reactivity. Pahuja et al.¹⁷ have also noted a decreasing trend in the prevalence of TTI. In contrast, Bhattacharya et al.¹⁸ have reported a significant increase in the TTI seroprevalence. Compared with above studies, a raising trend in prevalence of syphilis was found in our study. It may be because of low awareness about syphilis among blood donors.

CONCLUSION

Prevalence of syphilis among blood donors was in raising trends in this region and was more in replacement donors. It is equally more prevalent in middle aged individuals. It is more commonly present in laborers which may be attributed to high risk behaviour of these individuals. Most common co infection was Hepatitis B. Proper counseling prior to blood donation and awareness about syphilis among blood donors may increase the safety of blood as well as community.

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