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Original Research Article

Seroprevalence, Risk Factors and Sero-Positive Donor Compliance Response Rate among Blood Donors in Corporate Hospital

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Abstract:

Background & Objectives: High risk population of blood donation increase the prevalence of transmission of blood borne diseases & thus it leads to compromised blood safety. Objective of this study is to investigate the sero-prevalence of syphilis, syphilis seropositive donor compliance response and assessing the risk factors on syphilis among blood donors & thus analyzing the donation status of high risk population

Method: Present study is a retrospective study and data is taken from Jan-2021 to Dec-2023 and analyzed for seropositivity to T. Pallidum and Donor Compliance Response Rate and history given by syphilis positive donor after counselling.

Result: Out of 5247 blood donors screened for TTIs, 42 donors have been found sero-reactive for syphilis from Jan-2021 to Dec 2023, among them 6 were 1st time donors & 36 were repeat donors with syphilis sero-positive donor compliance response rate of 38.09%, 4.76% and 57.14% for donors responded & come, donors not responded and given wrong phone no. & donors responded but talk over telephone respectively.

Conclusion: Positive donors were more likely to have multiple sexual partners & positive travelling history with unsafe sex with commercial sexual workers. Health consultation and screening of high risk groups before blood donation is one of the important aspect to improve blood transfusion service. In addition, syphilis positive donors need counselling as the majority of syphilis positive donors did not turn upto collect the reports & receive treatments. All blood bank staff should be trained to identify high risk behaviour through proper history taking while giving the confidence to the donor regarding confidentiality.

Keywords: Syphilis, Risk Factors, Seo-positivity, Transfusion Transmitted Syphilis.

Introduction

Syphilis is a chronic infectious disease caused by bacterium Treponema pallidum that is usually transmitted through sexual contact, direct skin-to-skin contact with active lesions, or from mother to infant [1]. Syphilis, an ancient disease, is still a public health problem worldwide. The World Health Organization (WHO) estimated that there are 12 million new cases of syphilis each year, with more than 90% occurring in developing nations. [2]

Transfusion-transmitted syphilis: The first case of transfusion-transmitted syphilis was reported in 1915. By 1941, 138 cases had been reported in the literature [3]. Most reported cases were discovered to have occurred when donors were in the primary or secondary stage of disease [4-6]. the treponemas are relatively fragile and sensitive to cold; hence the risk of transmission through transfusion of blood stored below 20° C for more than 72 hours is very low [5,7]. There is a direct relationship between the amount of organisms present in the blood and the duration of their vitality (infectivity potential) [3,8,9]The risk of transfusion-transmitted syphilis is closely related to risk factors in the blood donor, in particular sexual behaviour since the disease is primarily transmitted by the sexual route. The rates of infection are high among homosexual men 10. Older age, male-male sex, two or more sexual partners, a past history of syphilis treatment and HIV seropositivity are closely related to transfusion-transmitted syphilis. Other risk factors associated with transfusion-transmitted syphilis include prostitution, bisexuality (men having sex with both men and women), intravenous drug use and skin scarification (tattooing, blood rituals) [11]. According to WHO, syphilis screening is mandatory in donated blood or blood products [12]. However, its seroprevalence is increasing in many countries according to recent studies. [13,14] Another problem lies in identifying high-risk individuals during donor selection

because of the inadequate history given by donors due to socio-cultural barriers and hesitation in revealing the history of intimate nature. [13,15] It is also seen that donors who are found out to be positive continue to remain in donor pool1 ; this is probably due to inadequate or ineffective post-test counselling in previous donations, or ignorance or lack of interest on part of reactive donors. [1,13]

Methodology

Itwas retrospective ,descriptive study which was conducted in blood bank of Shalby Hospitals, Ahmedabad, database of records of donors, screened from Jan-2021 to Dec -2023 with syphilis sero positivity have been analysed. All the blood donors from age range of 18-65, males and females, with hemoglobin of more than or equal to 12.5 g/dl were included. Informed consent was taken from all the donors, and they have been fully explained the process of donation. Detailed donor history with standardize donor questionnaire including surgical and travelling history was taken. All donors were screened for syphilis by Chemiluminescent Microparticles Immuno Assay (CMIA) for TP antibodies.

Donor Notification and Compliance: Donors with positive syphilis results were notified through phone call. Compliance was defined as the donor's response to the notification and subsequent follow-up actions, including medical consultation and treatment.

Statistics: Descriptive statistics were used to summarize the data. The sero-prevalence rate was calculated as the proportion of sero-positive donors among the total donors screened. Compliance rates were calculated as the percentage of notified donors who responded and took appropriate follow-up actions.

Result

Table 1 shows year wise distribution of blood donors. Majority of donors in our study were replacement donors which were 71.42% while voluntary donors constituted about 28.57%.

Sero Prevalence: Among the 5247 blood donors screened, 42 tested positive for syphilis, resulting in a sero prevalence rate of 0.8%.

In the present study prevalence of co-infection was very low (0.01%). Most common co-infection among blood donors associated with syphilis was found to be hepatitis B followed by HIV.

Demographic Characteristics: Demographic details are shown in table 2. A male to female ratio is 10:1.

Donor Compliance: Out of the 42 syphilis-positive donors notified, 95.23% responded, resulting in a compliance response rate of 95.23%. The methods of notification and response rates are detailed in Figure 1.

Risk Factors: Significant risk factors for syphilis seropositivity included multiple sexual partners, donors with positive travel history and unsafe sex, donor's with history of skin disease /swelling in armpit /fever. Figure 2 provides a summary of the risk factors identified.

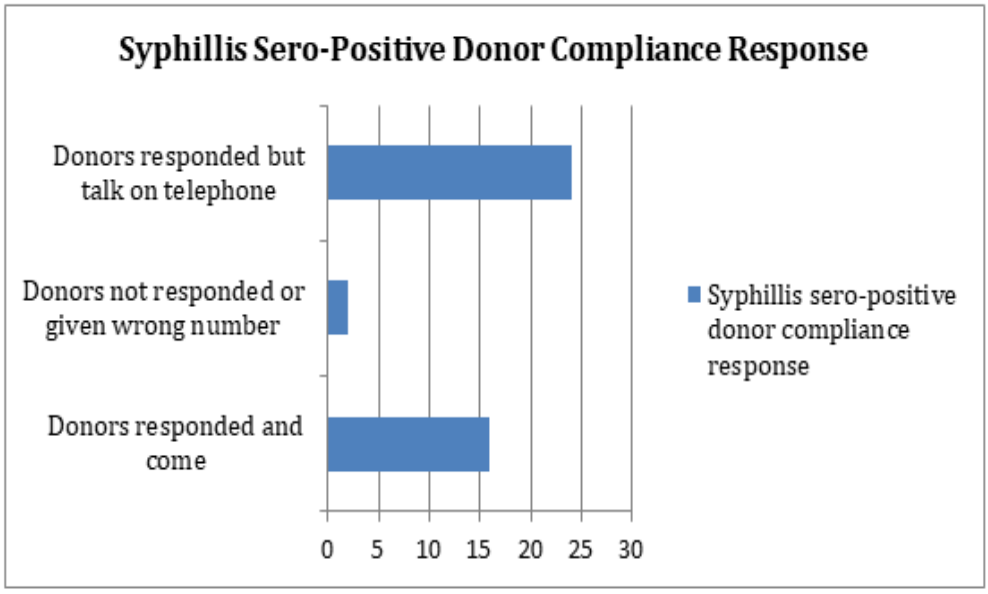

Figure 1: Syphilis Sero-Positive Donor Compliance Response

Table 1: Year-Wise Distribution of Blood Donors

Year wise Distribution	Voluntary		Replacement	
	Male	Female	Male	Female
2021	0	0	19	0
2022	4	0	9	2
2023	8	0	0	0

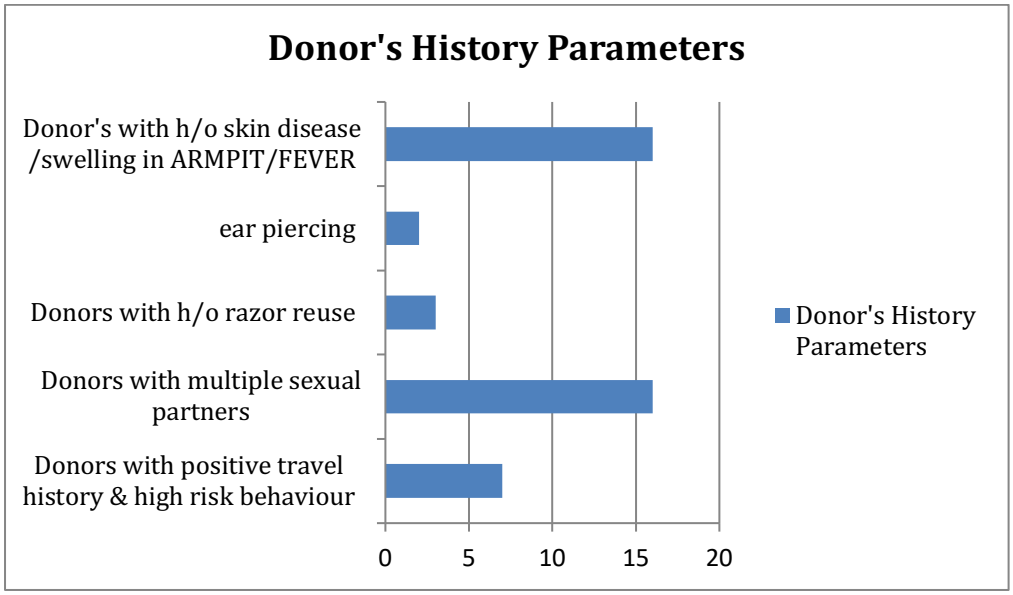

Figure 2: Donor's History Parameters

Table 2:Syphilis positive donors- Demographic profile

			Marital status of responders			
Age in years	Positive Donors	Responded	Married	Unmarried	Other	Foreign Visit in last 2 years
18-25	11	10	4	6	0	4
26-35	15	14	11	3	0	5
36-45	7	7	6	0	1	2
46-55	7	7	6	1	0	1
56-60	2	2	1	0	0	1

Our study showed seroprevalence of 0.98%, 0.94% and 0.46% for 2021, 2022, and 2023 respectively with overall prevalence of 0.8%. In a study conducted in Lahore in 2019, 0.68% donors were found reactive for T. Pallidium.

In a study done by Liu S et al. observed that seroprevalence of 0.9% among blood donors in Chengdu, China. Rawat A et al. found sero prevalence of 1.62% in a regional blood centre in north India. 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% (16). The global incidence of syphilis among blood donors is variable. In a study by Adjei et al. [17], the incidence of syphilis was 7.5% among Ghanian donors whereas an incidence of 12.7% was noted among Tanzanian donors by Matee et al. [18] and Bhatti et al. [19] 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 [16].

Table 3:

	Seroprevalence
Liu S et al.	0.9%
Rawat A et al.	1.62%
Elyamany G et al.	0.044%
Drago F et al.	0.031%
Kane MA et al.	0.16%
Chikwem et al.	3.57%

Most of the Positive Donors are Male, out of which most of were replacement donors (66.67%), this could be due to very few female donors,and many times they are differed from donation because of anemia, low weight & recent pregnancy. Study done by Bhattacharya et al. who has noticed predominance of the voluntary donors. Study done by Kumar A et al. [14] 63.63% of voluntary donors have been noticed. In contrast, a predominance of replacement donors was noted by Singh et al. (82.4%) [20], Kakkar et al. (94.7%) [21], Singh et al. (84.43%) [22]Syphilis positive donors who responded were asked to collect the reports. 2 of them already had idea about their diagnosis, one of them having co-infection with HIV. 14 donors had mentioned positive history of rash,skin disease/swelling in armpits/fever/genital ulcer which are the early signs of syphilis .out of them 6 donors were having multiple sexual partners.

Out of 40 responded donors, 3 donors were having history of razor reuse and 2 donors were having history of ear piercing. 4 donors were refused to reveal any history. 28 donors were found out to be married which mandate the screening of their partners .Travel history was taken from all positive donors .out of 40 responded positive donors 9 donors had travelled abroad in past 2 years out of which 7 donors had unsafe sex.

In our study co-infection prevalence was 7.14%. Most common co-infection was hepatitis –B (4.76%) among the blood donors, followed by HIV (2.38%) and no donors had HCV or malaria infection. In a study by Kaur et al. [16] observed association of syphilis and hepatitis B with HIV infection in blood donors. Prevalence of co-infection was high in many studies. Gupta et al. [23], otuonye et al. [24] and Patil et al. [25] have observed a definite correlation between positivity of HIV and syphilis.

Conclusion:

Positive donors were more likely to have multiple sexual partners & positive travelling history with unsafe sex with commercial sexual workers. Health consultation and screening of high risk groups before blood donation is one of the important aspect to improve blood transfusion service.

In addition, syphilis positive donors need councelling as the majority of syphilis positive donors did not turn upto collect the reports & receive treatments. Importance of prompt treatment and risk of spreading the disease through blood donations, or to spouses/sexual partners must be educated to the donor during post-test councelling.

All blood bank staff should be trained to identify high risk behaviour through proper history taking for which donor selection process needs to be modified while giving the confidence to the donor regarding confidentiality.

References

1. Kaur G, Kaur P. Syphilis testing in blood donors: an update. Blood Transfus. 2015; 13(2): 197-204.
2. World Health Organization. Global prevalence and incidence of selected curable sexually transmitted infections: overview and estimates. 2001. Available at: http://www.who.int/hiv/pub/ sti/en/who_hiv_aids_2014.05.pdf. Accessed on 14/05/2014
3. De Schryver A, Meheus A. Syphilis and blood transfusion: a global perspective. Transfusion. 1990; 30: 844-7.
4. Gardella C, Marfin AA, Kahn RH, et al. Persons with early syphilis identified through blood or plasma donation screening in the United States. J Infect Dis. 2002; 185: 545-9.
5. Orton S. Syphilis and blood donors: what we know, what we do not know, and what we need to know. Transfus Med Rev. 2001; 15: 282-91.
6. Singh AE, Romanowski B. Syphilis: review with emphasis on clinical, epidemiologic, and some biologic features. ClinMicrobiol Rev. 1999; 12: 187-209.
7. Wendel S. Current concepts on transmission of bacteria and parasites by blood components. Vox Sang. 1994; 67 (Suppl 3): 161-74.
8. Van der Sluis JJ, Ten Kate FJW, Vuzevski VD, et al. Transfusion syphilis, survival of Treponema pallidum in stored donor blood. II. Dose dependence of experimentally determined survival times. Vox Sang. 1985; 49: 390-9.
9. Garretta M, Paris-Hamelin A, Muller A, Vaisman A. Syphilis and blood transfusion. Rev Fr TransfImmunohematol. 1977; 20: 287-308.
10. Vall-Mayans M, Casals M, Vives A, et al. Reemergence of infectious syphilis among homosexual men and HIV co infection in Barcelona, 2002-2003. Med Clin (BARC). 2006; 126: 94-6.
11. Vera L, Milka D, Nurith SL, Eilat S. Prevalence and incidence of syphilis among volunteer blood donors in Israel. J Blood Transfus 2014.
12. https://www.who.int/bloodsafety/transfusion_services/Bhutan National Guidelines Screening Donated BT Transmissible Infections.pdf
13. Liu S, Luo L, Xi G, Wan L, Zhong L, Chen X, Gong T, et al. Seroprevalence and risk factors on Syphilis among blood donors in Chengdu, China, from 2005 to 2017. BMC infectious diseases. 2019;19(1):509.
14. Kumar A, Jyoti V, Prajapati S, Baghel R, Gangane N. Changing trends of syphilis among

blood donors in Bastar region, Chhattisgarh: A retrospective study: Changing trends of syphilis among blood donors. Community Acquir Infect. 2015;2. Accessed March 20, 2024.
15. Arshad A, Borhany M, Anwar N, Naseer I, Ansari R, Boota S, Fatima N, Zaidi M, Shamsi T. Prevalence of transfusion transmissible infections in blood donors of Pakistan. BMC Hematol. 2016 Nov 18; 16:27.
16. Kaur G, Basu S, Kaur R, et al. Patterns of infections blood donors in a tertiary case centre: a retrospective study. Natl Med J India. 2010; 23: 147-9.
17. Adjei AA, Kudzi W, Armah H, et al. Prevalence of antibodies to syphilis among blood donors in Accra, Ghana. Jpn J Infect Dis. 2003; 56: 165-7.
18. Matee MI, Magesa PM, Lyamuya EF. Seroprevalence of human immunodeficiency virus, hepatitis B and C virus and syphilis infections among blood donors at the Muhimbili National Hospital in Dar es Salam, Tanzania. BMC Public Health. 2006; 6: 21.
19. Bhatti FA, Ullah Z, Salamat N, et al. Anti-hepatitis B core antigen testing, viral markers, and occult hepatitis B virus infection in Pakistani blood donors: implication for transfusion practice. Transfusion. 2007; 47: 74-9.
20. Singh B, Verma M, Kotru M, Verma K, Batra M. Prevalence of HIV and VDRL seropositivity in blood donors of Delhi. Indian J Med Res. 2005; 122:234-6.
21. Kakkar N, Kaur R, Dhanoa J. Voluntary donors-need for a second look. Indian J Pathol-Microbiol 2004; 47:381-3.
22. Singh K, Bhat S, Shastry S. Trend in seroprevalence of hepatitis B virus infection among blood donors of coastal Karnataka, India. J Infect Dev Ctries. 2009; 3:376-9.
23. Gupta N, Kumar V, Kaur A. Seroprevalence of HIV, HBV, HCV and syphilis in voluntary blood donors. Indian J Med Sci. 2004; 58:255-7.
24. Otuonye NM, Olukoya DK, Odunukwe NN, Idigbe EO, Udeaja MN, Bamidele M, et al. HIV association with conventional STDS (sexual transmitted diseases) in Lagos State, Nigeria. West Afr J Med. 2002; 21:153-6.
25. 25) Patil AV, Pawar SD, Pratinidhi AK. Study of prevalence, trend and correlation between infectious disease markers of blood donors. Indian J Hematol Blood Transfus. 1996; 14:95-102.