

Trace, Track and Treat Syphilis Positive Blood Donors; Way Forward to Effectively Reduce STI

Sana Hanif¹
Tuba Farhat²
Ayesha Junaid³
Jahangir Adil⁴

Abstract

Objective: Counselling of syphilis positive blood donors, to educate them about the disease, its consequences and management

Methodology: In this descriptive study was conducted at the Blood bank of a private tertiary care hospital in Islamabad from September 2019 till September 2020. Blood donors (n=11,122) were evaluated for the presence of antibodies to treponema pallidum. Initially, all blood donors were screened for syphilis by electrochemiluminescence immunoassay to detect Treponemal pallidum (TP) antibodies. The positive test was repeated twice and was considered authentic if seropositivity was found two out of three times. All infected blood products were discarded. The donors were traced with their phone numbers. Each positive donor was contacted thrice on three different occasions if they did not respond. The ones who responded were informed, counselled and also referred to an infectious disease clinic, while taking care of confidentiality.

Results: Sero-prevalence of syphilis donors was 0.8%. Seventy eight of the reactive donors were first time donors. All of them were replacement donors.

All donors who were reactive for antibodies were males, and the majority (42.7%) of them were between the ages 36 to 45years. Out of total 89 syphilis positive donors, only 59 responded, 30 (33.7%) did not respond or gave wrong numbers. Only 6 (0.07%) positive donors came to collect their report, and subsequently took treatment after they were informed. Six donors reactive for syphilis antibodies had a history of travel abroad in the last two years. Out of 59 seropositive donors who responded, only 3 had a history of either a skin rash, swollen lymph nodes or fever.

Conclusion: Syphilis positive donors need tracing and counseling, as the majority of sero-positive cases did not turn up to collect reports and receive treatment. Blood bank staff should be trained to identify high-risk behavior through history, while giving confidence to the donor regarding confidentiality.

Keywords: Blood Donor, Syphilis, Sexually Transmitted Infections (STI).

¹Postgraduate Trainee, PIMS Hospital Islamabad

²Postgraduate Trainee, Shifa International Hospital, Islamabad

³Consultant Hematologist, Shifa International Hospital, Islamabad

⁴Postgraduate Trainee, General medicine, PIMS Hospital Islamabad

Address for Correspondence

Dr. Tuba Farhat

Postgraduate Trainee

Shifa international hospital, Islamabad

tubanadeem08@gmail.com

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.^{1,2} Around 6 million new cases of syphilis arise every year, making it one of the most common STI in the world.^{2,3} Another way by which it can spread is through transfusion from a healthy donor to a possible recipient¹.

According to WHO, syphilis screening is mandatory in donated blood or blood products.⁴ However, its seroprevalence is increasing in many countries according to recent studies.^{5,6} This can be attributed to the fact that many donation centers lack the facility of proper syphilis screening in Pakistan.^{8,9} 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.^{5,9} 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.^{1,5}

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Improvement in donor selection, use of sensitive tests in a screening of blood, and high vigilance have shown to help in decreasing the risk of spread of TTIs.¹⁰ The purpose of our study is to identify the loopholes in our donor selection by which many high-risk individuals enter the process of blood donation, and ways to improve donor selection. The study also aims at improving public health by emphasizing the counselling of seropositive donors to get prompt treatment so that spread of the disease can be minimized, and they can be brought back into the healthy donor pool. There is also a need to raise awareness regarding STIs and safe sexual practices in the general population so overall the disease burden can be reduced.

Methodology

This descriptive study was conducted in the Blood bank of a private tertiary care hospital in Islamabad to evaluate blood donors regarding the presence of antibodies to treponema pallidum in their blood or blood products. We analyzed the database of records of blood donors, screened from September 2019 till September 2020 with syphilis positive serology. We included all blood donors, voluntary or replacement, who came for donation during our study period, with ages between 18 and 60 years. Males and females with hemoglobin of more than or equal to 12.5 g/dl were included. The minimum weight requirement was set at 50kg for 450ml ±10% blood. Informed consent was taken from all donors, and they have fully explained the process of donation. All donors were required to fill a standardized donor questionnaire, in which demographics, past medical and surgical history, travel history and high-risk activities were documented. Any donor who fulfilled the AABB criteria of deferral was refused. Initially, all blood donors were screened for syphilis by electrochemiluminescence immunoassay to detect Treponemal pallidum (TP) antibodies. The

positive test was repeated twice and was considered authentic if seropositivity was found two out of three times. All infected blood products were discarded. The donors were traced with their phone numbers. Each positive donor was contacted thrice on three different occasions if they did not respond. The ones who responded were informed, counselled and also referred to infectious disease clinic while taking care of confidentiality. The data was compiled and analyzed in IBMSPSS version 23.

Results

A total of 11,122 blood donors (replacement or voluntary) who came between September 2019 and September 2020 were studied. 89 out of 11,122 donors were positive for syphilis, giving us a sero-prevalence of 0.8%. Seventy-Eight of the reactive donors were first time donors, while 11 had a history of blood donation in last 2 years (Figure 1).

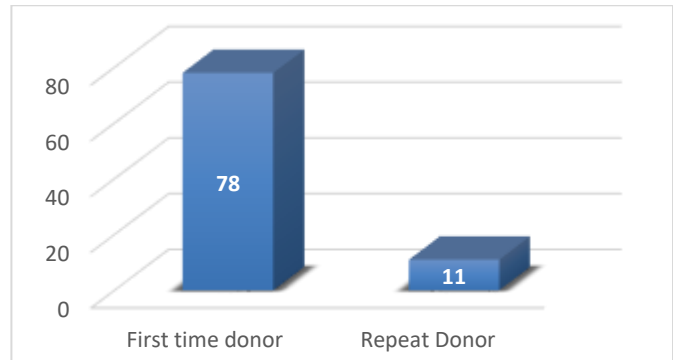


Figure 1. Distribution of Syphilis positive donors.

It was notable that all of them were replacement donors. All donors who were reactive for antibodies were males, and a majority (42.7%) of them were between the ages 36 to 45years (Table I). Out of total 89 syphilis positive donors, only 59 responded, 30 (33.7%) did not respond or gave wrong numbers (Table II). Of the ones who did respond, 49 (55%) of them were

Table 1: Syphilis positive donors-Demographic profile

Ages in years	Positive donors	Did not respond/gave wrong numbers	marital status of responders			Foreign visit in last 2 years	Collected report and took treatment
			married	unmarried	other		
18 to 25	16	4	5	7	0	2	1
26 to 35	26	7	17	2	0	0	0
36 to 45	38	12	25	0	1	4	5
46 to 55	7	5	2	0	0	0	0
55 to 60	2	2	0	0	0	0	0

married. Only 6 (0.07%) positive donors came to collect their report, and subsequently took treatment after they were informed (Figure 2). Six donors reactive for syphilis antibodies had a history of travel abroad in the last two years. Out of 59 seropositive donors who responded, only 3 had a history of either a skin rash, swollen lymph nodes or fever.

Table II: Syphilis serology positive donors-compliance

Parameter	Response n(%)
Responded	59(66.3%)
Did not responded or gave wrong numbers	30(33.7)
Collected reports and received treatment	6 (6.7)

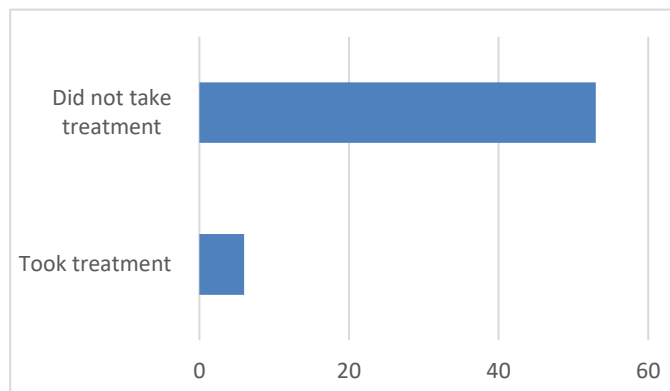


Figure 2. Number of reactive donors who were notified and counselled

Discussion

Our study showed a seroprevalence of 0.8%, which was in concordance with another study done in the same Hospital in 2015-17, which showed a prevalence of 0.75%.¹¹ In a study conducted in Lahore in 2019¹², 0.68% donors were found to be reactive for *Treponema Pallidum*. A seroprevalence of 0.91% was found in a study conducted in Karachi¹⁴, and all positive donors were replacement donors, similar to what we have found in our study. An epidemiological survey that included 606 blood banks across the country revealed a seroprevalence of 0.72% in 2018.¹⁵

A study published in 2019 showed a seroprevalence of 0.9% among blood donors in Chengdu, China.⁵ In north India, seroprevalence of 1.62% was found in a regional blood transfusion center¹⁶, In Saudi Arabia¹⁷ it was 0.044%, in Italy¹⁸ it was as low as 0.031% however in USA¹⁹ it was 0.16%. A Nigerian study from 2005-2016 revealed that 3.1% of

donors were syphilis positive, with males dominating the donor pool.²⁰

Lack of awareness in people regarding STIs, inadequate history given by donors during donor selection owing to the taboos associated with STIs, and lack of proper screening in some blood donation centers, especially in low and middle-income countries, may all contribute to the high prevalence.¹

All the positive donors in our study were males, which was following the studies conducted earlier across the country^{12,13,14} and internationally.²⁰ This could be because very few females come for donation due to sociocultural beliefs in Pakistan, and many times they are deferred from donating because of anemia, low weight and recent pregnancy.

We contacted all the donors who were found out to be positive. 30 out of 89 positive donors did not respond. Some of them had given wrong numbers, others did not even give any contact number. This could be because either they knew about their diagnosis and did not want to reveal it at pre-donation interview because of the associated taboos, or simply they did not want to be contacted, which was also seen in other studies.^{5,9}

Syphilis positive donors who responded were asked to collect their reports. None of them had any prior idea about their diagnosis. Only 3 positive donors mentioned a history of either a rash, swelling in armpits or fever, which are all symptoms of early syphilis.²² Others did not have any significant medical history, but that could be due to the hesitance in explaining the symptoms due to their intimate nature, fear of judgment, fear of breach of confidentiality, or simple absence of any classic symptom. Six 6 positive donors came to collect their reports during the study period, and were referred to Infectious diseases' clinic. All of them were contacted again to find out the status of their syphilis reactivity; they were all found out to be negative.

Eleven reactive donors (12.4%) had a history of one or more blood donations in the last 2 years. The fact that they were still in donor pool means ineffective donor selection at time of pre-donation interview, or poor post-test counselling. In India, a study stated that donors who are found out to be syphilis positive do not refrain from donating again, even after post donation and post

screening counselling.¹ This highlights the need to strictly scrutinize the donors coming in for donations, which requires trained staff that knows how to take proper history, especially related to high-risk behaviors and how to comfort the donor regarding confidentiality of any information revealed. Many times, a detailed history is not taken and donors are entered into donation process. Donation center staff also needs to be trained regarding post-test counselling, which requires urgent and effective communication of the test result to the donors and information regarding health-risk to others, if they decide to donate again.

Forty nine positive donors were found out to be married which not only mandates the screening of their partners, but also raises questions as to how they got the infection and what could be done to prevent it. This requires detailed sexual history which all the positive donors were not comfortable sharing due to cultural and religious barriers and taboo associated with STIs.¹ Travel history was taken from positive donors since tourists tend to get involved in casual sexual behavior when abroad²³, however only 6 out of 89 positive donors had travelled abroad in last two years, which was less than we had anticipated.

From our study, we found out that syphilis seroprevalence remains high even after strictly following the AABB deferral criteria, taking relevant history according to the questionnaire and physically examining the donor. High risk donors are unable to identify because of the discretion that donors maintain while giving history specially relating to their sexual practices because of the social taboos. Some donors are uneducated or there is a language barrier, other donors do not fill the questionnaire truthfully, and many do not consider it important to mention any high-risk behavior since they think of themselves as healthy⁵. Only a small number of reactive donors came to collect report which shows the lack of awareness and interest in rest of the positive donors.

Conclusion

1. There is a need to re-evaluate donor notification process and post-test counselling regarding STI such as syphilis.
2. 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 counselling.

3. Donor selection process needs to be modified; blood bank staff should be trained to identify high-risk behavior through history, while giving confidence to the donor regarding confidentiality
4. Knowledge of safe sexual practices, and awareness of STIs needs to be spread in general population so that public health could improve on national level.

References

1. Kaur G, Kaur P. Syphilis testing in blood donors: an update. *Blood Transfus.* 2015;13(2):197-204. doi: 10.2450/2014.0146-14. Epub 2014 Nov 21. PMID: 25545876; PMCID: PMC4385067.
2. Kojima N, Klausner JD. An Update on the Global Epidemiology of Syphilis. *Curr Epidemiol Rep.* 2018 ;5(1):24-38. doi: 10.1007/s40471-018-0138-z.
3. <https://www.who.int/reproductivehealth/congenital-syphilis-estimates/en/>
4. https://www.who.int/bloodsafety/transfusion_services/BhutanNationalGuidelinesScreeningDonatedBTTransmissibleInfections.pdf
5. 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.
6. Kumar A, Jyoti V, Prajapati S, Baghel R, Gangane N. Changing trends of syphilis among blood donors in Bastar region, Chhattisgarh: a retrospective study. *Community Acquir Infect.* 2015; 2: 51-56
7. <https://www.who.int/bloodsafety/ReportGlobalConsultation2009onVNRBD.pdf?ua=1>
8. Attallah S, Khan S, Khan J. Trend of transfusion transmitted infections frequency in blood donors: provide a road map for its prevention and control. *J Transl Med.* 2012;10:20. doi: 10.1186/1479-5876-10-20..
9. 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. doi: 10.1186/s12878-016-0068-2.
10. Prasad S, Bai KR. Seropositivity of HIV, Hepatitis B and C, and syphilis among blood donors: A retrospective study. *Asian J Transfus Sci.* 2014 Jan;8(1):66-7. doi: 10.4103/0973-6247.126705
11. Awan SA, Junaid A, Sheikh S. Transfusion Transmissible Infections: Maximizing Donor Surveillance. *Cureus.* 2018 Dec 28;10(12):e3787. doi: 10.7759/cureus.3787
12. Amin H, Jafar HS, Sadiq F. Prevalence of syphilis among healthy blood donors- a hospital based retrospective study, *Pjmh.*2019; 13(3):647-650.
13. Nazir S, Khan A, Nazar A, Fayyaz A, Khan MS, Ahmed S, et al. Prevalence of syphilis in Pakistani blood donors. *Advancements in Life Sciences.* 2013;1(1):27-30.

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14. Sultan S, Murad S, Irfan SM, Biag MA. Trends of Venereal Infections among Healthy Blood Donors at Karachi. *Arch Iran Med.* 2016 Mar;19(3):192-6. PMID: 26923891.
15. Waheed U, Saba NE, Wazeer A, Arshad M, Zaheer HA. *Epidemiology of syphilis in blood donors in Pakistan.* *Glob J Transfus Med.* 2020; 5:100-101.
16. Rawat A, Diwaker P, Gogoi P, Singh B. Seroprevalence & changing trends of transfusion-transmitted infections amongst blood donors in a Regional Blood Transfusion Centre in north India. *Indian J Med Res.* 2017 ;146(5):642-645. doi: 10.4103/ijmr.IJMR_468_15.
17. Elyamany G, Al Amro M, Pereira WC, Alsuhaibani O. Prevalence of Syphilis among Blood and Stem Cell Donors in Saudi Arabia: An Institutional Experience. *Electron Physician.* 2016;8(8):2747-2751. doi: 10.19082/2747.
18. Drago F, Cogorno L, Ciccarese G, Strada P, Tognoni M, Rebori A, Parodi A. Prevalence of syphilis among voluntary blood donors in Liguria region (Italy) from 2009 to 2013. *Int J Infect Dis.* 2014;45-6. doi: 10.1016/j.ijid.2014.04.008.
19. Kane MA, Bloch EM, Bruhn R, Kaidarova Z, Murphy EL. Demographic determinants of syphilis seroprevalence among U.S. blood donors, 2011-2012. *BMC Infect Dis.* 2015;15:63. doi: 10.1186/s12879-015-0805-3.
20. Okoroiwu HU, Okafor IM, Asemota EA, Okpokam DC. Seroprevalence of transfusion-transmissible infections (HBV, HCV, syphilis and HIV) among prospective blood donors in a tertiary health care facility in Calabar, Nigeria; an eleven years evaluation. *BMC Public Health.* 2018;18(1):645. doi: 10.1186/s12889-018-5555-x
21. Quintas, Edna & Cogle, Adis & Dias, Cláudia&Sebastiao, Adriana & Pereira, Altamiro&Sarmiento, António & Cordeiro, Lemuel. Prevalence of Syphilis in Blood Donors in Angola from 2011 to 2016. *Clinical and Medical Reports.*2018; 10.15761/CMR.1000119.
22. <https://www.nhs.uk/conditions/syphilis/symptoms/>
23. Hynes NA. Sexually Transmitted Diseases in Travelers. *Curr Infect Dis Rep.* 2005;7(2):132-137. doi: 10.1007/s11908-005-0073-2.