



SEROPREVALENCE OF SYPHILIS IN HEALTHY BLOOD DONORS OF LAHORE DURING YEAR 2016 AND 2017; AN UPCOMING PROBLEM FOR PAKISTAN.

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ABSTRACT: Blood transfusion has been proven as a common cause for contracting infectious diseases with 1.5 million donors each year in Pakistan carrying 1% risk of transfusion transmitted infections. Syphilis is one of them whose seroprevalence has been increasing in recent years. Thus, evaluation of its seroprevalence will give information about current burden of the disease. **Objectives:** To determine seroprevalence of syphilis among healthy blood donors of Lahore to assess disease burden for year 2016 and 2017. **Study Design:** Retrospective single centre cross-sectional study. **Setting:** Tertiary care hospital (Mayo Hospital) in Lahore with a referral base from all over Pakistan but predominantly from the Punjab province. **Period:** Two years (from January 2016 to December 2017). **Material & Methods:** The study was based on immunochromatographic assay of antibodies to *Treponema pallidum* in human serum using Nantong Egens Syphilis detection Kits. This is a qualitative test and provides rapid screening for syphilis in blood donors. Data was analyzed using SPSS 20 for prevalence study and mathematically for future prediction of its percentage. **Results:** A total of 76530 blood donors reported in the blood bank in two years. Out of these donors, 1720 were positive for TP antibody showing an overall percentage of 2.25%, 755 were positive in 2016 & 965 in 2017 with their percentages being 2.02% & 2.46% respectively. **Conclusion:** Percentage of syphilis has increased in year 2016 and 2017. This needs to be reduced by taking preventive measures and education to masses. Further work up of the patients who were TP positive is required.

Key words: Blood Donors, Syphilis, *Treponema Pallidum* Antibody.

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INTRODUCTION

Blood transfusion, on one hand, has saved millions of lives, while on the other hand, it has also been proven as a cause for contracting infectious diseases.^{1,2} Each transfusion carries 1 percent likelihood of causing transfusion transmissible infections (TTIs).³ Thus, each and every transfusion has got a risk for spreading infectious diseases.⁵

In Pakistan, approximately 1.5 million people donate blood every year & the number is increasing constantly.^{6,7} Transfusion of safe and healthy blood is a universal right and is also an indicator of high quality of a healthcare system.^{2,8} However in Pakistan problems encountered in this process are many with the most significant being lack of provision of proper services

recommended by WHO, poverty and unavailability of resources because of majority of population living in rural areas.^{9,10} Hence, it strictly demands improvements in infrastructure, proper training of the staff & equipping of blood banks with all the required resources.¹¹

An important disease which can be transmitted via blood is syphilis which is basically a sexually transmitted disease causes by *Treponema pallidum*, a spirochete. It can also be transmitted vertically from mother to child.^{12,13} Syphilis may either be manifested as asymptomatic or symptomatic. With its primary, secondary or tertiary stage).^{14,15} Its asymptomatic manifestation in blood makes it essential to properly screen the blood of healthy donors before being transfused to recipients, in order to prevent its transmission.

Syphilis is a prevalent STD both in developed and developing countries and its prevalence has increased world widely & in Pakistan as well.^{1,16,17} It is believed that the prevalence of an infection in blood donors may not truly reflect its prevalence in general population. It may falsely estimate disease prevalence because the blood donors mostly include young or middle aged males only and exclude elderly & very young age groups.^{18,19} However it can give an idea about the disease burden in a population and can also aid in ensuring safe transfusion of blood & blood products.^{20,21}

In our search for literature about prevalence of syphilis in healthy donors of Pakistan, we found that the prevalence is increasing at a rapid pace. A survey conducted in Lahore at Shaukat Khanum Memorial Cancer Hospital showed an increasing percentage of its prevalence through 1996 to 2005 with maximum percentage being in year 2002.²¹ Two recent studies carried out in Lahore in 2012 & 2014 depict an overall prevalence of 3.1% and 4.9% respectively.^{15,17} Data from other cities including Karachi & Islamabad (two big cities of Pakistan) also portray an increasing prevalence of this disease.^{22,2,16} This demands that its prevalence in blood donors needs to be evaluated each year. Here, we have studied prevalence of Syphilis in healthy donors of Lahore for the year 2016 and 2017 with the aim to assess the disease burden and also to monitor the safety of blood transfusion which may form the basis of public policy.

OBJECTIVES

1. Seroprevalence of syphilis among the healthy donors during year 2016 and 2017 visiting a public tertiary care hospital
2. Assess disease burden in order to form public policy.

METHODOLOGY

Study Design

This is a retrospective single center cross sectional study.

Setting

This study was carried out at a tertiary care

hospital (Mayo Hospital) in Lahore with a referral base from all over Pakistan but predominantly from the Punjab province.

Sample Size

Data of 76,530 healthy blood donors was collected from hospital blood bank for a period of two years (from January 2016 to December 2017). This study included healthy donors of age ranging from 18 to 55 years whereas all those below 18 and above 55 years of age were excluded. Moreover, the donors with Hb level less than 12g/dl as well as high risk populations including drug abusers, diabetics and those with chronic kidney disease were also excluded.

Lab Test

The study was based on immunochromatographic assay of antibodies to *Treponema Pallidum* in human serum using Nantong Egens Syphilis detection Kits. This is a qualitative test and provides rapid screening for syphilis in blood donors.

After collecting donor samples, 3cc fresh blood was added to grey top vacutainers. The test was performed immediately after the serum was separated in the tube. 3 drops of serum using droppers provided in the kit were added to the well in device. Test results were read after 15 minutes.

Since the test was meant to determine the presence of antibodies to TP, there were 2 bars of TP antigen present on the device. The binding of antibody to its antigen resulted in a positive reaction which gave rise to pink line on device antigen area. Intensity of this colour was dependent on the quantity of antibody in that serum. Data was analyzed using SPSS 20 for finding prevalence and was analyzed mathematically to predict its future burden.

RESULTS

A total of 76530 blood donors reported to the blood bank in two years, 37,341 and 39,189 in 2016 & 2017 respectively. Out of these 76,530 donors, 1720 were positive for TP antibody showing an overall percentage of 2.25%, 755 were positive in

2016 & 965 in 2017 with their percentages being 2.02% & 2.46% respectively. Seroprevalence of syphilis for the years 2016 and 2017 are also summarized in Tables-I & II respectively.

Year	Month	Total Screenings	Tp +Ve	%
2016	January	3242	94	2.899445
	February	3304	56	1.694915
	March	3744	83	2.21688
	April	3504	60	1.712329
	May	3698	61	1.64954
	June	3870	51	1.317829
	July	3142	68	2.164227
	August	3006	71	2.361943
	September	2400	52	2.166667
	October	2819	63	2.234835
	November	2211	34	1.537766
	December	2401	62	2.582257
Total		37341	755	2.021906

Table-I. Seroprevalence of syphilis in healthy blood donors at Mayo Hospital Lahore for the year 2016.

Year	Month	Total Screenings	Tp +ve	%
2017	January	3382	88	2.602011
	February	3385	67	1.979321
	March	3691	71	1.923598
	April	3221	91	2.82521
	May	3182	82	2.576996
	June	3143	73	2.322622
	July	3052	68	2.228047
	August	3319	89	2.681531
	September	2997	110	3.670337
	October	3319	91	2.74179
	November	2912	56	1.923077
	December	3586	79	2.203012
Total		39189	965	2.462426

Table-II. Seroprevalence of syphilis in healthy blood donors at Mayo Hospital Lahore for the year 2017.

	2016	2017	Overall
Total Screenings	37341	39189	76530
TP positive			
Percentage	755	965	1720
Total Screenings	2.02%	2.46%	2.25%

Table-III. Overall seroprevalence for the years 2016 and 2017 respectively.

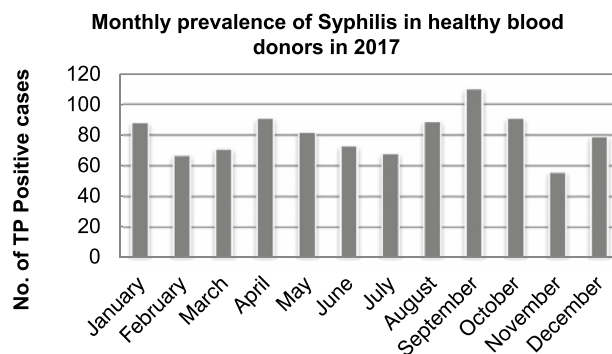


Figure-1

Comparison of percentage prevalence of syphilis amongst healthy blood donors in 2016 & 2017

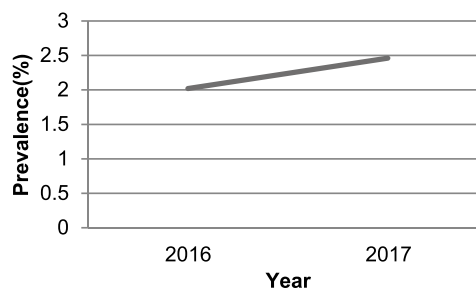


Figure-2

DISCUSSION

Blood transfusion, being a lifesaving procedure, is very commonly practiced in Pakistan but it is also a source of Transfusion Transmissible Infections (TTIS) with syphilis being one of them. Unscreened blood is one of the most common reasons for its horizontal spread. In our study, out of 76,530 blood donors, 1720 were positive for TP antibody (965 in 2016 and 755 in 2017) with individual and cumulative percentages of these years being 2.46%, 2.02% and 2.25% respectively.

In previous studies at Lahore, a rising percentage

of syphilis from 0.19% to 0.57% was observed among healthy donors through 1996-2002 with a percentage of 0.48% during 2005.²¹ Recent studies at Lahore (2012 and 2014) have also suggested a raising percentage of syphilis among healthy donors.^{15,17}

This clearly shows an increasing trend which has also been observed in Iran and Cameroon.^{23,24} Our study has shown an updated picture of the seroprevalence of syphilis among blood donors of Lahore.

Other cities of Pakistan are also following the same trend e.g. in Karachi, the percentage has increased from 0.22% to 2.1 % from 2008 to 2015.^{22,2} All the above data has led to a conclusion that percentage of syphilis has increased in previous years. This was due to unsafe sexual practices, decrease in adopting protective measures and improper screening of blood. This challenge has to be faced by our healthcare system which should take measures to reduce it. These include development of proper screening setup, conductance of constant survey and audit to ensure proper use of available resources and increase in economic growth to meet the demanded facilities. In meanwhile, a public awareness is mandatory through seminars, health workers' education, campaigns and media. At public level, younger donors who had never been transfused should be encouraged for blood transfusion. This can drastically reduce the prevalence of syphilis. All this discussion seemed to be fruitful for awareness about severity of situation and important steps to be made.

CONCLUSION

Percentage of syphilis has increased in year 2016 and 2017. This needs to be reduced by taking preventive measures and educating the masses. Further work up of the patients who were TP positive is required.

DECLARATIONS SECTION

Ethics approval and consent to participate

The study protocols and informed consent documents were approved by the Institutional

Bioethics Review Committee (IBRC).

Consent to publish

Informed written consent for publication was obtained from each participant.

Availability of data and materials

The datasets used and/or analyzed during the study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.






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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Sarmad Zahoor	Writing and analysis.	
2	Samreen Hameed	Provided expert opinion, Review & edited.	
3	Waqas Iqbal	Collaborated in design + corresponding manuscript.	
4	Hafeez ur Rehman	Initiate idea and tall access it data.	
5	M. Naveed ur Rehman	Supervised data collection.	
6	Jamil Jaral	Data collection.	