

SEROPREVALENCE OF TRANSFUSION TRANSMISSIBLE INFECTIONS (TTIS) IN BLOOD DONORS

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ABSTRACT

To find out the seroprevalence of HIV, Hepatitis B, C virus and Treponema Pallidum among the healthy blood donors, at Ghurki Trust Teaching Hospital, Lahore. Descriptive study. Blood Bank of GTTH, Lahore, from 1st January to 31st December 2008. All healthy blood donors reporting to blood bank in the specified study period were screened for HIV, Hepatitis B, C and Syphilis. A total of 6659 donors were screened, out of these 512 donors (7.69%) were seropositive for Hepatitis C, 113 (1.70%) were sero positive for Hepatitis B, 35 (0.5%) were seropositive for syphilis and only 3 (0.05%) had shown seropositivity for HIV. Transfusion transmissible infections are a major threat associated with unscreened blood donations. In Pakistan the prevalence of Hepatitis B and C is very high in occult form. Selection of healthy blood donors and public awareness programs targeting local community will be an important measure to stop its transmission through blood transfusion.

Key Words: *Hepatitis B, Hepatitis C, HIV, Syphilis, Blood donors.*

INTRODUCTION

Blood transfusion is a life-saving intervention and millions of lives are saved each year globally through this procedure.¹ However, blood transfusions are associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the transmission of infections.² Globally, more than 81 million units of blood are donated each year.³ More than 18 million units of blood are not screened for transfusion-transmissible infections.¹ According to World Health Organization (WHO), in the year of 2006 only 38 countries were collecting more than 75% of their blood supplies from families, the rest obtained it from professional blood donors on payment.³

Unsafe blood remains a major threat for the global spread of transfusion transmissible infections (TTIs). According to WHO, safe blood is a universal right, which means that blood that will not cause any harm to the recipient and that has been fully screened and is not contaminated by any blood-borne disease such as HIV, hepatitis, malaria, or syphilis.⁴ WHO recommends that, at least, all donated blood should be screened for Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human immunodeficiency virus (HIV), and syphilis.³ The prevalence of the transfusion transmitted infections (TTIs), among blood donors allows for assessment of epidemiology of these infections in the community.⁵ The acquisition of the infections in the healthy blood donor population can be a serious threat to

safety of the collected blood donations. A study was conducted among voluntary blood donors in Turkey which showed that out of the 44982 blood donations investigated, 1.38% had HBsAg, 0.35% had anti-HCV, and only one had anti-HIV confirmed.⁶ Another study was conducted in Malaysia showed that the mean prevalence of HBV was 1.83% among blood donors.⁷ In Saudi Arabia, it was noted that, there was a steady decrease in the HBsAg rates (2.58 to 1.67%), and anti-HCV (1.04 to 0.59%) between 1998 and 2001, respectively.⁸

In Pakistan more than 1.5 million pints of blood are collected each year.⁹ Out of these about 65% is from replacement donors, 25% from volunteer donors and about 10% from professional donors.^{10,11} At present, a total of 170 public sector blood banks are operational throughout the country and about 450 small and medium scale blood banks are operational in the private sector.¹² The bio-safety practice in both the public and private sector blood banks require immediate attention. In Pakistan, an administrative structure for the blood transfusion services exists only in Punjab.¹³ It was observed that out of 1176284 blood donors in Punjab the screening coverage on the average has been 77.42% for HIV and 86.84% for HBV.¹⁴ UNAIDS has estimated that only 50 percent of the 1.5 million blood bags are screened in Pakistan.⁴ Recently, at least 91 blood banks were closed down in the country's largest city, Karachi, after they were found not to be adhering to safe practices. The situation is even worse in smaller towns of Pakistan.¹⁴

The screening of blood for TTIs is mandatory for blood safety as lack of blood screening facilities adds to the hazards of blood transfusion. The possibility of transmission of infections would be minimized if blood is collected from low risk targeted general public. This can only be guaranteed in the context of sustained global co-operative efforts. A long-term and comprehensive plan for capacity building and structural reforms of the Blood Transfusion Services in Pakistan has been developed for quality assurance recently.⁴

The purpose of this study was to determine the seropositivity of the blood donors coming to Ghurki Trust Teaching Hospital (GTTH), Lahore. The current study looks at the prevalence of HIV, Hepatitis B, Hepatitis C and Syphilis amongst healthy blood donors coming to GTTH, Lahore, Pakistan in the year 2007-2008. By studying this prevalence, attention will be drawn towards the severity of the situation so that effective action can be taken to prevent further transmission of diseases via blood transfusions.

METHODOLOGY

A descriptive study was carried out in Blood Bank of Ghurki Trust Teaching Hospital, Lahore to determine the seropositivity of TTIs in blood donors. Data was collected by using a structured questionnaire which was pre tested in a pilot study using records of 300 blood donors in the first phase and necessary modifications were done in the questionnaire accordingly. Records were collected from blood bank of all donors coming to Blood Bank of GTTH during January 1st to December 31st, 2008. Six thousand, six hundred and fifty nine blood donors were included in the study (n =6659). A Non-Probability, Convenient Sampling Technique was used to select blood donors. All donors with incomplete record of their socio demographic profile were excluded from the study. *Enzyme linked immunosorbent assay (ELISA)* was used for detection of Hepatitis B, C and HIV and *Venereal Disease Research Laboratory Test (VDRL)* for Syphilis. The data was collected, entered and analyzed by using Statistical Package for Social Sciences (SPSS), version 11. Data was presented in the form of tables

Table 1: Gender distribution of 663 seropositive blood donors at GTTH Lahore, in the year 2008.

Gender	Prevalence			
	HIV	HBV	HCV	Syphilis
Males	2 (0.03%)	59 (0.88%)	261 (3.76%)	14 (0.21%)
Females	1 (0.01%)	54 (0.81%)	251 (3.19%)	18 (0.27%)
Total	3 (0.045%)	113 (1.696%)	512 (7.689%)	35 (0.49%)

and graphs. Descriptive statistics were determined in terms of percentages.

RESULTS

All 6659 people under study were voluntary blood donors and none of them were paid. These donors were screened for seropositivity of HBV, HCV, HIV and Treponema Pallidum according to WHO set criteria. Among the donors, 663 (9.96%) had TTIs. Hepatitis C was present in 512 donors (7.69%), 113 (1.7%) were positive for Hepatitis B, 35 (0.5%) were positive for syphilis and only 3 (0.05%) had shown seropositivity for HIV (*Figure 1*).

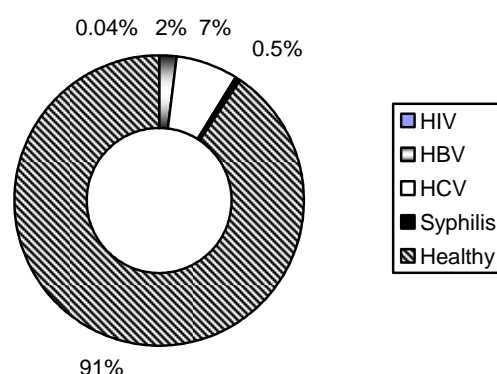


Figure 1: Seropositivity of blood donors at GTTH.

There was no difference in distribution of seroprevalence of all four diseases between two sexes as is shown in *Table 1*.

In the year of 2008 a total of 6659 blood donors visited blood bank of GTTH. Only 150 reported in month of February (2.25%) and 917 donors visited in month of November (13.8%). The monthly distribution of donors and their status of seropositivity is shown in *Table 2*.

The pattern of seropositivity of HCV showed continuous high trends throughout the year followed by HBV seropositivity (*Figure 2*).

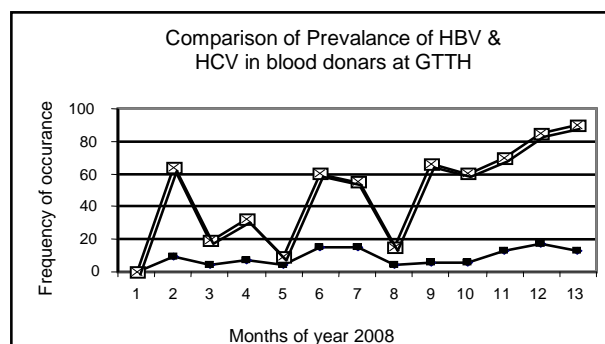
DISCUSSION

Pakistan has been identified as one of the nine priority countries for additional technical and financial support for Millennium Development Goals by

EMRO.¹³ In this regard efforts are underway for capacity building and structural reforms in health care delivery system through international consultants. A long-term and comprehensive plan for quality assurance in blood banks has been developed under the Blood Safety Component of the National AIDS

Table 2: Donors Distribution and their seroprevalence at GTTH in the year 2008.

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
HIV	1 0.12%	0	0	1 0.26%	0	0	0	0	0	0	0	1 0.17%
HBV	9 1.15%	4 2.26%	7 1.75%	4 1.05%	15 2.56%	15 2.51%	4 1.13%	6 0.85%	6 0.97%	13 2.16%	17 1.85%	13 2.23%
HCV	55 7.05%	15 10%	25 6.25%	5 1.32%	45 7.68%	40 6.7%	11 3.11%	60 8.55%	54 8.79%	57 9.5%	68 7.41%	77 13.23%
Syphilis	7 0.89%	0	2 0.49%	0	4 0.68%	2 0.33%	0	3 0.42%	4 0.65%	3 0.5%	5 0.32%	3 0.51%
Total patients	780	150	400	379	586	597	353	701	614	600	917	582

**Figure 2:**

Control Programme and of the Blood Transfusion Services in Pakistan.⁴ The main constraints are fragmentation in Blood Transfusion Services, weak supervisory control by regulatory authorities, poorly monitored quality assurance mechanisms and absence of service structure for the staff of Blood Transfusion Services.¹³ According to a report of WHO, there are thirty-one countries who are not able to screen all the donated blood for one or more of the infections – including HIV, hepatitis B, hepatitis C and syphilis – that can be transmitted through blood.³

The objectives of Pakistan's National Blood safety Programme are Safety of blood and blood products through capacity building, Expansion of voluntary non-remunerated blood donors and Promotion of rational use of blood and blood products.¹³ To evaluate the blood bank practices in Pakistan a study was conducted to inspect available facilities and equipment, and observe blood collection methods in thirty-seven blood banks of Karachi, which were randomly selected from a list of 87 blood banks. Of the 37 selected facilities, 25 were operational and 24 agreed to participate. It was observed that 50% of the facilities reported regularly utilizing paid blood donors. While 95% of blood banks had appro-

priate equipment and reagents to screen for Hepatitis B, only 55% could screen for HIV and 23% for Hepatitis C.¹⁴ The lack of blood screening facilities adds to the risk of transfusion transmitted infections (TTI's) which can be overcome by proper selection of donors.

Results of our study shows that seroprevalence of Hepatitis C in healthy donors is very high. (7.689%) followed by seroprevalence of Hepatitis B (1.696%). The seroprevalence of syphilis is 0.49% and sero positivity of HIV is 0.045%.

A similar study was conducted in India which depicted that the prevalence rates of TTI per 100000 donations were 350 for HIV (0.35%), 350 for HCV (0.35%), 1660 for HBV (1.66%) and 800 for syphilis (0.8%).¹⁵ It was noted that in Ethiopia the prevalence rates of TTIs in blood donors are 4.5% for HIV, 8.2% for HBV and 5.8% for HCV.¹⁶ In Iranian blood donors these rates were 0.003%, 0.487%, 0.093% and 0.005% for HIV, HBV, HCV and Syphilis respectively.¹⁷

A study was conducted in US blood donors from 1991 to 1996 to show the trends in incidence and prevalence of major transfusion transmissible viral infections which highlighted that prevalence of TTIs has shown a downward trend with increase donor screening effectiveness,¹⁸ while at the same time these rates are still very high in less developed countries. It was estimated that in Malawi, HIV prevalence is 10.7%, HBV prevalence is 8.1% and HCV prevalence is 6.8%.¹⁹

In Pakistan a similar study was conducted in Rawalpindi which showed that Hepatitis C virus was found to be most common (6.21%) whereas Hepatitis B virus was next in prevalence (5.86%)²⁰ In another study in healthy blood donor population of Northern areas of Pakistan, it was observed that in Hayatabad Medical Complex, Hepatitis B and Hepatitis C seroprevalence was 1.40% and 1.34% respectively while in Combined Military Hospital Peshawar, HBsAg was positive in 1.75% and anti-HCV

was positive in 2.60% donors.²¹ Prevalence of blood transmitted infections is very high in the country and resources to screen the blood are very limited. Having 20% prevalence of hepatitis C infection, 10% hepatitis B infection and 1% HIV infections among the professional blood donors, family blood donors are considered the safest.²²

It is estimated that seroprevalence of Hepatitis C varies from 0.27% to 6.8% among healthy blood donors from different parts of country. The highest seroprevalence of HCV is reported from Karachi (6.8%).²³ and Rawalpindi (6.21%).²⁰ Regarding seroprevalence of HBsAg, it varies from 1.55% to 7.53% among healthy blood donors from different parts of country. The highest seroprevalence of HBsAg is reported from Bahawalpur (7.53%)²⁴ and Rawalpindi (6.4%).²⁵ At the international level the HBsAg positivity rates were found as 3.4% in Georgia 1.5% in Kingdom of Saudi Arabia and 4.3% in Egypt.²⁶⁻²⁸ At the same time when we reviewed the same regions for the anti-HCV positivity, it was found to be 6.9%, 0.4% and 2.7% respectively.²⁶⁻²⁸ At the international level the HBsAg positivity rates were found as 3.4% in Georgia, 1.5% in Kingdom of Saudi Arabia and 4.3% in Egypt.²⁶⁻²⁸ At the same time when the same regions were reviewed for the anti-HCV positivity, it was found to be 6.9%, 0.4% and 2.7% respectively.²⁶⁻²⁸ The results of our study shows lesser prevalence of syphilis (0.49%) which is similar to other studies which show sero prevalence of syphilis in adults in Pakistan is 0.67%.²⁹ A study conducted in Karachi showed that a majority of seropositive people detected in Karachi (70.8%) and also in interior Sindh (69.2%) were males.³⁰

In developing countries lack of resources for universal and effective screening of blood donors is still a major source of transmission of infections in the recipients. A study conducted among poly-transfused thalassemic children in Karachi showed that 34.8% thalassemic children were anti-HCV positive due to inappropriate screened blood transfusions.³¹ The health care system for blood donation in Pakistan is weak as it does not offer any record management for donors.³² During our study we faced the same problem that due to non availability of records, follow up was not possible. As our study was based on records of donors we were unable to ask about the risk behaviours for transmission of these infections. It is noted that in blood transfusion facilities of Karachi only 8% of blood banks inquired the donors about drug use, and none of them asked donors any questions about high-risk sexual behaviour.¹⁴ The European Union is in the process of setting blood legislation to assist in the independent assessment of quality systems, established by individual blood establishments in order to safeguard the quality of blood.³³ In 2000, safe blood was dec-

lared an organization-wide priority in Pakistan and blood safety was designated as the theme of World Health Day 2000.³⁴

Limitations of the study:

The study was based on records of blood bank at Ghurki Trust Teaching Hospital, Lahore. Due to nonavailability of tracking system, the confirmed cases were not traceable to depict the actual prevalence of the diseases in blood donors.

It is **concluded** that safety of the blood supply is dependent on collecting blood from voluntary donors from low-risk populations, screening donated blood for transmissible infections and avoiding unnecessary transfusions. These activities need to be carried out by a well-coordinated blood transfusion service with quality control being implemented at all levels.

RECOMMENDATIONS

It is important to follow the WHO guidelines to screen every donor for HBV, HCV, HIV and Syphilis to decrease the transmission of TTIs. Voluntary donors should be promoted and their screening should be made mandatory at each health care facility. Record keeping should be promoted to follow up the screened patients. The government of Pakistan should also encourage blood banks at all levels to follow the National Blood Safety Regulations and to work together for its implementation.

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