

## Original Article

# Prevalence of Transfusion Transmitted Infections among Blood Donors of a Teaching Hospital in Islamabad

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**Objective:** The objective of the current study was to evaluate the prevalence and incidence of HBV, HCV, HIV, Syphilis and Malaria in the donated blood processed in a teaching hospital in the capital city of Pakistan

**Study Design:** Retrospective Single Centre Cross Sectional Study

**Place and Duration of the Study:** January 2010 to December 2011 at the Federal Government Polyclinic (FGPC) Hospital, the second largest tertiary care hospital in Islamabad  
**Material and Methods:** All blood donations were screened for HBsAg, Anti-HCV and Anti-HIV by ELISA and Syphilis and Malarial Parasite by Slide Agglutination and Immunochromatographic Technique (ICT) respectively. The results were compared with previous domestic studies.

**Results:** A total of 10,145 blood donations were evaluated during the study period (2 years). Majority of the donations (94%) came off the replacement donors while only 6% were from voluntary non-remunerated blood donation (VNRBD). Amongst these donations, 1,454 (14.34%) were infected at least with one pathogen while 8,691 (85.66%) were cleared for transfusion. Prevalence for HCV, HBV, HIV, Syphilis and Malaria were found to be 8.34%, 3.91%, 0%, 0.89% and 1.20% respectively. There has been a substantial increase in the incidence of HCV and HBV infections while changes observed in frequency of Syphilis and Malaria were insignificant and no case reported for HIV.

**Conclusion:** The practice of offering replacement and/or paid donors in bargain with screened blood from hospitals, is contributing towards a high frequency of HCV infection in donated blood. It could be avoided by promoting the culture of VNRBD and disseminating its philosophy in the society to mobilize and motivate donors. In addition, screening of blood and its components by quality assured methods, following uniform instructions and SOPs might improve the situation.

**Keywords:** Blood Donors, Transfusion, Voluntary.

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## Introduction

Access to safe blood and blood products still remains a major challenge throughout the world. Unsafe blood transfusion is very costly from economic point of view. The blood transfusion services often struggle against competing demands for increasingly restricted resources and have remained a low priority within health care budgets so far.

The situation in Pakistan is not different where Transfusion-Transmitted Infections (TTIs) continue to threaten the blood safety. The transmission of these infectious agents is of major concern for blood sector as transfusion forms an integral part of modern health

practices. The health sector in Pakistan has felt the importance of Blood Transfusion as a critical field as it

faces a shortage of safe blood supply to meet the population demand and an increasing burden of diseases from TTIs. The blood transfusion sector in Pakistan is passing through a system reform from a fragmented network of blood banks to a new centralized network of Regional Blood Centres. However, pre-reform Blood Transfusion Services in Pakistan are mostly hospital based with no functional separation of the process into independent establishments for efficient 'production' and 'utilization'.

Screening for TTIs is a critical part of the blood transfusion process as it ensures that transfusion is as

safe as possible. Globally, transfusion of contaminated blood causes up to 16 million new infections with hepatitis B, and 5 million <sup>[1]</sup> new infections with hepatitis C every year. With each blood unit transfused, there is always a 1% <sup>[2]</sup> likelihood of transfusion-linked risks including transfusion-transmitted infections.

Blood-borne transmission remains a key vector of the Hepatitis B and C infections in Pakistan, affecting about 7.4 percent of the population. <sup>[3]</sup> The frequency of HIV and syphilis is low but High Risk Groups (HRGs) have shown a higher prevalence rate for syphilis <sup>[4]</sup> and HIV/AIDS. <sup>[5]</sup> Malaria also continues to be a major public health risk during the recent past. The assessment of donor's blood for seropositivity of TTIs gives an idea of the epidemiology of these infections in the general population.

There are several studies already conducted in Pakistan demonstrating the prevalence of these TTIs but hardly any of them focused on the capital of Pakistan on such sized scale. The objective of the current study was to figure out the incidence of HBV, HCV, HIV, Syphilis and Malaria in Islamabad region and its suburbs.

## Materials and Methods

The study was conducted from January 2010 to December 2011 at the Federal Government Polyclinic (FGPC) Hospital, the second largest tertiary care hospital in Islamabad. Selection of blood donors was done according to pre-established inclusion criteria considering body weight, haemoglobin and interviewing about medical and donation history. The qualifying donors (n=10,145) were informed of the objectives of the study and oral consent was sought.

Serum samples taken from blood bags were screened for Hepatitis B surface antigen (HBsAg), anti-HCV antibodies (NANBASE C-96 3.0 enzyme linked immunosorbent assay), anti-HIV antibodies (DIMS's enzyme linked immunosorbent assay), syphilis (IMMUTREP Rapid Plasma Reagin RPR) and Malaria (Biotech ICT). All tests were performed according to manufacturers' instructions. The frequencies and percentages were calculated using Statistical Package for Social Sciences (SPSS version 17.0, SPSS Inc. Chicago, IL).

A comprehensive literature survey was done to shortlist national/local studies and those from neighbouring countries with similar experimental settings, for subsequent comparison of TTI prevalence among blood donors.

## Results

During the period from January 2010 to December 2011, a total of 10,145 blood donations were processed at blood bank of FGPC hospital, Islamabad. Of these, 9573 (94%) blood donations were from replacement donors while another 608 (6%) were contributed by voluntary non-remunerated blood donors (VNRBD). A total of 1,454 donations (14.34%) were found positive for at least one of the infections. The prevalence of HCV, HBV, HIV, Syphilis and Malaria was found to be 846 (8.34%), 397 (3.91%), 0 (0%), 90 (0.89%) and 121 (1.20%) respectively (Table-I).

**Table I: Prevalence of transfusion transmitted infections among blood donors (n=10,145)**

Test	Positive	
	Number	Percentage
Anti-HCV (ELISA)	846	8.34
HBsAg (ELISA)	397	3.91
Anti-HIV (ELISA)	0	-
Syphilis (RPR)	90	0.89
Malaria Parasite (ICT)	121	1.2

An online literature search for prevalence of transfusion-transmitted infections among blood donors exhibited 51 studies in Pakistan during past 12 years. Thirty two of those studies addressed seroprevalence of HBsAg among blood donors with weighted average of 3.11% (range 1.1 – 8.4%) whereas anti-hepatitis C antibodies were also assessed in 32 studies with average of 3.4% (range 0.07 – 8.68%).

## Discussion

Health care systems of developing countries are continuously facing the challenges of inadequate supply of safe blood and an increase in the prevalence of transfusion associated infections. A major constraint in availability of safe blood is the non-compliance of voluntary non-remunerated blood donation (VNRBD) concept recommended by WHO. Unfortunately this model could not be implemented in Pakistan owing to the social and traditional practices where replacement/paid donations are preferred over volunteer donations despite potential risk of increased transfusion-

transmitted infections (TTIs). The present study outlines the prevalence of TTIs in healthy blood donors.

The seroprevalence of HCV in the study population (8.34%) has clearly outnumbered frequency of HBV (3.91%) in these cases. This reflects a recent shift in prevalence trend witnessed during the last decade as documented by other groups as well. [6] A decline in HBV incidence rate might be attributed to the vaccination programmes and increased public health awareness campaigns whereas high rate of HCV seropositivity represents an ever increasing pool of asymptomatic carriers and chronically infected patients. In the past, such a high percentage of HCV has been previously reported by Manzoor I et al., in 2008 in Lahore (7.69%)<sup>[7]</sup> and also by Ujjan ID et al., in 2006 in Hyderabad (8.68%)<sup>[8]</sup>. An increased prevalence of viral hepatitis among blood donors has serious consequences on health care system. A large community of thalassaemic patients in the country (6% carrier rate) [9] are facing an imminent risk with accumulating higher percentages of HBV (8.4%) and HCV (56.8%) as they receive multiple transfusions every year. [10] Other high risk groups include intravenous drug users, male sex workers and transgenders.

None of the subjects in the study tested positive for anti-HIV antibodies. According to the National AIDS Control Programme, [11] 97,400 people in the country of 180 million (0.05%) are afflicted with HIV infections. Despite increased incidence among high risk groups, prevalence among general population has been below 0.1%. [5] The rate of syphilis seropositivity in the subjects was 0.89% which is slightly higher than previously published results falling in the range of 0.01 – 0.78%. [7, 12-14] The prevalence of syphilis has gone up in the recent past and probably attributed, partly to unsafe sexual practices and decline in the use of protective measures. Special emphasis should be given to tackle this increasing rate of infection because it increases the risk of HIV transmission by two to five folds, in addition, syphilis/HIV co-infection have high prevalence. [15-16] Other countries in the region including Iran [17] (0.04%) and India [18] (0.08%) have reported lower prevalence of syphilis.

For malaria, which was first reported as transfusion-transmissible in 1911 [19], appropriate donor selection and deferral criteria are considered sufficient but our results showed 122 positive cases (1.20%) which were asymptomatic. The high prevalence of malaria is very

serious and it is therefore recommended that all blood donations must be screened for malaria parasites.

## Conclusion

The best approach to minimize these TTIs is to create awareness among the public in order to develop a culture of voluntary blood donation and mandatory quality assured screening. Our study proposes the development and testing of appropriate approaches for setting up a blood bank system based on voluntary blood donations. Our study proposes launching a national system for the evaluation, selection and validation of all assays used for blood screening to ensure flawless blood testing. With such a high number of TTIs, it is also more economical and resource saving to perform all this screening directly via donors' blood, before drawing blood which would eliminate potential high risk donors.

In Pakistan, Blood Donor Organizations (BDOs) are mostly university based voluntary organizations managed by students. They collect blood from voluntary donors for hospitals of their choice. Some of them are also running thalassaemia care and community health programmes. We propose the establishment of linkages with the BDOs. This potential has never been exploited in the past and it could facilitate the promotion of voluntary blood donation concept. Recently, government of Pakistan has initiated a similar project, National Blood Transfusion Programme (NBTP) which is striving to address this issue through a comprehensive approach based on a complete system reform which very clearly outlines the responsibilities of blood establishments in terms of staff qualifications, basic blood screening, testing, documenting and reporting requirements.

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## References

1. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. *Indian J Pathol Microbiol* 2010;53:308-9
2. Hutin Y, Kitter ME, Dore GJ, Perz JF, Armstrong, GL, Dusheiko G et al. Global burden of disease (GBD) for hepatitis C. *J Clin Pharmacol*. 2004;44:20-29
3. Pakistan Medical Research Council. Prevalence of Hepatitis B and C in Pakistan. 2008. Pakistan Medical Research Council, Ministry of Health, Government of Pakistan

4. Bibi I, Devrajani BR, Shah SZA, Soomro MH, Jatoi MA. Frequency of syphilis in female sex workers at red light area of Hyderabad, Pakistan. *J Pak Med Assoc.* Vol. 60, No. 5, May 2010 353-356
5. Waheed U. HIV/AIDS: Evaluation of Kits and Formulation of a Testing Strategy for Pakistan, 2012. LAP Lambert Academic Publishing. ISBN 978-3847314462
6. Qureshi H, Arif A, Riaz K, Alam SE, Ahmed W, Mujeeb SA. Determination of risk factors for hepatitis B and C in male patients suffering from chronic hepatitis. *BMC Res Notes* 2009, 2:212.
7. Manzoor I, Hashmi N, Daud S, Ajmal S, Fatima H, Rasheed Z, Syed S. Seroprevalence of Transfusion Transmissible Infections (TTIs) in Blood Donors. *Biomedica* 2009;25 (2): 154 – 158
8. Ujjan ID, Memon RA, Butt AR, Sheikh IA, Khokar GN, Yousafani GM, Farooq M. Seroprevalence of HbsAg and anti-HCV in healthy blood donors. *Pak J Gastroenterol* 2006;20(1):75-7.
9. Ahmed S. Thalassaemia in Pakistan. Pakistan Society of Haematology, Education Series. *Haematology Updates* 2009; 7-10
10. Shah SMA, Khan MT, Zahour Ullah, Ashfaq NY. Prevalence of Hepatitis B Hepatitis C virus infection in multi-transfused thalassaemia major patients in North West Frontier Province. *Pak Med J Sci.* 2005; 21(3): 281-284.
11. National AIDS Control Programme. Ministry of Health, Government of Pakistan. <http://www.nacp.gov.pk> Accessed on 12/09/2012
12. Moiz B, Adil SN, Khurshid M. Seroprevalence of syphilis in healthy non commercial blood donors in Karachi. *J Coll Physicians Surg Pak* May 2006;16(5):385-6.
13. Rahman MU, Akhtar G, Lodhi Y. Seroprevalence of Syphilis in the blood donors in Lahore. *Pak J Med Sci.* 2002;18(4):284-286
14. Shah SA, Nasir K. Seroprevalence of Syphilis among Blood Donors at Shaikh Zayed Hospital, Lahore. *Mother & Child* 1998;13(4):154-7
15. Kent ME, Romanelli F. "Reexamining syphilis: an update on epidemiology, clinical manifestations, and management". *Ann Pharmacother* 2008;42 (2): 226–36.
16. Stamm LV. Global Challenge of Antibiotic-Resistant *Treponema pallidum*. *Antimicrob. Agents Chemother.* 2010;54 (2): 583–9.
17. Khedmat H, Alavian SM, Miri SM, Amini M, Abolghasemi H, Hajibeigi B, Alaeddini F, Fallahian F. Trends in Seroprevalence of Hepatitis B, Hepatitis C, HIV and Syphilis Infections in Iranian Blood Donors from 2003 to 2005. *Hepatitis Monthly* 2009;9(1):24-28
18. Bhawani Y, Rao PR, Sudhakar V. Seroprevalence of transfusion transmissible infections among blood donors in a tertiary care hospital of Andhra Pradesh. *Biology and Medicine* 2010; 2 (4): 45-48
19. Woolsey G. Transfusion for pernicious anaemia: two cases. *Ann Surg* 1911;53:132-5.