

Original Article

HIGH SERO-PREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG PRISONER BLOOD DONORS FROM PUNJAB PRISONS

Aslam Pervaiz, Muhammad Ashfaq, Bushra Faiz, Tanveer Ahmed Rana and Faheh Sher Sipra

Objective: Prisoners as a high risk group are never recommended for blood donations. In Pakistan, prisoners are legally allowed to donate blood and get thirty days extra remission. In Pakistan, there is not much published data on prisoner blood donors.

The study aimed to estimate the sero prevalence of human immunodeficiency virus (HIV), Hepatitis B (HBV), Hepatitis C virus (HCV) and Syphilis among physically healthy prisoner blood donors in prisons of Punjab.

Material and Methods: A retrospective review of record of all prisoner donors who donated blood during camps from January 2007 to December, 2009 was carried out in January 2010. Physically fit prisoner donors were tested for HCV, HBV, HIV and Syphilis by rapid test kits before donation. Those found negative for these infections were allowed to donate blood. Donated blood was retested for anti-HIV, anti-HCV and HBsAg by ELISA and syphilis by VDRL.

Results: A total of 3,074 prisoner donors were tested. 3050 (99%) donors were male. Mean age was 28 years (17-57 yr). Among prisoners, 235 (7.6%) were positive for HCV, 114 (3.7%) for Syphilis, 111 (3.6%) for HBV and 21 (0.7%) for HIV. Among these, 434 (14%) were positive for at least one of these infections. Three females (12.5%) were positive for syphilis and one (4.14%) for hepatitis B.

Conclusion: The prevalence of HIV, HBV, HCV and syphilis is higher in prison donors as compared to blood donors from general population. So prison inmates constitute a very high risk group among blood donors. Stringent screening of blood donors and even testing of donated blood by highly sensitive tests is recommended. We also recommend further studies and then modify blood donation laws accordingly.

Key words: HIV, HBV, HCV, Syphilis, Prisoner Blood Donors, Punjab, Pakistan

Introduction

Blood donations play a pivotal role for saving lives during acute emergencies subject to the condition that blood is safe.¹ Hepatitis B (HBV), Hepatitis C (HCV), Human Immunodeficiency Virus (HIV) and Syphilis are blood borne pathogens. These are efficiently transmitted by percutaneous (e.g. needle-stick) exposure to infectious blood. HBV, HIV and Syphilis are also transmitted by body fluids (e.g. semen and vaginal fluid).² The prevalence of various Sexually Transmitted Infections (STIs) among routinely accepted blood donors is well documented.³⁻⁵ Pre donation screening of volunteer donors is vital to ensure the delivery of safe blood to the public.¹

The high transmission rate of these blood-borne viruses in prisons is well known for several years.⁶⁻⁸ Prisoners are disproportionately affected by these infections, with prevalence of two to ten times higher than in the general population.⁹ So prisoners constitute a very high risk groups for transmitting blood-borne infections.

So, prisoners are not recommended for blood donations globally [FDA]. However, in Pakistan, there is not much published data on prisoner blood donors. Prisoners are allowed to donate blood vide Pakistan prison rules 1978, Rule no.212 subject to their medical fitness and thirty days extra remission is awarded. Medical fitness is declared by prison medical officer. Six months interval is permissible for next donation. Blood donation practices by prisoners to NGOs for thalassemic, hemophilic or other patients, who need blood transfusions on regular intervals, are prevalent in Punjab Prisons. To collect blood donation from prisoners is easy, as compared to general population, because they are available in large numbers at one place and are already motivated because they get benefit in the shape of remission. In the light of Pakistan Prison Rules (PPR), Inspectorate of Punjab Prisons grants permission to NGOs for arranging blood donation camps. WHO has recommended pre-donation blood test for HIV, HBV, HCV and Syphilis as mandatory.^{10,11} So permission is granted subject to physical fitness of prisoners and their screening inside jail before

donating blood for HIV, HBV, HCV and Syphilis. During blood camp, prisoners (willing to donate blood) are screened by Rapid test kit. These NGOs think that screening a prisoner inside Jail is overburden on them. So they carryout screening with a poor quality rapid test kits to fulfill the formality. However, they again screen the donated blood by ELISA method to re-confirm the safety of blood before transfusion.

The study aimed to estimate the sero prevalence of Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), Hepatitis C virus (HCV) and Syphilis among physically healthy prisoners who donated blood after screening, during blood camps arranged by Sundus Foundation in almost all prisons of Punjab during last three years.

Material & Methods

This study was conducted in January 2010 by the authors and Sundas Foundation, Lahore. To ensure the safety of blood, volunteer donors were checked by a doctor for physical fitness before screening. Volunteers with history of recent fever, weight loss, diarrhea, jaundice, liver disease, cardiovascular disease, pulmonary disease, malignancy and epilepsy were not included. Physically fit prisoner donors were tested for HCV, HBV, HIV and Syphilis by rapid test kit before donation. Those found negative for these infections were allowed to donate blood. Donated blood is retested for anti-HIV, anti-HCV and HBsAg by ELISA and for Syphilis by Venereal Disease Research Laboratory Test (VDRL). Blood found positive for any of these infections is discarded and remaining was transfused to needy patients.

A retrospective review of record of all prisoner donors, who donated blood in blood donation camps, arranged from January 2007 to December 2009, was carried out. We used a standard Performa to record Information about age, sex, date of donation, name of prison and laboratory report about positivity or negativity of each donor for HBV, HCV, HIV and Syphilis.

For confidentiality, personal identifiers were stripped off. The Epi-Info version 3.5.1 was used for data entry and analyses, while tables and charts were made using Microsoft Office.

Results

A total of 3,074 prisoner donors were tested. 3050 (99%) donors were male and 24 (1%) female. Mean age was 28 (17-57 yr) years. **(Fig-1)**

Among prisoners, who donated blood, 235 (7.6%) were positive for HCV, 114 (3.7%) Syphilis, 111 (3.6%) for HBV and 21 (0.7%) for HIV. 434 prisoners (14%) were positive for at least one of these infections. Hence 434 units of blood were discarded. [See Graph 2] Age distribution of positive cases is shown in table 2 & graph 3. Prevalence of these infections according to sex is given in Graph 4. See temporal trend of these infections **graph 5**.

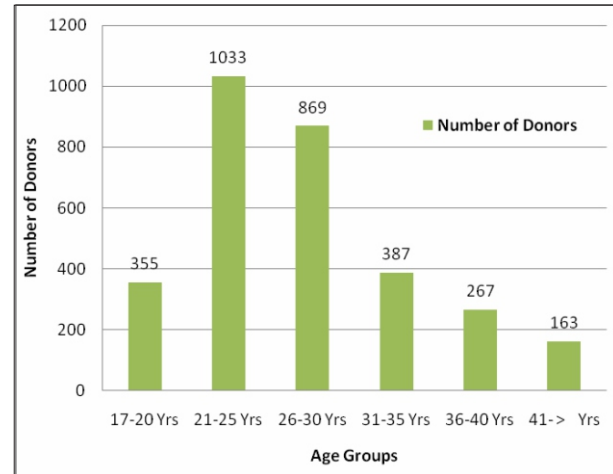
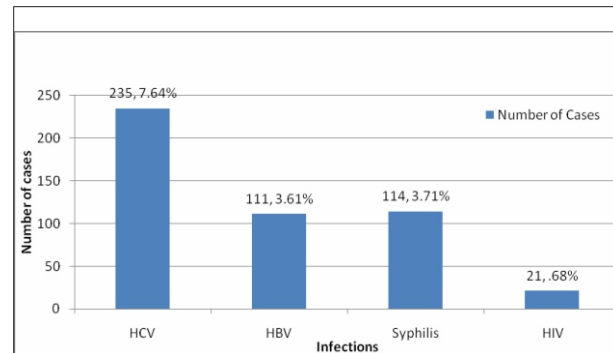
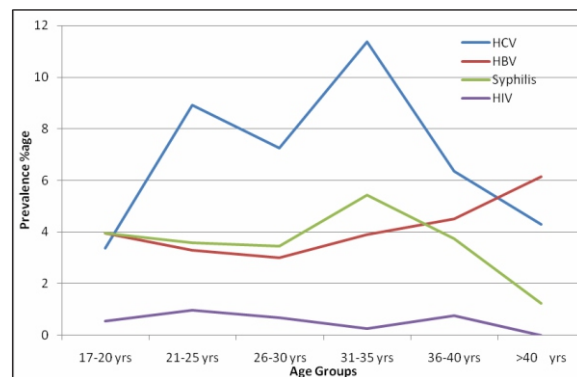


Fig-1 Age distribution of prisoner blood donors.



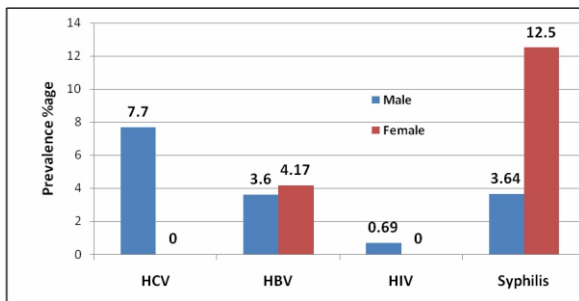
Graph-2: Prevalence of Syphilis, HCV, HBV and HIV among Prisoner Blood Donors.



Graph-3: Prevalence %age of HCV, HBV, HIV and Syphilis infections with respect to age groups in Prisoner Blood Donors.

Table-2: Sero prevalence of HCV, HBV, HIV and Syphilis in different age groups of Prisoner Blood Donors.

Age Groups	HVC %	HBV %	Syphilis %	HIV %
17-20 Years	3.38	3.94	3.94	0.56
21-25 Years	8.91	3.29	3.58	0.97
26-30 Years	7.25	2.99	3.45	0.69
31-35 Years	11.37	3.88	5.43	0.26
36-40 Years	6.37	4.49	3.75	0.75
>40 Years	4.29	6/13	1.23	0.00
Total	7.64	3.61	3.71	0.68

**Graph-4:** Gender wise Sero prevalence of HCV, HBV, HIV and Syphilis cases among Prisoner Blood Donors.

Discussion

High Prevalence of these infections among prisoner blood donors as compared to general population blood donors indicates that prisoners are high risk group. Blood donation by prisoners is prohibited worldwide even for research purposes [FDA]. So studies regarding prevalence of these infections among prisoner blood donors are scarce.

The prevalence of HCV is 7.64%, HBV 3.6%, Syphilis 3.7% and HIV 0.68% in this study. In the medical and public health literature review over a 13-year period (January 1994-September 2007) prevalence of HCV was found 2.8% and HBV 2.3% among healthy adult blood donors in Pakistan.¹² Another study revealed prevalence of HCV Infection 2.4% among replacement blood donors and 1% among voluntary blood donors in Pakistan.¹³ In Shaukat Khanum Cancer Hospital, Lahore prevalence of these infections among volunteer and replacement blood donors was found to be HBV 1.46 2.99%, HCV 3.01 4.99%, HIV 0 - .06% and Syphilis 0.19 0.57% respectively. Blood donation data of ten years was reviewed in this study.¹⁴ Prevalence of HIV was reported 0 - 0.22% in a number of studies on blood donors.^{15,16} Prevalence of HBV, HIV and Syphilis among blood donors in

Lahore was reported 1.7%, 0.05% and 0.49% respectively.^{17,18} Seroprevalence of syphilis among adult donors was reported to be 0.67% in another study.¹⁹ The data published with respect to prevalence of HBsAg among the blood donors of Pakistan since the year 2005 to date indicates that the average prevalence of HBsAg was 3.02% in Punjab.²⁰ In our study, HCV, HIV and syphilis show fluctuating trend till 35 years and then progressively decreasing trend. However HBV show progressively increasing trend after 30 years of age. A study in Lahore showed increasing trend after 35 years in HCV, HBV and HIV but decreasing trend in Syphilis.¹⁴ However prevalence of HCV and HBV infections is significantly higher and in case of HIV and syphilis many times higher among prisoner blood donors as compared to general population donors in this study. This proves that prisoner blood donors are high risk donors. Decreasing trend of HBV before the 30 years of age may be due to increased vaccination against hepatitis B in the community through EPI (Expanded Program of Immunization). Decreasing trend of other infections seems to be the cross effect of HIV awareness campaigns. However further research studies about the epidemiology of these infections are required to answer all questions in this regard.

Among female prisoner donors prevalence of HCV and HIV was nil but prevalence of HBV and syphilis was high as compared to male prisoner donors. In another study, done in Ghurki Trust Teaching Hospital, prevalence of HCV, HIV and Syphilis were consistent with our study.¹⁸ In our study, only those prisoners present themselves for donation who think that they are healthy. Blood was collected from prisoners who were declared physically fit and found negative in screening against these infections. It indicates that prevalence may be too high if blood testing may be carried out, out of random samples. These healthy looking prisoners are unaware of their

status. This state of affairs is more dangerous because these prisoners never perceive for any treatment and neither observe preventive measures to spread their disease to others and their family. Others are also not aware of their status. So they are not conscious to observe preventive practices with regard to them.

Our study has some limitations. It may not be a true representative of whole prison population. Only those donors were tested who were willing to donate blood. One month remission is awarded to prisoners for one pint of blood. So their motivation may be under the influence of remission. It may be considered donation versus some sort of benefit. Prisoner donors have specific characteristics. Therefore, results may not be generalizable to the whole prison population as the prevalence rate of these infections may underestimate. Preferably young and middle aged people donated blood. So prevalence of these infections among other age groups especially older and juvenile prisoners may not be a true representative of actual prevalence. Other authors have also acknowledged these limitations.^{12,21} Serological tests are unable to detect these infections in their window period e.g., HBV. So in some cases blood declared negative may have potential to transmit infection.

Conclusions

It is evident from our study that prevalence of transfusion transmissible infections (TTIs) among intended prisoner blood donors is high as compared to general population volunteer blood donors. This is underlying reason of not recommending prisoners for blood donation. The probability of infection from an exposure varies in proportion to the prevalence of the virus in the population. Among the population with high

prevalence of TTIs the risk of missing the detection of these infections during window period is high. There is 1% chance of transfusion related complications including Transfusion transmitted infections with every unit of blood transfusion.^{10,22-24}

As per a WHO report the viral dose in HIV transmission through blood is so large that one HIV positive transfusion leads to death, in children on an average, after 2 years and in adults after 3 to 5 years.^{22,23}

Price of missing of detection of any infection even in a single pint of blood may be a human life who accepted donation for life.

This study well identified the burden of blood borne pathogens among physically healthy looking prison population in Punjab Prisons. It facilitates evidence based policy making for prevention and control of these infections in this population. Prison period is an ideal time for treatment of positive cases and to educate those are on risk. Continued education and awareness will play an important role for control of this problem. The prisoners have their own circle of relations. Prisoners are influential in this circle and their messages are considered to be responded. So education of a prisoner means educating a group or gang as peer education and so is a self continuing process. Stringent screening of prisoner blood donors must be undertaken with highly sensitive tests. Enhanced coverage of vaccination against hepatitis B in this population may help to further reduce disease of these infections should be carried out in this population. Screening at the time of entry in to prison will help to bifurcate the burden of acquisition of these infections into acquired before or after incarceration. Additional studies are recommended before considering amendment of relevant rules.

Punjab Health Department

Technical Officer (Health), Inspectorate of Prisons Punjab,

www.esculapio.pk

References

1. Ministry of Health, Jamaica. National Transfusion Service 1999. Ministry of Health, Jamaica.
2. Cindy MW, Keith MS and Scott SS. Hepatitis B, hepatitis C, and HIV in correctional populations: a review of epidemiology and prevention. *AIDS* 2005, 19 (suppl 3):S41S46
3. Ministry of Health, Jamaica. Surveillance report 1999, 2000 and 2001. Ministry of Health, Kingston, Jamaica.
4. Brady-West DC, Buchner LM. Retrospective audit of blood donation at a hospital-based blood centre. Implications for blood product supply and safety. *West Indian Med J* 2000; 49: 2268.
5. Ampofo W, Nii-Trebi N, Ansah J, Abe K, Naito H, Aidoo S, et al. Prevalence of blood-borne infectious diseases in blood donors in Ghana. *J Clin Microbiol* 2002; 40: 35235
6. Andrew A, Adjei, Henry B, Armah, Foster G, William K, Ampofo, Isaac K E, Quaye, Ian F A, Hesse and George Mensah. Prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and syphilis among prison inmates and officers at Nsawam and Accra, Ghana. *Journal of Medical Microbiology* (2006), 55, 593597
7. Catalan-Soares BC, Almeida RTP and Carneiro-Proietti ABF.

- . (2000). Prevalence of HIV-1/2, HTLV-I/II, hepatitis B virus (HBV), hepatitis C virus (HCV), *Treponema pallidum* and *Trypanosoma cruzi* among prison inmates at Manhuacu, Minas Gerais State, Brazil. *Rev Soc Bras Med Trop* 2000; 33: 2730.
8. Haber PS, Parsons SJ, Harper S E, White PA, Rawlinson W D and Lloyd AR. Transmission of hepatitis C within Australian prisons. *Med J Aust*, 1999; 171: 3133.
 9. Cindy MW, Keith MS and Scott SS. Hepatitis B, hepatitis C, and HIV in correctional populations: a review of epidemiology and prevention. *AIDS* 2005, 19 (suppl 3):S41S46
 10. Sinha SK, Roychoudhury S, Biswas K, Biswas P, Bandopadhyay R. Prevalence of HIV, Hepatitis B, Hepatitis C and Syphilis in donor's blood: A study from eastern part of India. *Open Journal of Hematology*, 2012; 3-1
 11. Screening Donated Bloods for Transfusion-Transmissible-Infections, World Health Organization, 2009 ([http:// www.who.int/ bloodsafety/ ScreeningTTI.pdf](http://www.who.int/bloodsafety/ScreeningTTI.pdf)).
 12. Ali SA, Donahue RM, Qureshi H, Vermund SH. Hepatitis B and C in Pakistan: prevalence and risk factors. *Int J Infect Dis.* 2009; 13(1): 9-19.
 13. Mujeeb SA, Pearce MS. Temporal trends in hepatitis B and C infection in family blood donors from interior Sindh, Pakistan. *BMC Infectious Diseases* 2008; 8: 43 doi:10.1186/1471-2334-8-43
 14. Sultan F, Mehmood T, Mahmood MT. Infectious pathogens in volunteer and replacement blood donors in Pakistan: a ten-year experience. *Int J Infect Dis.* 2007; 11: 407412
 15. Khan MA, Rehman A, Ashraf M, Ali A, Allah Ditta. Prevalence of HBV, HCV and HIV in Blood Donors at Liaquetpur. *Professional Med J Mar* 2006; 13(1): 23-26.
 16. Sheikh AA, Sheikh AS, Sheikh NS, Shan R, Malik T, Afridi F. High frequency of false positive results in HIV screening in Blood Banks. *J Ayub Med Coll* 2004; 16 (1): 28-31.
 17. Attaullah S, Khan S and Khan J. Trend of transfusion transmitted infections frequency in blood donors: provide a road map for its prevention and control. *Journal of Translational Medicine* 2012, 10:20
 18. Manzoor I, Hashmi N, Daud S, Ajmal S, Fatima H, Rasheed Z and Syed S. Seroprevalence of Transfusion Transmissible Infections (TTIs) in Blood Donors. *Biomedica* 2009; 25 (2): 154 158
 19. Khan EA, Khokhar N. Malik G J. Seroprevalence of syphilis in asymptomatic adults seeking employment abroad. *Rawal Med J* 2004; 29: 65-67.
 20. Khan NU, Siddique L, Ali I, Iqbal A, Munir I, Rashid F, et al. Prevalence of hepatitis B in the blood donors of N-W.FP and FATA regions and the current scenario of HBV infection in Pakistan. *African J of Biotechnology.* 2010; 9(37): 6162-6166.
 21. Jafri W, Jafri N, Yakoob J, Islam M, Tirmizi FA, Jafar T, Akhtar S, Hamid S, Shah HA, Nazmi SQ: Hepatitis B and C: prevalence and risk factors associated with seropositivity among children in Karachi Pakistan. *BMC Infect Dis* 2006, 6:101.
 22. Pallavi P, Ganesh CK, Jayashree K, Manjunath GV. Seroprevalence and Trends in Transfusion Transmitted Infections Among Blood Donors in a University Hospital Blood Bank: A 5 Year Study. *Indian J Hematol Blood Transfus* (Jan-Mar 2011) 27(1):16
 23. Arora D, Arora B, Khetarpal A (2010) Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. *Indian J Pathol Microbiol* 53:308309
 24. Widmann FK, editor. Technical manual American Associations of Blood Banks. Anglington USA: 1985; 325-44.