

High Seropositivity of HIV, Hepatitis and Syphilis in Prisoner Blood Donors than the General Population Volunteers from the Punjab, Pakistan –A Longitudinal 13 Years Study

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Abstract:

Background: HBV, HCV, HIV and Syphilis are leading transfusion transmitted infections. Blood donors are screened against these infectious diseases before transfusion to patients.

Methods: Data of general population and volunteer prisoner blood donors is retrieved from records of January 2007 to September 2009. Data is analysed using Epi Info version 3.5.1. Blood donors were screened using ELISA method against HCV, HBV, and HIV while VDRL method is used for screening against Syphilis.

Results: Prevalence of HBV, HCV, HIV, and Syphilis in general population blood donors is 3.3%, 4.7%, 0.51% and 0.47% respectively. Prevalence of HBV, HCV, HIV, and Syphilis in prisoner blood donation is 7.81%, 15.42%, 1.17%, and 7.63% respectively.

Conclusion: Prevalence of HBV, HCV, HIV and Syphilis is high in prisoners as compared to general population.

Keywords: Hepatitis B, Hepatitis C, HIV, Blood donors, Prisoners

Introduction:

Blood and blood products play a vital role for saving lives during surgical procedures and trauma care. Almost all prolonged surgical interventions require standby availability of matched blood. Similarly, during cancer therapies and management of blood disorders, i.e., thalassemia and haemophilia require matched blood. Major source of blood, perhaps the only source of blood worldwide, are the unpaid Volunteer blood

donors (1). However, the situation in Pakistan is reverse: the family members donate more than 90% of blood, when available, and around 10 to 20 percent purchased from professional blood donors². Pakistan has a high burden of thalassemia with 70000 registered patients in various institutions (2). These patients need blood transfusion on regular intervals to prolong life. Family members avoid donating blood on regular basis. Often patients belong to

poor economic background. Blood is more important than bread for them. So mostly they are dependent on free blood donations. Different private blood transfusion services run by nongovernmental organizations (NGO) facilitate them. These organizations arrange blood donation camp in general population, e.g., educational institutions, factories, offices, markets places etc. In the Punjab few NGOs also arrange blood camps in prisons with the permission of Prisons Authorities. To collect blood donation from prisoners is easy as compared to general population, because they are available in large numbers at one place, already motivated through getting some calculated benefit in the shape of remission sentence. Prisoners are allowed to donate blood vide Pakistan Prison Rules (PPR) 1978, Rule No.212 subject to their medical fitness. Thirty days remission awarded to donor prisoner in lieu of one pint of blood (3).

Some infective pathogens, e.g., Hepatitis B virus (HBV), Hepatitis C virus (HCV), Human Immunodeficiency virus (HIV), and Syphilis are common blood borne pathogens. These have common mode of transmission (4,5). These are transmitted by exposure to infectious blood through transmission of blood or blood products and percutaneous (e.g., needle-stick). HBV, HIV and Syphilis transmitted through mucosal body fluids (e.g., semen, vaginal fluid) (6).

However, in the paucity of epidemiological studies in Pakistan, the prevalence of HBV infection is estimated to be 2.5%, and that of HCV infection as 4.8% (7). The prevalence of HIV is guesstimated at less than 0.1% (8) among general population in Pakistan. Seroprevalence of syphilis, among asymptomatic

adults seeking employment abroad, was reported as 0.67% (9). In a longitudinal study over a 13-year period (January 1994–September 2007) in Pakistan, prevalence of HCV is reported as 2.8% and HBV as 2.3% among healthy adult blood donors (10). In the Punjab, Shaukat Khanum Cancer Hospital, Lahore recorded prevalence of these infections among volunteer and replacement blood donors as HBV 1.46 – 2.99%, HCV 3.01 – 4.99%, HIV 0 - 0.06% and syphilis 0.19 – 0.57% after reviewing ten years blood donation data (11).

Available data suggest a high prevalence of HIV, syphilis, HBV, and HCV among prisoners globally (12, 13, 14, 15, 16). Prevalence is estimated two to ten times higher than in the general population (17). Prisoners emerged as a very high-risk group for blood borne infections (18). They are not recommended for blood donations (19). However, in Pakistan, there is no published data regarding prevalence of these communicable infections among prisoner blood donors.

In this situation transfusion of safe blood is a matter of concern. Delivery of safe blood has become difficult by increasing prevalence of these pathogens. The transfusion of contaminated blood, instead of saving life, can be fatal. Thus, the pre-transfusion screening of donated blood for test for HIV, HBV, HCV and Syphilis is vital to ensure the delivery of safe blood to the public (20). Those NGOs in the Punjab, that organize blood donation camps in the Prisons, as well as those arrange in general population, carry out screening of donated blood. Analysis of screened blood data may provide a reliable

estimate of prevalence of these infectious in the various types of blood donor populations. The study was conducted to assess the prevalence of HIV, HBV, HCV and syphilis among prisoner blood donors and compare it with general population donors in the Punjab, Pakistan. Based on the data of the study evidence-based recommendations will be formulated for submission to the policy makers to revisit the Pakistan Prison Rules (PPR) 1978, in the light of the findings.

Material and Methods:

Setting: This study was undertaken in a well-equipped laboratory of Sundas Foundation, a NGO in Lahore, that provides free blood transfusion to registered patients of haemophilia and thalassemia at regular intervals as per medical advice. For round the clock availability of blood and blood products Sundas Foundation organize blood donation collection camps in general population, i.e., colleges, universities, factories, and markets, as well as prisons of the Punjab, round the year.

Donor population: All healthy volunteer donors, either prisoners or from general population, who donated blood in organized blood donation campaign during January 2007 to September 2009, constituted the sample population. All prospective volunteer blood donors, above 16 and below 60 years, were interviewed prior to donation and examined by the physician for physical fitness. Those found unfit on physical examination or found to be a patient of jaundice or any blood borne disease were not allowed to donate blood.

Laboratory Test: Donated blood was tested for anti-HIV, anti-HCV and HBs Ag by

ELISA and Syphilis by VDRL (Venereal Disease Research Laboratory Test).

Data collection: A retrospective review of Laboratory record of all donors was carried out during March to June 2010. A standard Performa was used to abstract data about demographic characteristics, date of donation and laboratory test report of each donor for HBV, HCV, HIV and Syphilis. The protocol has been approved by the Institutional Ethical Committee (IEC) and strict confidentiality of personal data of blood donors.

Statistical analysis: Data were statistically analysed with Epi-Info version 3.5.1. A *p* value less than 0.05 was set as significant level. Tables and figures were prepared by using Microsoft Office. The frequency data has been compared by chi-square and Fisher's exact test where appropriate. Odd ratios (OR) were examined by using univariate analyses. Those variables, which were significantly associated with seropositivity of these infections from univariate analyses were examined by multiple logistic regression models to assess independence of variables.

Results:

A total of 14,330 volunteer blood donors were tested, of whom 11,263 (78.6%) were from the general population and 3,067 (21.4%) were from the prison. Mean age of general population and prisoner donors was 21 (Range; 16- 60yrs) and 28 (Range; 17-57 yr) years respectively ($p < 0.005$). Among general population donors, 9880 (88%) were males and 1383 (12%) females. While in prisoner donors 3050 (99%) were males and 17 (1%) females. Among general population blood donors 292 (2.6%) were positive for Anti-HCV, 201 (1.8%) for HBs Ag, 22

(0.2%) for Syphilis and 14 (0.12%) for Anti-HIV. Among these, 518 (4.6%) were positive for at least one of these diseases. Co-infection among these infections was negligible in general population donors. Among prisoners, 235 (7.7%) were positive for Anti-HCV, 114 (3.7%) for syphilis, 111 (3.6%) for HBs Ag and 21 (0.7%) for Anti-HIV. Among these, 434 (14%) were positive for at least one of these infections. Age distribution of cases of these infections among prisoner and general population donors is given in Table 1. Sex wise distribution of these infections among donors is given in Table 2. Male to female difference of these infections in general population donors was negligible.

Co-infection of these infections among both subtype of donors is given in Table 3. Being a prisoner blood donor was associated with higher seropositivity for Syphilis (OR=19.68; CI=12.2-31.99, $p = .00$), Anti-HIV (OR=5.53; CI=2.69-11.46, $p = .00$), Anti-HCV (OR=3.11; CI=2.6-3.73, $p = .00$) and HBs Ag (OR=2.00; CI=1.62-2.63, $p = .00$).

Discussion:

The present study is unique of its type. No other study has compared frequency of Anti-HCV, HBs Ag, Anti-HIV and Syphilis among prisoner and general population volunteer blood donors. Prevalence of Anti-HCV was 3 times, HBs Ag 2 times, Anti-HIV 6 times and Syphilis 19 times higher in prisoner donors as compared to general population donors. Study findings are inconsistent with previous studies those identified that prisoners are high risk groups and prevalence of these infections is two to ten times high among prisoners (17, 18). These studies give prevalence of blood borne

pathogens among random sample of prisoners. However, prisoners included in our study are healthy volunteer, who felt that they are healthy and declared so on clinical examination. Previous studies are not realistic in comparison of prisoner and general population. Authors compare the findings of their studies among prisoners with findings of already conducted studies among general population. In this study prevalence of these infections is worked out among volunteer prisoner and general population blood donors those donated blood during same period. So, these findings are more relevant and strongly strengthen the version "Prisoners are high risk groups (21-24). Findings of present study also add another evidence-based support to FDA for not recommending prisoners for donation of blood and blood products.

Blood donation by prisoners is prohibited worldwide by FDA. FDA has recommended "Current inmates of correctional institutions (including jails and prisons) and individuals who have been incarcerated for more than 72 consecutive hours during the previous 12 months be deferred as donors of Whole Blood, blood components, Source Leukocytes, and Source Plasma for 12 months from the last date of incarceration" FDA considers approval of blood collection from high risk donors for in-vitro, or other special uses, when there are no alternative sources.[FDA] So studies regarding prevalence of these infections among prisoner blood donors are scarce. Despite an exhaustive review of the literature we could not find similar studies for comparison.

Prisoner donors also not fulfil the criteria of Volunteer unpaid blood donors set forth by

the WHO. They get remission as reward of blood donation. As the commercial donors never donate by their free will, they donate blood for money. Similarly, prisoner donors donate for remission and fall under the category of commercial donors. If we carried out behavioural screening before donation for current inmates, they may avoid telling about their behavioural risk factors because they are interested to donate blood for early release (25). Reliability of pre-donation screening through rapid test by NGOs may also be questionable because refusal to intended donor to donate blood may decrease prisoner's motivation to donate blood and will reduce blood donation bulk for NGO. Prisoners donate for remission gains.

The prevalence of HCV, HBV, HIV and Syphilis amongst general population blood donors from various areas of Punjab extracted from Published data is summarized in Table 3. Frequencies of these infections among two groups of our study (General population donors and volunteer prisoner donors) during the study period are also given below in same table for comparison.

The prevalence of HCV among general population donors in our study is almost similar to reported for Punjab. However, prevalence among prisoner donors is two to three times high than reported for general population in our study and for Punjab (26, 27, 28, 29). The prevalence of HBsAg Positive among general population donors in our study is also almost similar to reported for Punjab. However, prevalence among prisoner donors is high than reported for general population in our study and for Punjab (26, 27, 28,29). The prevalence of syphilis in our study among general

population donors is half than reported by Shaukat Khanum Cancer Hospital, Lahore (only study which reported prevalence of syphilis among blood donors in Punjab) (11). However, prevalence of syphilis among prisoner donors is 6-18 times high than reported for general population in our study and for Punjab (26, 27, 28, 29). Prevalence of HIV among general population donors in our study is too high than reported in these blood donor studies, however it is almost same when compared to national estimates. Prevalence of HIV among prisoner donors is six times high than national estimate and our study findings (11).

Prevalence of HCV and HBV is slightly high and syphilis and HIV low in 17 to 30 years old general population donors as compared to above 30 years. Prevalence of HCV, HBV and Syphilis is high and HIV low among above 30 years old prisoner donors as compared to below 30 years. As per of our knowledge no other blood donors study in Punjab has discussed prevalence of these infections among different age groups of blood donors. So, we cannot present comparison. However, prevalence of these infections among both age groups is high in prisoner donors as compared to general population donors except HIV, which is high among general population donors above 30 years of age.

Of the 434 prisoner donors with infectious diseases 59 (13.6%) had dual or triple co infections. But out of the 518 general population donors with infectious diseases only 11 (2.1%) had dual co infections. As a whole, coinfection among any two or three of these infections among prisoner and general population donors is 1.52% and .097%

respectively. It is 16 times high in prisoner donors. Triple co infection do exists among any three infections in prisoner donors but not present in general population donors. However, no prisoner donor was suffering from all these four infections. Higher prevalence of Syphilis, HBV and HIV co-infection with HCV cases indicates that these infections share common modes of transmission. Significant triple co-infections also represent the same modes of transmission (30, 31, 32). No study in Pakistan among blood donors has discussed co-infection among these infections.

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Table 1: Age Distribution of Prevalence of Syphilis, HCV, HBV and HIV in Prisoner and General Population of Blood Donors

Age Groups	Prevalence (%age) of Infections									
	Among Gen. Population Donors					Among Prisoner Donors				
	No. D	HCV	HBV	Syphilis	HIV	No. D	HCV	HBV	Syphilis	HIV
17-30 yrs	10539 (93.6%)	2.63	1.8	0.19	0.10	2253 (73.4%)	7.40	3.28	3.59	0.8
>30 yrs	724 (6.4%)	2.07	1.52	0.28	0.41	814 (26.6%)	8.32	4.53	4.04	0.37
Total	11263	4.7	3.3	0.47	0.51	3067	15.72	7.81	7.63	1.17

Table 2: Co-Infection of Syphilis, HCV, HBV and HIV in Prisoner and General Population of Blood Donors

Co-Infection among different Infections	Prisoner (N=3067)		General Population (N=11263)	
	Number	%age	Number	%age
HCV and Syphilis	21	0.68	2	0.017
HCV and HBV	14	0.46	8	0.072
HCV and HIV	7	0.23	1	0.009
Syphilis and HIV	5	0.16		
Syphilis and HBV	5	0.16		
HBV and HIV	1	0.03		
Syphilis, HCV and HIV	4	0.13		
Syphilis, HBV and HCV	1	0.03		
HIV, HCV and HBV	1	0.03		

Table 3: Prevalence of Hepatitis B, Hepatitis C, HIV and Syphilis among blood donors in different parts of Punjab, Pakistan

Reference	Place	Year	Number	Anti-HCV % +ve	HBsAg % +ve	Anti-HIV % +ve	VDRL % +ve
Shah	Shaikh Zayed Hospital, Lahore	2006-08	60719	3.8	1.4	0.006	--
Khan	Bahawal Victoria Hospital, Bahawalpur	2005	27938	2.5	2.6	00	--
Chaudhary	Fauji Foundation, Hospital Rawalpindi	2005	1428	2.5	2.4	--	--
Mahmood	Blood Transfusion Centre, Multan	2004	6000	.2	3.3	00	--
Sultan	Shaukat Khanum Cancer Lahore	1996-2005	41498	3.68	2.21	0.02	0.43
Present Study	All Punjab General Population	2007-2009	11263	2.6	1.8	0.12	0.2
	Donor Prisoner		3067	7.7	3.7	0.7	3.6