

Pre-Blood-Donation Screening of Volunteer Prisoners for Hepatitis B and C in Prisons of the Punjab, Pakistan

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ABSTRACT

Objectives: To identify the potential benefits of pre-donation screening of blood.

Study design: Retrospective.

Place and Duration: Prisons in the Punjab province. From January 2011 to September 2013.

Background: Prisoners, as a high risk group, are not recommended for blood donations. In Pakistan, however, prisoners are legally allowed to donate blood and get thirty days remission.

Methodology: Volunteer prisoners, after examination and verification by a physician for their physical fitness, were tested for Hepatitis C Virus (HCV) and Hepatitis B Virus (HBV) by Rapid Test Kit before bleeding. Data was analyzed by Epi-Info.

Results: A total of 5894 male volunteer prisoner donors were screened and 1038 (17.6%) were rejected because of hepatitis infection. The mean age was 28 years (range; 17 - 70 years). Of 5894 prisoners, 857 (14.5%) were HCV positive and 222 (3.8%) were HBV positive. Co-infection of HCV and HBV was present among 41 (0.7%). Hepatitis infection, among convicted-prisoner blood donor, is significantly associated with higher seroprevalence for HCV (OR 1.35, 95% C.I. 1.17-1.57) while under-trial-prisoner is significantly associated with higher seroprevalence for HBV (OR 1.40, 95% C.I. 1.06-1.85).

Conclusion: Hepatitis B and C viruses were responsible for almost 18% prisoner blood donor rejection. Pre-donation screening of blood donors is an effective intervention to improve the safety and limit the cost of blood. Treatment of identified infected prisoners may contribute to public health. In the international scenario this study findings necessitate the amendments in the relevant prison rules.

INTRODUCTION

Donated blood plays a pivotal role for saving lives of thalassemic, hemophilic, severely anemic, hepatitis patients, and during acute emergencies subject to the condition that the blood is safe and free from pathogens; because infected blood will be injurious to the Health of recipients. The screening of prospective donors is vital to ensure the delivery of safe blood to the public.¹ The prevalence of various STDs (sexually transmitted

diseases) among routinely accepted blood donors is well documented.^{2,3,4} Blood borne pathogens are efficiently transmitted by percutaneous (e.g., needle-stick, shaving blades, etc.) exposure to infectious blood and transfusion of blood and blood products. HBV (Hepatitis B Virus), HCV (Hepatitis C Virus) and Syphilis are also transmitted per mucosal body fluids (e.g., semen, vaginal fluid, etc.).⁵

In the absence of epidemiologic studies in Pakistan, the prevalence of HBV infection is estimated to be 2.5% and that of HCV infection as 4.8%. It is one of the highest rates in the world.⁶ However, Blood donor studies in Pakistan, showed various prevalence of HCV ranging from 0.82% to 6.21%.⁷⁻¹⁶ Similarly most of the studies, based on screening of donors at blood banks in Pakistan, gave prevalence rate of, HBV as less than 3.54%.^{7,9-13,17-19}

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The high transmission of blood-borne viruses i.e., HBV, and HCV in prisons is well known for several years.²⁰⁻²² Prisoners are disproportionately affected by these infections, with prevalence of two to ten times higher than in the general population.²³ Prisoners have high risk behaviors including unsafe sexual practices, sharing shaving blades and syringes. In prisons MSM practice exists especially in juvenile and drug addict barracks. Young age and first time offenders are forced for sexual favour by elders and more aggressive inmates. Overcrowding in these barracks also fuels the high risk sexual behaviors among them.²⁴

Prisoners, being very high-risk group for blood-borne infections, are not recommended for blood-donation globally. However, in Pakistan, not much published data on prisoner blood donors is available. Prisoners are allowed to donate blood, vide Pakistan Prison Act 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 mandatory between each donation. A prisoner can donate blood many times with his will but he can earn maximum four remissions.

According to Pakistan Prisons Remission System, prisoners can earn other remission besides blood donation. Under Pakistan Prison Act, rule 217, a prisoner cannot earn ordinary remission more than one-third of his conviction and Superintendent Prison can forfeiture ordinary remission of any prisoner subject to his poor conduct. However, remission awarded against Blood donation is not liable to forfeiture like ordinary remission and is also exclusive of the maximum limit of one third remissions. So prisoners donate blood voluntarily to get early release. However, under trial prisoners may also donate blood voluntarily on humanitarian grounds. Under trial prisoners can also get blood donation remission if their period passed in jail as under-trial is included in conviction by the Law-Court. Practice of blood donation by prisoners to NGOs (Non-Governmental Organizations) for thalassemic or other patients, who need blood transfusion, are quite common in the Punjab Prisons. To collect blood donation from prisoners is easy as compared to general population, because motivated donors are available in large number at one place: added incentive is remission. NGOs, which want to collect blood from Prisoners, seek permission from the Inspector General (IG) Prison. Generally permission is granted subject to screening of Prisoners, inside Jail premises, before donating blood against HIV, AIDS H BV and syphilis, and Physical fitness of the volunteer by the Medical Officer Jail. During blood camp prisoners (willing to donate blood) are screened by Rapid test kit.

Thus, the present study was conducted to find out the seroprevalence of Hepatitis B and C among prison

inmates who volunteered blood donors from prisons of the Punjab.

METHODOLOGIES

This retrospective study was conducted from January, 2011 to September 2013, in the prisons of the Punjab. The permission was sought by Sundus Foundation, a NGO, with qualified staff and well equipped laboratory, which aims to identify, register and provide blood transfusion supportive therapy to persons afflicted with haemophilia and thalassemia. Blood for transfusion to these persons is collected from willing donors for which blood donation camps are organized in colleges, universities, factories, markets as well as in prisons round the year. To ensure the safety of blood, donors are checked, before bleeding, by a physician not only for physical fitness but also for HCV and HBV, which is done by rapid test kit.

Data regarding, age, cause of confinement, type of prisoner and prison of confinement were collected for each volunteer prisoner blood donor, including their consent. The protocol was approved by the Institutional Ethical Committee (IEC). The Epi-Info version 3.5.1 was used for data entry and analyses while figures were made using Microsoft Office. The frequency data were compared by chi-square test. Odd ratios (OR) were calculated by using univariate analyses. A *p* value less than 0.05 (2-tailed) was considered statistically significant.

RESULTS

A total of 5894 intended volunteer prisoner blood donors were screened out of which 1038 (17.6%) were denied due to hepatitis infection. All were male and 65% of them were between the ages of 21 to 30 years. Of 5894 jail inmates, 2219 (37.6%) were convicted prisoners (mean age 29 years) and 3675 (62.4%) under trial prisoners (mean age 27 years). 857 (14.5%) were HCV positive and 222 (3.8%) were HBV positive. Dual infection with HBV and HCV was 0.7%. Of 2219 convicted prisoner donors, 366 (16.5%) were HCV positive and 81 (3.7%) were HBV positive. Of 3675 under trial prisoner donors, 491 (13.4%) were HCV positive and 141 (3.8%) were HBV positive.

Analyses on regional basis between Northern Region and Central Region of the Punjab prison revealed higher incidence of both HCV and HCB in the Central Region. Region wise prevalence of HCV and HBV is shown in Figure 1.

Age wise distribution of intended prisoner donors and prevalence of HCV and HBV is presented in Table 1 and Figure 2.1, 2.2., 2.3. The temporal trend and year wise distribution of HCV and HBV is shown in Table 2. and Figure 3.1, 3.2, 3.3.

Being convicted prisoner blood donor is significantly associated with higher sero prevalence for HCV (OR 1.35, 95% C.I. 1.17-1.57, $p < 0.05$) and being under trial prisoner is significantly associated with higher sero prevalence for HBV (OR 1.40, 95% C.I. 1.06-1.85, $p < 0.05$).

DISCUSSION

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

Table 1: Age wise prevalence of HCV and HBV among volunteer prisoner donors

Characteristic	N (%)		
	Prisoners screened	HCV	HBV
Age group (years)			
17-20	571 (9.69)	46 (8.06)	16 (2.80)
21-30	3847 (65.27)	549 (14.27)	142 (3.69)
31-40	1221 (20.72)	217 (17.77)	545 (4.44)
41-50	229 (3.89)	43 (18.78)	9 (3.93)
51-70	26 (0.44)	2 (7.69)	1 (3.84)
Total	77 (100)	379 (100)	87 (100)
	5894	857 (14.5)	222 (3.8)

This study is believed to be the first of its kind in the country. High HCV prevalence simulates with an 'outbreak' like situation of HCV within prison settings of Punjab province. The prevalence of HCV among intended healthy prisoner blood donors is three times high and HBV 1% high as compared to general population in Pakistan.⁷ This study supports previous reports that prisoners represent a high-risk group for blood borne diseases and prevalence of HCV and HBV is many times higher than general population.²⁵⁻³¹

The prevalence of HCV is 14.54% and HBV 3.8% 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 3% and HBV 2.4% among healthy adult blood donors in Pakistan.³² Another study revealed prevalence of HCV Infection 2.4% among replacement blood donors and 1% among voluntary blood donors in Pakistan.³³ Another study shows prevalence 4.85%.³⁴ At services hospital Lahore it was found 4.97% among healthy blood donors.^{15,35} In railway hospital Rawalpindi prevalence of HCV was 6.2% and HBV 1.8% but in CMH Sialkot prevalence of HCV among volunteer blood donors was 6.52%.³⁶ In a study conducted in Shaukat Khanum Cancer Hospital including volunteer and replacement blood donors found HCV and HBV prevalence 3.68% and 2.22% respectively. This study includes blood donation of

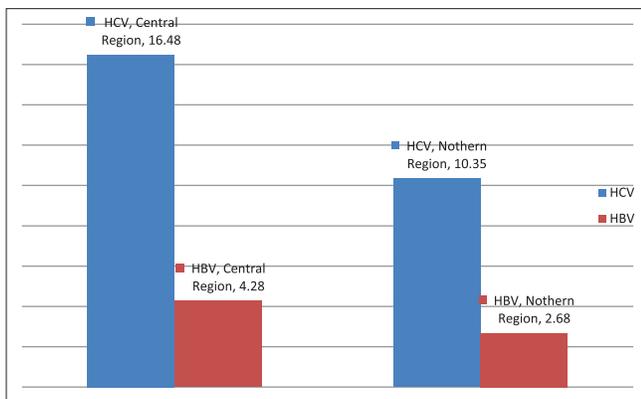


Figure 1: Region wise prevalence of HCV and HBV among volunteer prisoners donors in the punjab prisons

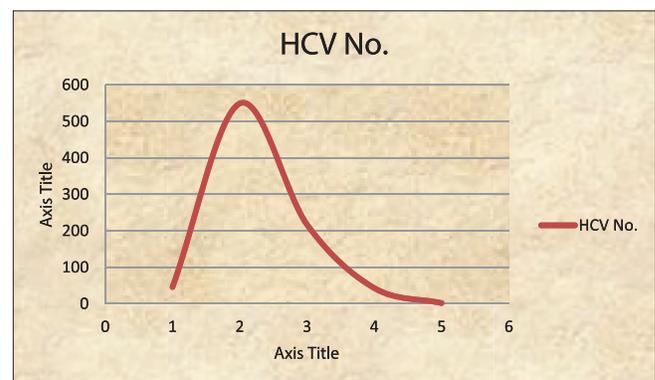


Figure 2.2: Age wise prevalence of among volunteer prisoner donors

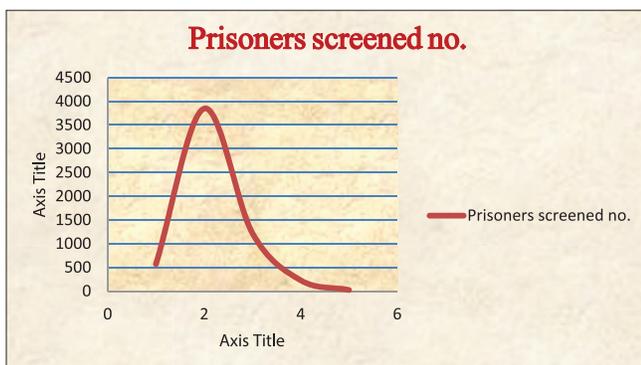


Figure 2.1: Prisoners screened no.

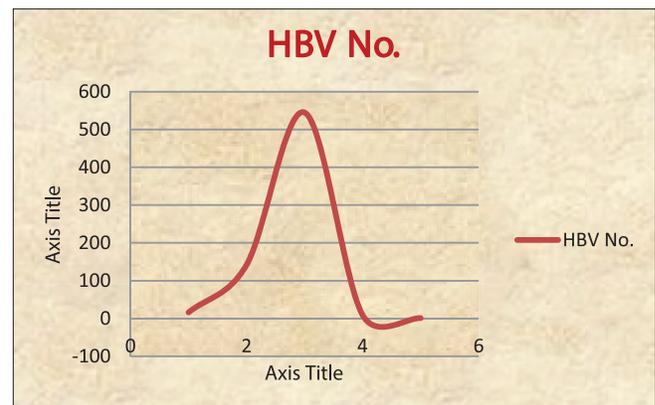
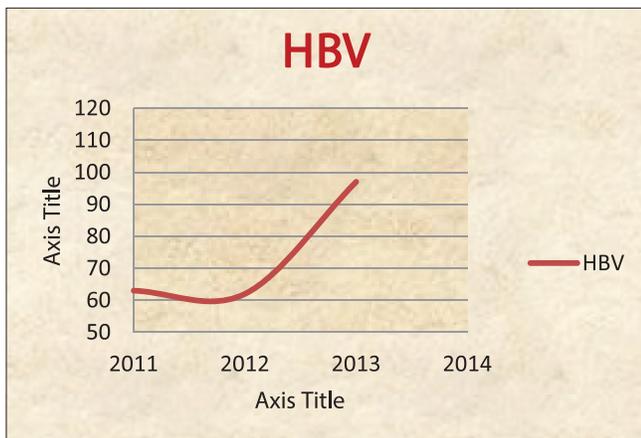
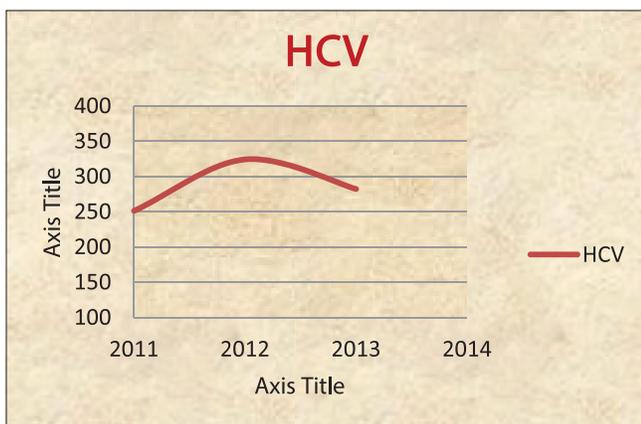


Figure 2.3: Age wise prevalence of HBV among volunteer prisoner donors

Table 2: Year wise prevalence of HCV and HBV among volunteer prisoners donors in the Punjab prisons

Years	N (%)		
	Prisoners donors screened	HCV	HBV
2011	1935 (32.83)	251 (12.97)	63 (3.26)
2012	1994 (33.83)	324 (16.25)	62 (3.11)
2013	1965 (33.34)	282 (14.35)	97 (4.94)
Total	5894	857 (14.54)	222 (3.77)

**Figure 3.1:** Prisoners screened no.**Figure 3.2:** Year wise prevalence of HBV among volunteer prisoners donors in the punjab prisons**Figure 3.3:** Year wise prevalence of HCV among volunteer prisoners donors in the punjab prisons

ten years.³⁷ The data published with respect to prevalence of HBs Ag among the blood donors of Pakistan since the year 2005 to date indicates that the average prevalence of HBs Ag was 3.02% in Punjab.³⁸

The prevalence of HCV and HBV are showing regional trend. Prevalence of HCV and HBV are high among intended prisoner blood donors of Central Region as compared to Northern Region. Almost no increasing or decreasing temporal trend in the prevalence of HCV and HBV is seen during three consecutive years.

CONCLUSIONS

The study has shown clearly that prevalence of HCV among intended prisoner blood donors is 2-5 times high and HBV 1.4 -2% high as compared to general population volunteer blood donors. This is underling 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 HCV and HBV the risk of missing the detection of antibodies against these viruses during window period is high.

It is evident from this interventional study that pre-donation screening of blood substantially minimizes the risk of collection of infected blood for donation.

On the finding of this study, Sundus Foundation has stopped blood collection from prisoners.

One the other hand it also identifies the disease burden which 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 who are on risk.

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