

Seroprevalence of Hepatitis B, C and HIV in Blood Donors in Northern Pakistan

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Abstract

Objective: To study the seroprevalence and trends of Hepatitis B, C and HIV sero markers in healthy blood donors of Northern Pakistan.

Subjects and Methods: Blood donated by healthy donors from both Armed Forces and civilian population, collected from Jan 1996 to Dec 2000 were tested by Enzyme Linked Immunoassay at Armed Forces Institute of Transfusion Rawalpindi, Pakistan. Demographic data of these donors was also studied.

Results: Of 103858 blood donors, 3.3% (95% CI 3.20%-3.41%) were HBsAg, 4.0% (95% CI 3.91%-4.11%) were anti HCV and 0.007% anti HIV positive. Their average was 28 years. HBsAg positive donors were a decade younger than anti HCV positive donors. Pattern in Armed Forces and civilians donors was similar but there was significant reduction in the prevalence of HBsAg carriage in all blood donors.

Conclusion: This study supports the changing trends in HBV/HCV seroprevalence in blood donors and a low prevalence of HIV in Pakistani population. (JPMA 52:398; 2002).

Introduction

Blood donation from voluntary and non-remunerated blood donors and screening for anti HCV antibodies has significantly decreased the number of hepatitis B and C cases and also has reduced the significance of surrogate markers like ALT and Hepatitis B core antibody¹⁻³. Because of poor health care system, unsafe blood transfusion practices and existing cultural and religious norms a high prevalence of Hepatitis B and C and a low prevalence of HIV is expected in Pakistan. This study reports a five years seroprevalence of HBV, HCV and HIV in army personnel and civilians who donated blood at the Armed Forces Institute of Transfusion (AFIT).

Material and Methods

Donation records and serum of all donors reporting to the Armed Forces Institute of Transfusion (AFIT), Rawalpindi from January 1996 to December 2000 were analyzed. All donors were interviewed and findings were recorded on a specially designed questionnaire. Type of donor i.e., directed, replacement or volunteer, donor identification, age, medical record, blood group, height, weight, blood pressure, haemoglobin and addresses were recorded. Informed consent was obtained from each donor.

Only donors having history of jaundice in preceding year, I/V drug abuse stigma, low weight, fever, low hemoglobin or less than desirable age were excluded. Each donor was asked about the previous donations and card issued at that time was checked as per institutional policy. The standardized donor deferral criterion, which is used to defer volunteer donors, could not be applied completely on these directed/replacement donors. The data presented in the following paragraphs include only donors who have been accepted for donation.

The screening methods consisted of Qualitative ELISA on Quantum 11 Spectrophotometric ETA equipment. Abbott Laboratories reagents for HbsAg (EIA Cat No. 66-6634/R8), for anti HCV (ETA 3.0 Cat No.67-6443/R5) and for HIV (1/2 GO eia Cat No. 675646/RI) were used according to the manufacturers instructions. Controls provided by the manufacturer and external controls were used. Positively reacting samples were retested in duplicate with the same methodology next day and those reacting positive in either one or both duplicate tests werelabeled as “repeat reaction” and then included in the study.

Results

Over a period of five years (January 1996 to December 2000) a total of 103858 donations were collected with an average of 20771 donations per year. Of these, 69584 donations, (67%) were from civilians and 34273 (33%) from Armed Forces personel. The volunteer donors constituted less than 0.1%, the rest being replacement/directed donors. Professional donors could no be excluded with confidence because occasionally they tend to get sponsored by the family members. The card system helped to identify the donors previously deferred on the basis of Hepatitis B, C or HIV. The chances of multiple donations from missed seroactive donors was negligible as there were no repeat donors from Armed Forces or civilian population. Screening results were conveyed to the respective donors and they referred to an appropriate clinician. Ninety nine percent of the donors were males belonging to Northern Pakistan. Average age of the donors was 28 years (range 18 years to 69 years). Majority of the donors were in their third decade of life (Figures land 2).

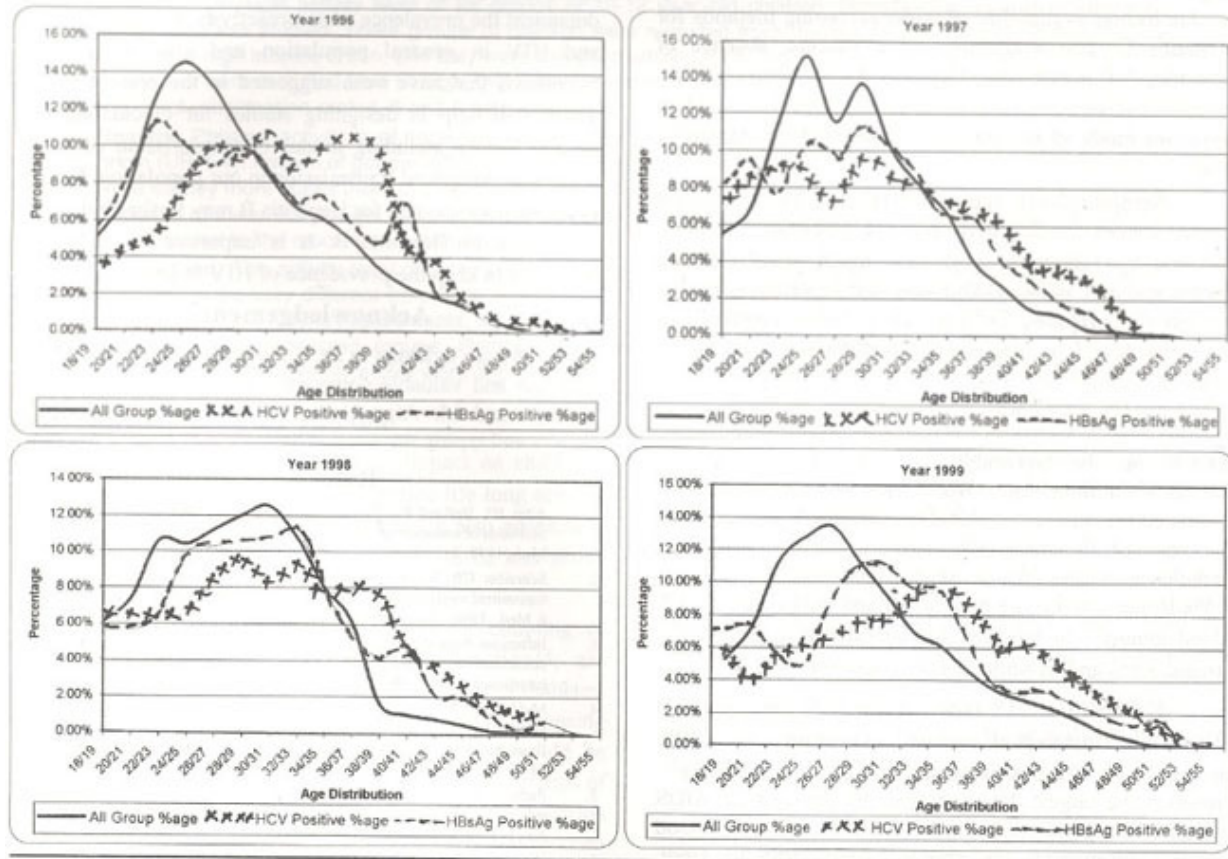


Figure 1. Age distribution of all donors and Hepatitis B and creative donors.

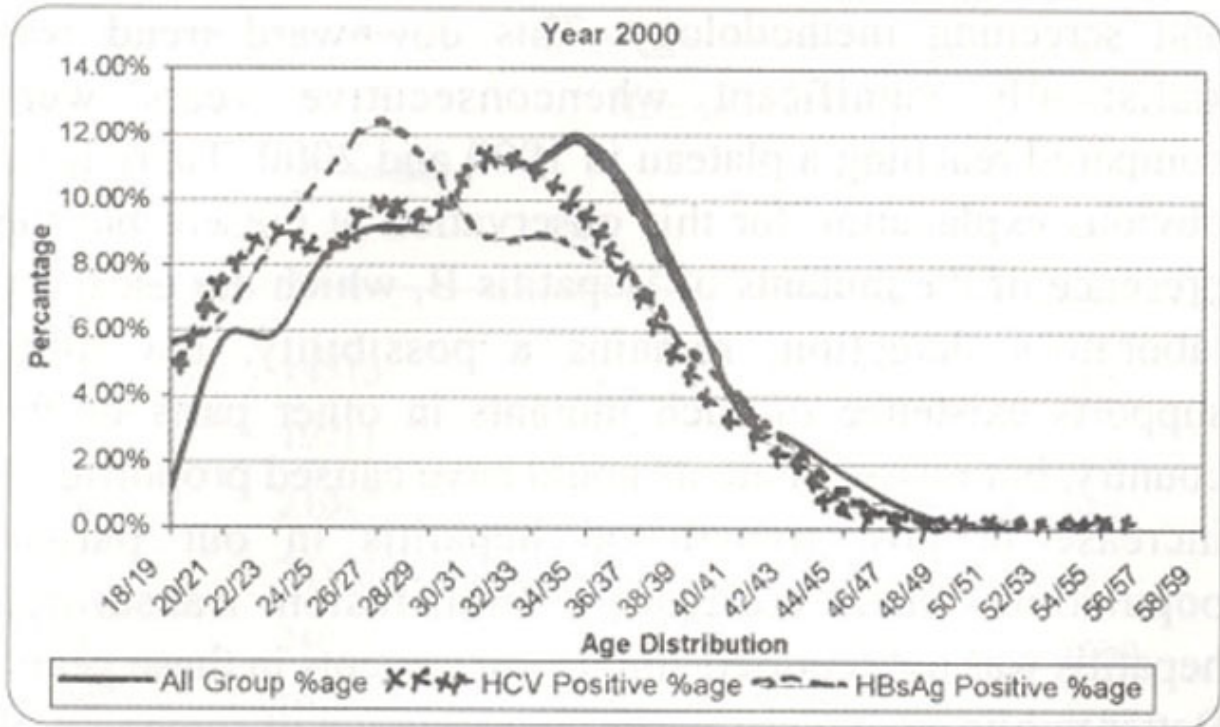


Figure 2. Age distribution of all donors and Hepatitis B and C sero reactive donors.

HbsAg positive donors were a decade younger than anti HCV antibodies positive donors (Figures 1 and 2). There was insufficient information on the ethnic groups of all the donors. Out of 103858 donors, 3440 (3.3% and 95% confidence interval 3.2% to 3.4%) were HBsAg and 4167 donors (4.0% and 95% confidence interval 3.9% to 4.1%) were anti-HCV positive. Seventy-three donors (0.07%) tested positive for both HBsAg and anti-HCV antibodies. Eight donors (0.007%) were HIV positive. There was no difference in the seroprevalence of civilian or Armed Forces personnel. The prevalence data of HbsAg for each year was compared with each consecutive year to see the increasing/decreasing trends (Tables 1 and 2).

Table 1. Prevalence of Hepatitis B, C and HIV.

Year	No. of Donations	HBsAg Positive		Anti-HCV Positive		HBsAg + HCV Positive		HIV	
		No.	%	No.	%	No.	%	No.	%
1996	14513	758	5.22	493	3.39	13	0.08	0	0
1997	19711	808	4.09	826	4.19	14	0.07	0	0
1998	21047	577	2.74	855	4.06	16	0.07	2	0.009
1999	24573	676	2.75	984	4.00	16	0.06	1	0.004
2000	24014	626	2.60	1009	4.20	14	0.07	5	0.020
96-00	103858	3445	3.32	4167	4.01	73	0.070	8	0.007

Table 2. Comparison of prevalence of Hepatitis in consecutive years.

Years	HBsAg	Significance	HCV	Significance
1996 Vs 1997	5.22% Vs 4.09%	P 0.001	3.39%Vs 4.19%	P >.5
1997 Vs 1998	4.09% Vs 2.74%	P 0.0001	4.19%Vs 4.062%	P >.5
1998 Vs 1999	2.74% Vs 2.75%	P .951	4.062%Vs 4.00 %	P >.5
1999 Vs 2000	2.75% Vs 2.6%	P 0.939	4.0% Vs 4.01%	P > .5

The seroprevalence of HBsAg showed a downward trend from 1996 to 1997 but then the effect plateaus off in later year. However, the seroprevalence of HCV is not significantly different from 1996 to 2000. There were no sero-reactive donors for HIV in 1996 and 1997. Two donors in 1998 (.009%), one in 1999 (.004%) and five in 2000 (0.020%) were repeat reactive for HIV. Total prevalence of HIV during these four years fluctuation in seroreactivity with season or time of the year was observed.

Discussion

in this study an attempt has been made to define the seroprevalence of Hepatitis B, C and HIV among healthy donor population mostly from Northern areas of Pakistan. Data consists of analysis of the last five years (January 1996 to December 2000). The testing method used during whole period of the study consisted of third generation ELISA technique that is used by the majority of the large Blood Transfusion Services. The donor population consisted of both Civilians as well as Armed Forces personnel. Since uniformed personnel are exposed to peculiar living conditions (barracks, closed community living, almost uniform working environment and same health facilities), possibility of a difference between the seroprevalence rate of the civilians and Armed Forces personnel was kept in mind but was not found to be true. This observation may signify exposure of both groups to common risk factors unrelated to the peculiar environment provided by Armed Forces. However, all cases HIV seroreactive donors were civilians.

Age distribution is shown in Figure 1. The earlier peak of Hepatitis B could be due to higher rate of vertical transmission of this virus in our population. Since donors are not less than 18 years of age, it was not possible to assess the minimum age of acquisition of HBsAg. A cross sectional serosurvey of population under 18 years may show the age of highest prevalence of HBV in our population. The late positivity of anti HCV may be due to exposure to its risk factors at a later age. It is usually in the earlier half of the third decade that our male population starts their career, becomes socially and sexually active. Detailed epidemiological studies are required to correlate these observations with prevalence of Hepatitis C.

Overall seroprevalence of HBsAg during these five years was 3.3% and showed a significant downward trend, despite uniform donor population, donor acceptance criteria and screening methodology. This downward trend was statistically significant when consecutive years were compared reaching a plateau in 1999 and 2000. There is no obvious explanation for this observation at present but the presence of the mutants of Hepatitis B, which are escaping laboratory detection, remains a possibility. No study supports existence of such mutants in other parts of the country, but missed mutants could have caused proportional increase in post transfusion hepatitis in our patient population. Such increase in transfusion transmitted hepatitis was not reported among our patients in these years. Better public awareness, earlier introduction of screening of blood donors and vaccination opportunities for Hepatitis B may have contributed to this falling trend. Additional factors could have been the change in the behavior of people, changing practices of medical community with regard to usage of disposable syringes and usage of screened blood for hepatitis B. Vaccination alone against HBV cannot account for a decrease in prevalence in such a short time because it is neither affordable nor widely available to the section of society to which majority of our blood donors belonged. Even in USA the availability of vaccination against hepatitis B has not caused significant decrease in hepatitis B seroprevalence⁴. Self-deferral of hepatitis B positive individuals is another possible explanation and could not be excluded.

The average seroprevalence of Hepatitis C over the past 5-year period was found to be 4.01%, which was 0.7% higher than Hepatitis B with no significant trend. This may be due to non availability of wider screening methods for Hepatitis C, non availability of a vaccine, absence of screening of donors for Hepatitis C in many centers, continued unsafe practices while giving injections⁵ and an unknown mode of transmission, other than the parenteral route.

Seroprevalence rate of HBV and HCV amongst blood donors in Southern part of Pakistan (Karachi) reported by Kakepoto et al⁶ was much lower (HBsAg 2.28% and anti HCV 1.18%) than that reported by us and another study (HbsAg 5.0% anti HIV 2.4%) reported from the same area⁷. The reasons for this difference are not very obvious. Mujeeb et al have however, observed that the positivity for HCV was directly related to the level of literacy thus a higher number of educated donors visiting AKUH could be responsible for decreased prevalence rate for HCV in their data. World Health Organization has estimated the number of Hepatitis Surface Antigen carriers is expected to reach 400 million worldwide with a prevalence of upto 10% in some Asian countries. It is 0.1-0.5% in the general US population and 0.02-0.04% in US blood donors⁸. In Pakistan the prevalence in children is around 3.6% and in adults it varies between 4-10%^{9,10}.

Kakepoto et al.⁶ reported the HIV prevalence of .02% while Mujeeb et al⁷ reported no positive case of HIV. In one centre the positivity rate for HIV was 0.003%¹¹. However the largest data published by the national AIDS programme reports screening of a total of 23,40,000 blood samples throughout the country from 1986 to 1999, 0.00% documenting a total of 139 HIV positive (0.6% and 178 (.007%) full blown AIDS cases¹². Combined prevalence of HIV positive and AIDS cases was .07%. This situation is in sharp contrast to US where at one time upto 1% of single donor unit transfusion were infected with HIV in early 1980s¹³. In our study although there were few HIV positive cases during the five year period but majority of cases were in the year 2000, that is significant in comparison with previous years (Table 1).

This study shows an intermediate prevalence rate of both HBV and HCV involving a relatively younger donor population while prevalence of HIV is still low. Hepatitis affecting younger age group leads to liver damage at an earlier age putting extra burden on health services for a longer

period of time. This warrants raising people's awareness through media and universal screening of blood for HBV and HCV. The situation at present is grim because universal screening of blood donors for HBV and HCV is not being carried out routinely in Pakistan. Detailed epidemiological studies would be needed to further document the prevalence of seroreactivity of Hepatitis B, C and HIV in general population and also to test the hypothesis that have been suggested in the present study. These will help in designing studies for elucidating the natural history including modes of transmission of HCV other than parenteral transmission in our population. Larger population vaccinated for Hepatitis B may further lower the prevalence of Hepatitis B. It is important to undertake measures to keep the prevalence of HIV at low levels.

Acknowledgements

We are indebted to Dr. Suhaib Ahmed for his help in statistics and valuable comments. We are thankful to Mr. Zulfiqar and Mr Atta Ahmed for assistance in drawing figures and typing the manuscript.

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