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Research Article

Serological and Molecular Prevalence of HBV and HCV and their Possible Transmission Routes in Volunteer Blood Donors of Punjab Pakistan

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Abstract

Introduction: Hepatitis B and C viruses are common transfusion-transmissible infectious agents and are threats to safe blood transfusion. This paper aimed to determine the sero and molecular epidemiology, risk factors and tendency of these viruses in volunteer blood donors in various districts of Punjab, Pakistan.

Methods: Total 2957 apparently healthy blood donors from different districts of Punjab were selected and subjected to screening for HBV and HCV markers and qualitative PCR was conducted. All the blood donors were interviewed and all the possible information was recorded in specifically designed data sheet.

Results: Out of 2957consecutive blood donors 2920 (98.74%) were males and 37 (1.25%) were females. The number of younger blood donors was significantly higher ($p<0.0005$) as compared to age group 36-45years. The overall prevalence of HBV and HCV was 1.18% (35/2957) and 4.93% (146/2957), respectively. Prevalence of anti HCV positive cases and HBsAg was found higher in Nankana and Bahawalpur. The HBsAg and anti-HCV were more common in AB+ve and B+ve blood groups respectively. History of dental treatment and beautyparlor /Barber shop were common highest risk factors. Among all donors only 4.09%(121) were vaccinated against hepatitis B.

Conclusion: From the present study it was concluded that a considerable percentage of the apparently healthy volunteer blood donors carry HCV and HBV agents. Dental procedures and beautyparlor/Barbershop were the most common risk factors. To ensure the safety of blood for recipient, comprehensive screening of donors' blood using standard methods are highly recommended.

Keywords: Hepatitis C Virus; Hepatitis B Virus Punjab; Blood donors

Introduction

In Pakistan safe blood transfusion remains a major concern due to the high prevalence of a number of circulating Transfusion-Transmissible Infections (TTIs) particularly hepatitis causing viruses in the region, inadequate blood transfusion services/ policies, infrastructure, and financial resources. Hepatitis may be caused by viruses, bacteria, drugs or excess alcohol intake. The most important causes of acute and chronic viral hepatitis are due to the six well characterized hepatotrophic viruses A,B,C,D,E,&G [1]. Differentiation of viral hepatitis agents can be made only with the help of specific serological tests [2].

All types of hepatitis viruses are endemic in Pakistan. However, their prevalence varies in different areas of the country because of the geographical distances and variability in the ethnicity of the population [3]. Hepatitis C virus (HCV) continues to be a major disease burden on the world. In 1999 the WHO estimated a worldwide prevalence of about 3% with the virus affecting 170 million people worldwide [4]. In Europe, general prevalence of HCV is about 1% but varies among different countries [5].

So, present study was designed to investigate molecular prevalence of hepatitis B and C in relation to blood groups and environmental factors by collecting large number of samples from healthy donors who visited the different blood banks Punjab, Pakistan.

Methods

Data from 2957 consecutive blood donors were included for up to 1 year and analyzed from different districts of Punjab. A Performa was filled for each donor (with age between 18-60 years and weight >50 Kg) containing information regarding name, age, sex, address, education/ awareness, blood groups, screening results, vaccination status, history of transfusion/ blood donation, injection, infection of spouse, attending hepatitis patients, profession, dental treatment, needle prick, beauty parlor/barber shop, tattooing and any others. Donors with history of hepatitis, current or recent systemic disease/ or history of drug abuse, surgery and blood or blood products transfusion with last 6 months were excluded from study. All the donors included in this study were unpaid volunteers and consent was obtained from all patients. The study was approved by the Ethical Committee Bacteriologist to Government of Punjab, Health Department.

Blood grouping of all the donors was done by the slide and tile

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Table 1: Distribution of total blood donors with age and sex.

Age	Male	Female
18-30	2123 (71.79%)	28 (0.94%)
31-40	581 (19.64%)	08 (0.27%)
41-50	169 (5.71%)	01 (0.03%)
51-60	47 (1.58%)	00 (0.00%)
Total	2920 (%)	37(%)

method using commercially available reagents for blood grouping (DIAGAST inc. France) controls of known groups was run along with the screening of Hepatitis B Surface Antigen (HBsAg) and HCV were performed by using Abbot (USA) kit which uses an immunochrome autographic qualitative detection. Positive and negative sera were run as controls along with the tests. Further confirmations of the samples were done by the qualitative PCR by the method as described by the villano et al 2013.

Statistical analysis

SPSS version 14.0 for windows was employed and results were obtained in rates (%).

Results

Demographic characteristics of volunteer blood donors are shown in Table 1. Out of total 2957 blood donors 2920 (98.74%) were males and 37 (1.25%) were females. The number of males and females young blood donors was much higher as compared to the other age groups (*P-value < 0.001%).*

Prevalence of HBV and HCV in different groups and genders

Prevalence of HBV and HCV in different groups and genders in different age group is shown in Table 2. Among HbsAg positive male donors 85.71% were in age group of 18-30 years and 14.29% were in age group of 31-40 years. No HbsAg positive case was found in other two age groups. High number of Anti HCV positive cases was found in age group 18-30.

Table 2: Age and Gender wise Prevalence of HBsAg and Anti HCV positive cases.

Age Groups (Years)	HBsAg Positive cases		Anti HCV Positive cases	
	Males	Females	Males	Females
18-30	30(85.71%)	0	86(60.15)	2 (66.67)
31-40	5(14.29%)	0	41(28.67)	0
41-50	0	0	16(11.18)	1(33.33)
51-60	0	0	0	0
Total	35(100%)	0	143(100%)	3(100%)

Table 3: Prevalence of HBV and HCV in blood donors with different blood groups.

Blood group types	HBs Ag Positive	Anti HCV Positive cases
AB+	15 (42.86%)	33 (22.60%)
O+	8 (22.86%)	23(15.75%)
B+	6 (17.14%)	42 (28.77%)
A+	3 (8.57%)	29 (19.86%)
O-	2 (5.71%)	5 (3.42%)
B-	1 (2.86%)	9 (6.16%)
A-	1(2.86%)	5 (3.42%)
Total	35 (100%)	146 (100%)

Table 4: Prevalence of HBsAg and HCV positive cases in different districts of Punjab.

Districts	Distribution of HCV positive (n=146)	Distribution of HBsAg positive cases (n=35)
Kasur	14 (9.59%)	1 (2.86%)
Shaikhupuraa	12 (8.41%)	2 (5.71%)
Sahiwal	4 (2.53%)	1 (2.86%)
Pakpatan	12 (7.89%)	3 (8.57%)
Faisalabad	17 (11.76%)	3 (8.57%)
Lahore	8 (5.24%)	1 (2.86%)
Okara	13 (8.74%)	2 (5.71%)
Gujranwala	9 (5.88%)	1 (2.86%)
Pattoki	10 (6.97%)	3 (8.57%)
Sargodha	5 (3.33%)	1 (2.86%)
Nankana	17 (11.94%)	1 (2.86%)
Sialkot	9 (6.26%)	2 (5.71%)
Multan	6 (4.34%)	4 (11.43%)
khaniwal	5 (3.14%)	4 (11.43%)
Bhawalpur	6 (4.25%)	6 (17.14%)
	146 (100%)	35 (100%)

Prevalence of HBV and HCV in blood donors with different blood groups

Prevalence of HBsAg was higher 42.86% in AB+ve blood group, followed by O+ve (22.86%), and lowest in B-ve blood group. Prevalence of anti HCV positive cases among different blood groups is as follows; 28.77% in B+ve blood group, 22,60% in AB+ve, and lowest in A and O-ve blood groups as shown in Table 3.

Frequency distribution of HBsAg and anti HCV positive cases in different districts of Punjab

Distribution of HBsAg and anti HCV in different districts of Punjab is shown in Table 3. Prevalence of anti HCV positive cases was found high (11.94%) in Nankana and lowest (2.53%) in sahiwal. Whereas, Bahawalpur had highest prevalence of HBsAg and Lahore, sahiwal and kasur had lower prevalence of HBsAg as shown in Table 4 and Figure 1.

Association of possible risk factors with HBsAg and anti HCV positive patients

Results of different risk factors along with prevalence percentage are shown in Table 5. Among 35 HBsAg positive cases history of barbershop/beauty parlour was highest 10 (30.32%) followed by dental treatment 9(24.50%). Among the 146 anti HCV positive cases, history of barber shop/beauty parlor was 28.10%, followed by dental treatment 42(29%) and of injection28 (19.45%). Least associated risk factor was of tattooing in both cases.

Immunization of the patients against Hepatitis B

Out of the total blood donors history of vaccination against hepatitis B was also conducted and it was found that out of 2920 male blood donors only 121 (4.09%) were vaccinated against hepatitis B. Among 37 females only 70.24% were vaccinated against hepatitis B.

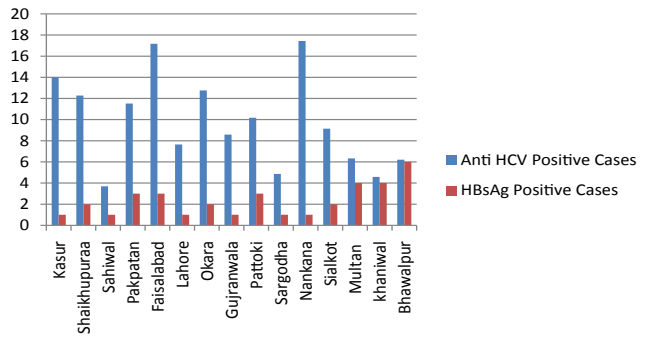

Figure 1: Prevalence of HBsAg and HCV positive cases in different districts of Punjab.

Discussion

Globally almost half of a million people are affected by HBV and HCV (transfusion-transmissible infection) and the incidence is shifting on an alarming rate particularly in developing countries [6]. In Pakistan, the rate of HCV and HBV is increasing vary rapidly and was roughly estimated that here are 9 million carriers of HBV and 14 million carriers of HCV [7]. Therefore in Pakistan, unsafe transfusion of blood and blood products remain an issue of major concerns in transfusion medication and incessant monitoring of the extent of these transfusion-transmissible infectious agents in blood donors can minimize their transmission. In current study female blood donors were very low as compared to the male blood donors. The reasons were poor health of females and several social issues. Asifet al, 2004 has also reported similar results as most of their donors were males (96.96%) as compared to females (3.41%) [8]. Moreover, the number of young blood donors was much higher as compared to other age groups (P value< 0.0005) in present findings. This is due to the more trend of blood donation in this age group in the areas of current study. Previous published reports also showed that 64% of voluntary donors were in the age group of 21-30 years [9].

The sero prevalence of HCV of this study is much higher than that from Multandistrict of the Punjab, Pakistan (0.27%) and lower for HBV (3.37%) in the studied healthy blood donors [10]. In present study, Prevalence rate of HBsAg and anti-HCV was more frequent in AB+ve and B+ve blood groups. This may be due to the more presence of these blood groups in general population. However, greater tendency of HCV and HBV in these blood groups could be explored further to know that either this is genetic or this is by chance. More cases of HCV and HBV were observed from district Nankana and Bhawalpur respectively. This might be due to, low literacy rate, poor hygienic conditions and low standards of living and no awareness of the common risk factors. Another important implication in our data analysis was to find the most possible risk factors involved in HBV and HCV transmission. Dental treatment and beauty parlour or barber shops are playing crucial role in the transmission of hepatitis B and C. Presently peoples are more careful about disposable syringes that may definitely reduce the spread of hepatitis B and C from infected patients to health population. Ryas et al., conducted in blood donors of Northern Pakistan reported that 79% anti-HCV positive blood donors associated with one or more of the likely risk factors, intramuscular injections (I/M) 71, % dental extraction 19% , surgery 15% , heterosexual contact with prostitutes 19% and multiple

Table 5: Percentage of risk factors involved in anti HCV and HBsAg positive cases.

Risk Factors	HBsAg Positive cases	Anti HCV Positive cases
Transfusion	2 (4.50%)	9 (5.99%)
Injection	7 (21.00%)	28 (19.45%)
Dental treatment	9 (24.50%)	42 (29%)
Attending Hepatitis Patient	3 (7.25%)	12 (8.17%)
Infection of spouse	3 (7.48%)	9 (6.35%)
Needle prick	1 (4.00%)	5 (3.25%)
Beauty parlour/ Barber Shop	10 (30.32%)	41 (28.10%)
Tattooing	1 (1.00%)	0 (0.00%)

blood transfusion 2% [9]. In another similar study by Villano et al. in Baltimore, reported that 30.3% of participants developed anti-HCV antibodies with most in the first 2 years of the study [11]. An epidemiological study was carried out in the largest blood bank of Santa Catarina, Brazil from 1991-2001, showing a significant drop in risk of acquiring HCV, but the lowest risk of 113721 was still almost 10 times higher than that of developed countries [12].

It was observed from the current study that, Immunization has played an important role in decreasing the prevalence of hepatitis B. On the other hand the results of a recent study from other part of Pakistan showed high prevalence rate of HBV in young subjects due to the absence of any immunization program and awareness campaigns [13].

Conclusion and Suggestions

A significant number of the apparently healthy volunteer blood donors harbour transfusion-transmissible infectious agents such as HCV and HBV. Prevalence rate of HBsAg and anti-HCV is more frequent in AB+ve and B+ve blood groups respectively. Appropriate guidelines and procedures on national level needs to be developed and implemented on urgent basis that may play a significant role in reducing the spread of these blood-borne infections during transfusion. These guidelines should contain mandatory screening of blood and blood products before transfusion, use of disposable syringes, appropriate sterilization of surgical and dental instruments, and appropriate disposal of infected materials. Immunization campaigns beside with general public alertness and educational efforts are required to be practiced immediately. The prevalence of transfusion-transmissible infectious agents needs to be studied continuously and on a larger scale for persistent monitoring of the extent of these agents in blood donors to minimize their transmission.

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