Original Research Article

Hepatitis B, C, and HIV infections among blood donors at several hospitals in Lahore, Pakistan.

ABSTRACT

The study's objectives are to find out the frequency of hepatitis C, B, and HIV infection among blood donors at different hospitals of Lahore; to understand the relationship of demographic risk factors contributing to the positive cases of hepatitis C, B, and HIV. A cross-sectional study with random sampling in which 200 blood donors participated. A questionnaire was used to record the social and personal practices. A small percentage of blood donors have a history of jaundice. More than one-fourth had undergone surgical intervention, and more than one-third had suffered a needle stick injury. The vast majority had a history of I/V injections/drips, tooth extraction/dental operations, or both. 10.5% of blood donors were Anti-HBV positive, 12.5% were Anti-HCV positive, and 0.5% were HIV positive. Shaving from community barbers should be avoided. In addition, to overcome hepatitis B, C, and HIV transmission, health education programs should be held among blood donors and the general public to prevent them from infection.

Key Words: Blood donors, Hepatitis B virus, Hepatitis C virus, HIV, Lahore

Introduction

Viral hepatitis is one of the global public health issues caused by hepatitis B virus (HBV), and hepatitis C virus (HCV) is declared to be a significant cause of mortalities in developing countries (Shah, & Ehsan, 2009; Cardona et al., 2020). Approximately 2.2% of the world is HCV victims (Weinberg, Zarka, Levy, & Shinar, 2009). Furthermore, according to literature, 140 million people previously analyzed to be positive for HCV antibodies are persistently infected, claiming HCV as one of the world's chronic bloodborne virally caused infections (Leyssen, & De Clercq, 1999). It is anticipated that approximately 350 million people, that is, 7% of the total population worldwide, are chronic HBV carriers (Kao et al., 2002). In southeast Asia, Chronic HBV infection is endemic where 10% population may be infected (Purow & Jacobson, 2003). With the help of better storage techniques and the utilization of blood banks, the blood has

become more widely used in patients. According to Shepard, Finelli & Alter (2005), more than one and a half million blood pints are collected per annum in Pakistan. 65% of the collected blood is from replacement donors, 25% from volunteer donors, and about 10% from professional donors (Qureshi et al., 2009). "Hepatitis B, C, HIV" and many other diseases are mainly transmitted through the blood (Chaudhary et al., 2007).

More than 15 million people are sick with hepatitis B and C viruses (Mustafa et al., 2021). Pakistan government announced a National Blood Policy in 2003 to ensure, before transfusion, the appropriate screening of blood (Waheed et al., 2009). Through blood transfusion, the threat of hepatitis transmission has been reported. Lack of accurate blood screening and late launching of vaccination is associated with HBV spread in Pakistan (Khan et al., 2011; Tunio et al., 2013).

In Pakistan, before initiation of donor screening for hepatitis, transfusion of blood or plasma-derived products was linked with a significant risk of acquisition of HBV and HCV (Rahman, Akhtar & Lodhi, 2002). By 2003, 7% of the total transmission of "AIDS" in Pakistan was caused by contaminated blood and blood products (Shah, & Ehsan, 2009).

Blood-beared viruses such as "hepatitis B, hepatitis C, and HIV" have infected millions of people wAtaei & Shirani, 2012). Hepatitis is the inflammation of liver cells and is prevalent in all parts of the world, irrespective of socioeconomic status. It is less in countries with high standards of living, e.g., Australia and North Europe. It is high in dev, and iting countries like Africa, Southeast Asia, and China (Park, 2013). The pervasiveness of infectious diseases is rising in developing countries, which may warn donated blood's biological safety. Among the blood donors, "HCV infection" was by far more repeatedly identified than "HBV and HIV infections." Because of the grave consequences of the disease, there is a need to study the frequency of "hepatitis B, hepatitis C and HIV" infection among blood donors for constituting the proper screening program at Blood Transfusion Centers.

HIV and HBV share standard transmission modes, including bloodborne and vertical routes (Adesina et al., 2010). For example, hepatitis C and B virus are transmitted parentally due to HBV infection to blood contacts, including sexual contacts, abrasion with contaminated sharp tools, needles, and perinatal transmission to the child from infected mothers (Bosan et al., 2010). At the same time, HIV infection is transmitted through unprotected sexual intercourse, mother-to-child transmission, sharing HIV-infected injection and equipment by drug abusers, and transfusion of HIV contaminated blood and blood products.

The frequency of transfusion trials was the only significant risk factor associated with HCV and HIV infections but not for HBV (Katabuka et al., 2012). Even though other microorganisms may cause bloodborne diseases, "hepatitis B, C, and human immunodeficiency virus" are the most common pathogens (Narin et al., 2012). Insecure injection practices are a significant public health problem and can direct the transmission of bloodborne pathogens (Abkar et al., 2013).

In the latter half of the century, the extensive availability of injectable therapies and increased illegal injection drug use were believed to be responsible for the swift emergence of hepatitis C virus infection. They are also considered prime risk factors for "HCV" transmission worldwide (Alter, 2011).

HCV infection is associated with close relationships with injection drug users (IDUs) or HIV-seropositive partners (Caiaffa et al., 2011). In addition, family substitute blood donors are more likely to transmit "transfusion-transmissible infections (TTIs)" than voluntary blood donors (Durro, Koraqi & Saliasi, 2010).

Although voluntary donations are harmless compared with replacement ones, they need to be encouraged (Kaur et al., 2010). The selection of healthy blood donors is essential to ensure disease-free healthy blood. A confidential self-exclusion (CSE) system was adopted so that high-risk donors could secretly exclude their blood from use in transfusions (Kasraian & Tavasoli, 2010). Transfusion-transmitted infections continue to be a hazard to safe transfusion procedures, and multiple conditions cause a small but definite risk to the recipients of blood products. Chronic disease with the "hepatitis C virus" is more prevalent than human immunodeficiency virus infection (Krauskopf et al., 2011). Coinfection of "HIV and other sexually transmitted diseases (STDs)" is extensive and widespread where the coinfection of "hepatitis B & C virus with human immunodeficiency virus" harms liver disease progression (Chen et al., 2013). For the coinfection of "HIV and HCV," injection drug use (IDU) is the most customarily recognized risk factor (Burton et al., 2010).

The Centers for Disease Control (CDC) and Prevention for HIV carriers suggest routine yearly screening for STDs Banani et al., 2013). Regular blood test for HCV and HBV, and HIV is also strongly recommended and individualized counseling to recognize those at risk. Improved surveillance and systematic epidemiological studies must be undertaken (Anbazhagan et al., 2010). Hepatitis C virus coinfection in HIV-positive individuals is reported frequently and is responsible for increased morbidity and mortality. Findings demonstrate a high prevalence with a 13 fold higher risk of HCV coinfection among HIV-positive patients (Balogun et al., 2010).

(Placeholder12)Coinfection of acute HIV and acute hepatitis B is rare (Banasal et al., 2010). Hepatitis B, C, and HIV are threats to society increasing day by day. World Health Organization releases a public health strategy on viral hepatitis to fulfill the 2030 Agenda for Sustainable Development. This strategy emphasizes hepatitis B and C due to their relative public burden (WHO., 2016). However, researchers are working on the causes, prevention, and treatment. But as it is increasing continuously, there is more need to reach the roots of the prevalence of the diseases. Therefore, we planned to research this particular area. This study can draw the attraction of the ordinary person to the awareness about the existence of Hepatitis B, C, and HIV in the donated blood.

Material and Methods: The study was conducted at four hospitals in Lahore. It was a cross-sectional study. All the male and female blood donors came to the blood bank of four hospitals of Lahore, i.e., Lahore General Hospital, Services Hospital Lahore, Mayo Hospital Lahore, and DHQ. Kot Khawaja Saeed Hospital Lahore was the study population.

It was random sampling. The study's sample size was 200 blood donors (50 donors from each hospital), representing the population in different areas of Lahore. Sample size 200 was selected because it was adequate to deal with during the limited research time. Sample Analysis of "Hepatitis B, C, and HIV" was done by the kit method.

Inclusive Criteria were adults above 18 years reporting to the blood bank for voluntary blood donation. Healthy blood donors. Age minimum 18 years and weight at least 50 kg

The Data has collected through a questionnaire in the English language for all participants. The detailed history and variables were also studied on the same questionnaire in Hepatitis C, Hepatitis B, HIV infection reactive cases.

The computer software SPSS version 16.0 was used for data entry and analysis. The mean and standard deviation were used to present quantitative variables. Where applicable, qualitative variables were presented using a frequency table, percentages, and suitable charts. To access the association between the qualitative variables' chi-test was used. Association of positive cases of HCV/HbsAg/H.I.V. was seen with demographic factors and other evident factors. P-value ≤ 0.05 was taken as significant. Hepatitis B, C, and HIV infection reactive cases were the dependent variables. In contrast, independent variables were age, sex, educational and marital status, previous history of jaundice, occupation, blood transfusion record, drug addiction, and sexual contact with sex workers were the independent variables.

Results: According to the data, there is no statistically significant relationship between using a common pin in teeth and getting HBV, HCV, or HIV. There is no statistically significant relationship between sharing scissors and having HBV, HCV, or HIV in this study. The findings show a statistically significant link between nail cutter sharing and HBV and HCV infections, but no link between nail cutter sharing and HIV infection. Consequently, this research has no statistically significant link between sharing toothbrushes and having HBV, HCV, or HIV. The findings reveal no statistically significant association between sharing razors and having HBV or HIV infections. However, there is a statistically significant link between sharing nail cutters and having HCV infection.

This study has no statistically significant link between shaving from barbers and having HBV, HCV, or HIV. Thus, the result shows that in this study, there is no statistically significant association for the history of tattooing and having HBV, HCV, and HIV Table clarifies that out of 200 blood donors, 163 (81.5%) had a history of I/v injections/drips while 37 (18.5%) blood donors had no such history.

Discussion:

Blood transfusion is considered one of the significant sources of "Hepatitis B, C, and HIV" transmission. Numerous people die every year owing to these diseases. The primary reasons behind this are inadequate resources, weak infrastructure, untrained staff, weak policies, regular break-down, and improper blood screening about "Hepatitis B, C, and HIV." In contrast, blood donors are the leading source of these transmissions. The current study was carried out to know "Hepatitis B, C, and HIV" occurrence amongst blood donors. The study revealed that 48.0% of blood donors were up to 30 years old, while a majority (52.0%) were more than 30. Research presented data on the prevalence of HBV, HCV, and HIV among blood donors in northern areas of Pakistan which recommend similar studies in other urban and rural areas of Pakistan (Muhammad et al., 2020). A research by Al-Ghani (2011) regarding the pervasiveness of "Hepatitis B, C and HIV" infections among blood donors showed that 51.2% of blood donors were up to 30 years old and 48.8% were more than 30 years old, which disclosed that most of the blood donors were males (90.5%). This corresponds to the survey findings conducted by Chaudhary and coworkers (2007), who reported that male blood donors were in the majority (97.1%).

Education plays an imperative role and helps in adopting safety measures. It was very discouraging that a significant proportion (53.5%) of blood donors were illiterate, which could be a considerable threat to healthy people who care about their health by adopting safety measures. Still, because of taking donated blood, they become a victim. It is pertinent to mention that most blood donors (65.5%) were unemployed, and blood donation could be their profession. In contrast, blood transfusion from a professional blood donor is not considered a healthy practice. A mainstream (81.5%) of blood donors had a history of previous blood donation. The findings of our study are comparable with the research conducted by Sulehri and colleagues (2013), who confirmed that the majority (97.0%) of blood donors had a history of blood donation. Another study conducted by Khan and partners (2012) asserted that 8.3% of blood donors had a history of blood donating.

Blood from such donors who have a history of jaundice should be avoided. It was disturbing that 11.0% of blood donors had a history of jaundice. The study's findings conducted by Sulehri and colleagues (2013) are much better than our study results which reported that only 4.7% of blood donors had a history of jaundice. The study further revealed that 20.5% of blood donors had a history of blood transfusion, while Sulehri and colleagues asserted that 6.0% of blood donors had a history of blood transfusion.

Addiction is an unhealthy habit that makes people careless, and they do not care about safety measures. Therefore, it was very discouraging that 6.5% had a history of drug addiction among blood donors. The study's results by Sulehri and colleagues (2013) are better than our study results in that only 1.3% of blood donors had a history of drug addiction. Therefore, blood transfusion from professional blood donors should be avoided. It is pertinent to mention that 44.5% were professional blood donors. Sexual contact with sex workers infected with HCV, HBV, and HIV could significantly cause such infections. The study disclosed that 1.0% of blood donors had a history of sexual contact with sex workers infected with HCV, HBV & HIV.

Surgical intervention is a part of life and cannot be avoided in an emergency/health problem. The study identified that 28.5% of blood donors had a history of surgical intervention. The survey's findings carried out by Sulehri and colleagues (2013) showed better results than 6.0% of blood donors who had a history of surgical intervention. Needlestick injury and use of common pin in teeth could occur because of infection. It is essential to mention that 35.0% of blood donors had a history of needle stick injury, while 22.5% had a history of using a common pin in the teeth. The findings of our study are comparable with the research done by Bhutta and associates

(2012), who asserted that 25.0% of blood donors had a history of using a common pin in the teeth.

Ear and nose piercing are not suitable for health, and such practice should be discouraged to prevent "Hepatitis B, C, and HIV" infections. The study showed that 13.5% of blood donors had a history of ear and nose piercing. The analysis performed by Bhutta and associates (2012) exhibited a better scenario that 8.0% of blood donors had a history of ear and nose piercing.

Scissor sharing could also pose a threat of infection. During the study, it was found that only 2.5% of blood donors had a history of scissor sharing. The findings of our study are much better than the study undertaken by Bhutta and associates (2012), who reported that 41.7% of blood donors had a history of scissor sharing. Similarly, nail cutter sharing is also not good. In our study, 35.5% of blood donors had a history of nail cutter sharing. The results of our study are comparable with the research carried out by Minga and coworkers (2010), who elucidated that 36.0% of blood donors had a history of nail cutter sharing.

Toothbrush sharing is an unhealthy habit and should be avoided to prevent "Hepatitis B, C and HIV" and other infectious diseases. Therefore, it was alarming that 1.5% of blood donors had a history of toothbrush sharing. But the results of our study are better than the study conducted by Akhtar and colleagues (2013), who reported that 2.7% of blood donors had a history of toothbrush sharing. Likewise, 23.5% of blood donors had a history of razor sharing. The study conducted by Akhtar and colleagues exhibited a better scenario that only 2.7% of blood donors had a history of razor sharing. To reduce the risk of infection, shaving from barbers should be discouraged. The study disclosed that a significant proportion (53.0%) of blood donors had shaving from barbers. The survey's findings carried out by Thakral and associates (2006) are better than our study results in that 32.0% of blood donors had a history of shaving from barbers.

An enormous portion (81.5%) of blood donors had a history of I/V injections/drips during the study. The findings of our study are comparable with the research conducted by Bhutta and associates (2012), who confirmed that the majority (75.0%) of blood donors had a history of I/v injections/drips. A study in major cities of Punjab, including Lahore, reported a high significance of HIV because of reusing the syringes and injections (Ali et al., 2021). Similarly, tooth extraction is also one of the significant sources of infection. In our study, 42.5% of blood donors had a history of tooth extraction or dental procedures. Research done by Bhutta and associates exhibited a better scenario in that 33.3% of blood donors had a history of tooth extraction / dental practice.

A serology test was performed among blood donors and found that 10.5% of blood donors were Anti-HBV positive, 12.5% were Anti-HCV positive, and 0.5% of blood donor was HIV positive. At the same time, the study undertaken by Ymele and coworkers (2012) confirmed that HBV, HCV, and HIV infection prevalence was 12.14%, 1.44%, and 4.44%, respectively.

Health department intervention and NGO participation are required to create awareness among blood donors to prevent "Hepatitis B, C, and HIV" infections. Media can also play a significant role by regularly broadcasting health education programs to prevent illness from blood donors and the general public.

Conclusion:

The pervasiveness of "Hepatitis B, C, and HIV" is increasing rapidly among the population in Pakistan. Blood transfusion without screening is considered a leading cause of spread, while other risk factors like extramarital relation, shaving from barber and tattoo marks are also associated. Blood donors are the primary source of "Hepatitis B, C, and HIV" transmission within the population. Health education programs must be held among blood donors regarding the ill effects of "hepatitis B, C, and HIV" infection. NGO participation and health department intervention could be more beneficial to inform people as well as blood donors.

Figures and tables

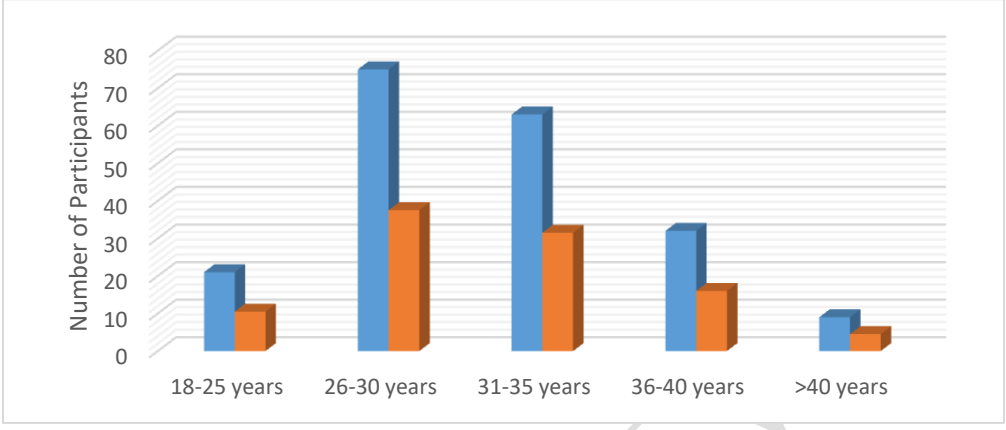

Figure 1: Frequency distribution of blood donors according to age *n*=200. The result shows that among 200 blood donors, 21 (10.5%) were 18-25 years old, the majority 75 (37.5%) was 26-30 years old, 63 (31.5%) were 31-35 years old, and 32 (16.0%) were 36-40 years old while only 9 (4.5%) blood donors were more than 40 years old.

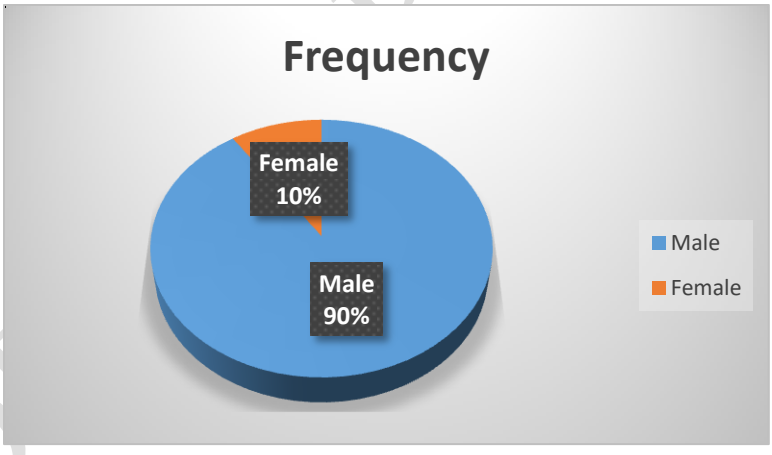

Figure 2: Frequency distribution of blood donors according to sex *n*=200.The abovetable describes that out of 200 blood donors, 181 (90.5%) were males while only 19 (9.5%) were female blood donors.

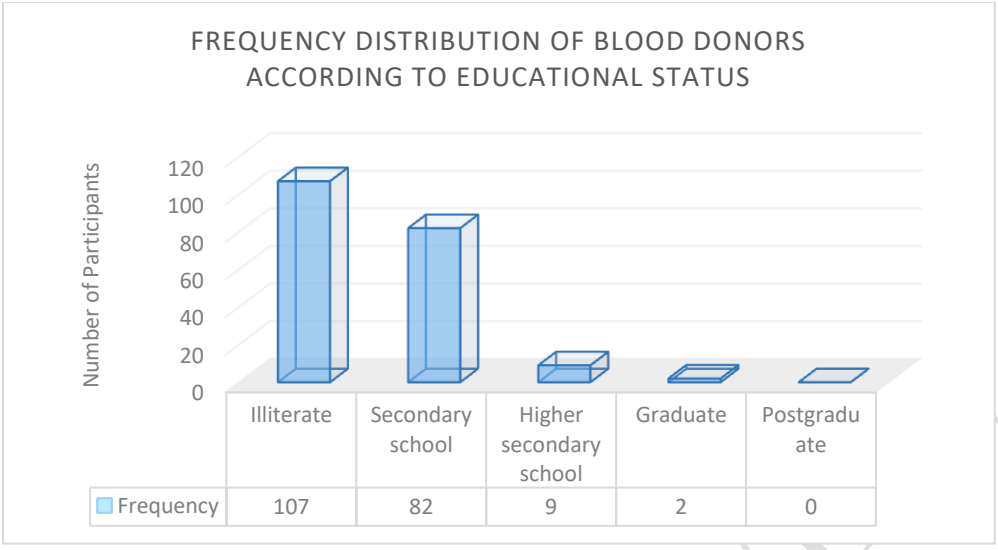

Figure 3: Frequency distribution of blood donors according to educational status *n*=200. Out of 200 blood donothe rs, majority 107 (53.5%) was illiterate, 82 (41.0%) studied up to secondary and 9 (4.5%) had passed higher secondary examination while only 2 (1.0%) blood donors were graduate.

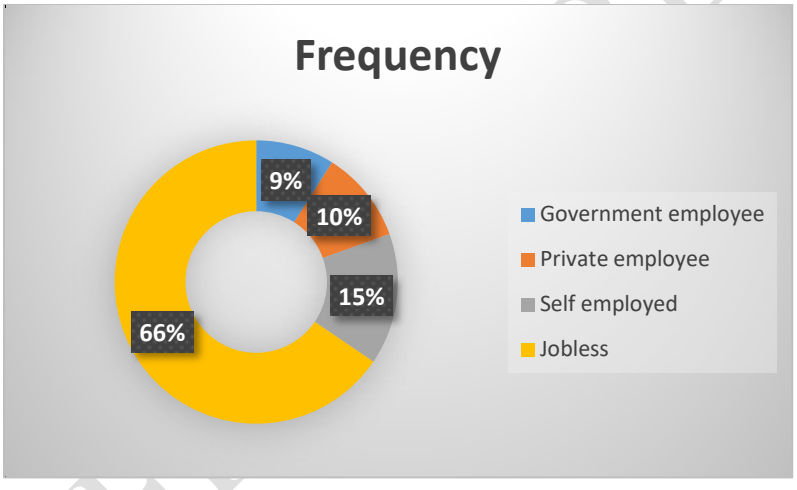

Figure 4: Frequency distribution of blood donors according to occupation *n*=200. It is depicted fthe rom above table that out of 200 blood donors, 18 (9.0%) were government employees, 21 (10.5%) were working in private firms, 30 (15.0%) blood donors were self-employed and majority 131 (65.5%) of blood donors was jobless.

Table 1: Frequency distribution of blood donors according to history *n*=200.

Blood donors' activities	Response	Frequency	Percentage (%)
	Total	200	100
Previous Blood Donation	Yes	163	81.5
	No	37	18.5
Previous Jaundice	Yes	22	11.0
	No	178	89.0
Previous Blood Transfusion	Yes	41	20.5
	No	159	79.5
Previous Parenteral Therapies	Yes	7	3.5
	No	193	96.5
Drug Addiction	Yes	13	6.5
	No	187	93.5
Professional Blood Donor	Yes	89	44.5
	No	111	55.5
Sexual Contact	Yes	2	1.0
	No	198	99.0
Surgical Intervention	Yes	57	28.5
	No	143	71.5
Needle Stick Injury	Yes	70	35.0
	No	130	65.0
Using Common Pin in Teeth	Yes	45	22.5
	No	155	77.5
Ear and Nose Piercing	Yes	27	13.5
	No	173	86.5
Scissor Sharing	Yes	195	97.5
	No	5	2.5
Nail Cutter Sharing	Yes	71	35.5
	No	129	64.5
Tooth Brush Sharing	Yes	3	1.5
	No	197	98.5
Razor Sharing	Yes	47	23.5
	No	153	76.5
Shaving from Barber	Yes	106	53.0
	No	94	47.0
Tattooing	Yes	9	4.5
	No	191	95.5
I/v Injections / Drips	Yes	163	81.5
	No	37	18.5
Operation / Surgical Intervention	Yes	44	22.0
	No	156	78.0
Gynecological / Obstetrical Intervention	Yes	13	6.5
	No	187	93.5
Tooth Extraction or other Dental Procedure	Yes	85	42.5
	No	115	57.5
Sexual Promiscuity	Yes	0	0
	No	200	100.0

Table 2: History of needle stick injury in relation to Anti-HBV, HCV and HIV crosstab

NEEDLE STICK INJURY	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	3	67	8	62	0	70
No	18	112	17	113	1	129
Chi-Square	4.425		0.113		0.541	
p-value	0.035		0.737		0.462	
H/O USING COMMON PIN IN TEETH	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	2	43	5	40	0	45
No	19	136	20	135	1	154
Chi-Square	2.26		0.102		0.292	
p-value	0.132		0.749		0.589	
H/O EAR AND NOSE PIERCING	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	0	27	2	25	0	27
No	21	152	23	150	1	172
Chi-Square	3.662		0.740		0.157	
p-value	0.05		0.390		0.692	
SCISSORS SHARING	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	21	174	24	171	1	194
No	0	5	1	4	0	5
Chi-Square	0.602		0.264		0.026	
p-value	0.438		0.608		0.872	
NAIL CUTTER SHARING	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	12	59	4	67	0	71
No	9	120	21	108	1	128
Chi-Square	4.80		4.745		0.533	
p-value	0.028		0.029		0.475	
SHARING OF TOOTH BRUSH	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	0	3	0	3	0	3
No	21	176	25	172	1	196
Chi-Square	0.357		0.435		0.015	
p-value	0.550		0.509		0.902	
SHARING OF RAZORS	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	8	39	2	45	1	46
No	13	140	23	130	0	153
Chi-Square	2.780		3.818		3.272	
p-value	0.095		0.051		0.070	

SHAVING FROM BARBERS	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	12	94	16	90	1	105
No	9	85	9	85	0	94
Chi-Square	0.162		1.388		0.891	
p-value	0.688		0.239		0.345	
TATTOOING	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	1	8	2	7	0	9
No	20	171	23	168	1	190
Chi-Square	0.004		0.841		0.047	
p-value	0.951		0.367		0.828	
O I/V INJECTIONS	Anti HBV		Anti-HCV		HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	18	145	22	141	1	162
No	3	34	3	34	0	37
Chi-Square	0.276		0.801		0.228	
p-value	0.599		0.371		0.633	
OPERATION/SURGICAL INTERVENTION*	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	3	41	7	37	0	44
No	18	138	18	138	1	155
Chi-Square	0.814		0.599		0.283	
p-value	0.367		0.439		0.594	
GYNECOLOGICAL / OBSTETRICAL INTERVENTION	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	0	13	0	13	0	13
No	21	166	25	162	1	186
Chi-Square	1.631		1.986		0.070	
p-value	0.202		0.159		0.792	
TOOTH EXTRACTION OR OTHER DENTAL PROCEDURE	Anti-HBV		Anti-HCV		Anti-HIV	
	Positive	Negative	Positive	Negative	Positive	Negative
Yes	9	76	11	74	0	85
No	12	103	14	101	1	114
Chi-Square	0.001		0.026		0.743	
p-value	0.972		0.871		0.389	

Table 3: Frequency distribution of blood donors according to serology *n*=200.

Serology	*Frequency*	*Percentage (%)*
Anti HBV		
Positive	21	10.5
Negative	179	89.5
Anti HCV		
Positive	25	12.5
Negative	175	87.5
Total	200	100.0
HIV		
Positive	1	0.5
Negative	199	99.5
Total	200	100.0

Above table exhibits that according to serology tests, 21 (10.5%) blood donors were Anti-HBV positive, 25 (12.5%) were Anti-HCV positive and 1 (0.5%) blood donor was HIV positive.

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