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Seropositivity of Hepatitis B, Hepatitis C, Human Immunodeficiency Virus and Syphilis in blood donors of Hyderabad, Sindh, Pakistan

A. A. SAMO, N. M. BAIG, A. SIDHU, S. N. SHAIKH, Z. A. LAGHARI[++]

Department of Physiology, University of Sindh, Jamshoro, Sindh, Pakistan

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Abstract: Background: The safety of blood essential component of blood screening program. Different countries have different health standards. Maintaining effective blood screening is critical for blood recipients. However, the microbial agents that are transmissible from blood to blood are particularly hazardous for blood transfusion services because such microbial agents cause morbidity and mortality in the blood recipients. Previously conducted studies have just focused on seropositivity rate of TTIs, the aim of present study to study seropositivity and association with demographic factors. Methodology: A cross-sectional study was carried out in the Hematology Section of Diagnostic laboratory of Isra University, Hyderabad in April 2019 to May 2019. Basic demographic data was collected from participants through structured questionnaire. The seropositivity was assessed using ICT and Elisa method. Results: A total 353 blood donors participated in study. The mean age of blood donors was 27.59±5.88 years. The seropositivity of HBV among the blood donors of Hyderabad was 1.1%, HCV was 5.1%, HIV was 0.8%, syphilis was 2.3%. Among risk factors a significant association was noted between HCV and repeated blood donation [$\chi 2$=4.05 p=0.04]. Conclusion: There is dire need to launch an effective health education program to aware people about the prevention of infectious diseases.

Keywords: Transfusion Transmitted Infections, Blood Donors, Hyderabad, Sindh, Pakistan,

1. INTRODUCTION

Blood transfusion is essential for saving lives patients who need blood for maintaining the homeostasis. Approximately 120 million units of blood is donated annually around the world, the donation around the world also varies in countries. For example, according to World Health Organization (WHO) the blood donations in high income countries are seven times higher than low-income countries(Organization, 2021). The demand for blood transfusion in particularly high in Pakistan because of medical conditions including, thalassemia, anemia, malnutrition, pregnancy, surgery, accident, and trauma. Saving lives depends on blood transfusions. However, it is noted that like all treatment modalities, the blood transfusion may have additional complexities such as transfusion transmissible infections (TTIs) including hepatitis b (HBsAg), hepatitis c (HCV), human immunodeficiency virus (HIV) and syphilis(Arshad *et al.,* 2016).

The blood banks pay essential role to supply the safe blood. Blood safety is essential to ensure the patient health. The health care providers are responsible to detect, assess, and warn the potential health risk within the blood supply. These public health associated efforts ensure the highest quality transfusions so that the patients with medical condition should have best outcome(Prevention, 2021). Blood safety remains a major public health problem in developing countries including Pakistan. Due to the lack of implementation of blood transfusion policy in Pakistan, the TTIs may increase because of lack of resources, trained staff, and awareness on TTIs(Luby*et al.,* 2006). The province of Sindh has established Sindh safe blood transfusion authority act in November 2017(Sindh, 2017). Despite of establishment of such authority, lack of implementation on act was noted when World health organization (WHO) has indicted that unsafe practices at blood banks in Larkana city as one of the factors which caused HIV outbreak ("Public health round-up," 2019). Different studies have been conducted in past and authors have reported the seropositivity of infectious diseases among blood donors in Pakistan(Arshad *et al.,* 2016; Chaudhry, *et al.,* 2013; Umair, *et al.,* 2012), Study conducted at Lahore in 2015 on 10048 participants found 1.59%, 3.75%, 0.11, 2.08% seropositivity of HBsAg, HCV, HIV, and syphilis among blood donors. Authors from Azad Jamu Kashmir using sample of 8927 blood donors found 1.68%, 2.5% seropositivity of HBsAg and HCV.

However, these studies have only focused on seropositivity of the infectious diseases, questions about on the demographic factors and risk factors remain

[++]Corresponding Author Email: zulfiqar.laghari@usindh.edu.pk

largely unanswered. In this study we focused the seropositivity, demographic and risk factors of HBsAg, HCV, HIV and syphilis among blood donors in Hyderabad city.

2. METHODOLOGY

Study design and setting:

This cross-sectional study was carried out in the Hematology Section of Diagnostic laboratory of Isra University, Hyderabad in April 2019 to May 2019.

Study Population:

Three hundred seventy non-pregnant, non-lactating weighted ≥50 kilograms adults with age ranging from 18 to 55 who came to donate blood either voluntarily or in replacement were asked to take part in the proposed study. The hemoglobin threshold for blood donation was set as 12.5 13.5 g/dl and 12.5 g/dl for females and males, respectively. Among 370 (100%) adults, 15 (4.05%) adults refused to take part in the study, out of remaining 355 participants only 2 participants were female (these 2 samples would lack any statistical meaning so we excluded) and focused on 353 male participants. Study participants were asked to sign the informed consent form. All those individuals who were at any type of medication, illness, known infection, anemia, had transfusion within less than 4 months, radio or chemotherapy were excluded from the study. This work is routinely done in the hematology section of Isra University Hospital.

Blood collection and screening:

The blood sample from each study participant was collected in 5ml red cap vacutainer (for hemoglobin level using blood analyzer), and 5 ml blood was collected for serum. Serum was obtained after centrifugation at 3000 rounds per minute using centrifuge machine. After obtaining serum the Rapid immunochromatographic technique strips were used for detecting the seroprevalence of HBsAg, HCV, HIV, and syphilis.

Variable setting and Statistical analysis:

Information about age, gender, ethnicity, religion, education, marital status, and blood donation was collected using a proforma. The data was entered, cleaned, coded in software statistical package for social sciences version 23. Mean, standard deviation, frequency, and chi square was computed using SPSS.

Ethical Approval:

Study was approved by Ethical Review Committee, University of Sindh, Jamshoro. The participants were informed about the objectives of the proposed study. The participants were asked to sign the informed consent form. After they were asked the demographic information and then they were screened for HBsAg, HCV, HIV, Syphilis. Those who were detected with any one of this disease were referred to medicine department for treatment. All the information collected from the study participants were kept secret.

3. RESULTS

Basic demographic characteristics of study participants:

Sample size of this study was 353 participants. The mean age of study participant was 27.59±5.88. Among 353 participants 64.59% were Sindhi, 19.26% were Urdu, 7.64% were Punjabi, 5.38% were Pathan and 3.11% were Balochis. Among 353 participants, 95.7% were Muslims, 3.11% were Hindus and 1.13% were Christians. Data was divided according to age groupless or equal than 30 years.

Table 1. Basic Demographic characteristics of participants

Factor	Frequency (%)
Age	Minimum=18 Maximum=55 Mean±SD=27.59±5.88
Ethnicity Sindhi Urdu Punjabi Pathan Balochi	 228 (64.59%) 68 (19.26%) 27 (7.64%) 19 (5.38%) 11 (3.11%)
Religion Muslim Hindu Christian	 338 (95.75%) 11 (3.11%) 4 (1.13%)
Age ≤30 >30	 264 (74.8%) 89 (25.2%)
Marital Status Unmarried Married	 148 (41.9%) 205 (58.1%)
Education Illiterate Literate	 65 (18.4%) 288 (81.6%)
Blood donation First time Repeated donation	 91 (25.8%) 262 (74.2%)
Seropositivity status **HBV-ve** **HBV+ve** **HCV-ve** **HCV+ve** **HIV-ve** **HIV+ve** **Syphilis+ve** **Syphilis-ve**	349 (98.9%) 4 (1.1%) 335 (94.90%) 18 (5.1%) 350 (99.2%) 3 (0.8%) 345 (97.7%) 8 (2.3%)

Table 2. The association of age, marital status, education and blood donation with the HBV, HCV, HIV, and syphilis in blood donors

Factor	Frequency (%) =353	HBV+ve=04	HCV+ve=18	HIV+ve=3	Syphilis+ve=8
Age					
≤30	264 (74.8%)	4χ2=1.36 *p*=0.240	16 χ2=2 *p*=0.152	3 χ2=1.02 *p*=0.310	5 χ2=0.65 *p*=0.413
>30	89 (25.2%)				
Marital Status					
Unmarried	148 (41.9%)	3 χ2=1.81	10 χ2=1.44 *p*=0.228	2 χ2=0.76 *p*=0.381	2 χ2=0.96 *p*=0.326
Married	205 (58.1%)	*p*=0.171			
Education					
Illiterate	65 (18.4%)	0 χ2=0.91	6 χ2=2.81 *p*=0.0912	1 χ2=0.44 *p*=0.502	1 χ2=0.19 *p*=0.667
Literate	288 (81.6%)	*p*=0.334			
Blood donation					
First time	91 (25.8%)	0 χ2=1.40	1 χ2=4.05 ***p*=0.04**17	2 χ2=2.64 *p*=0.101	3 χ2=0.58 *p*=0.445
Repeated donation	262 (74.2%)	*p*=0.234			

χ2 indicates chi square value.*p* indicates p value.

and greater than 30 years. Among all 353 participants 74.8% belonged to age group ≤30 years and 25.2% participants belonged to age group >30 years. Among all 353 participants, 41.9% participants were unmarried and 58.1% were married. Among all 353 participants, 18.4% participants were illiterate and 81.1% of the participants were literate. Among all 353 participants, 28.8% participants were donating blood first time and 74.2% participants were repeatedly donating blood. Three hundred seventy non-pregnant, non-lactating weighted ≥50 kilograms adults with age ranging from 18 to 55 who came to donate blood either voluntarily or in replacement were asked to take part in the proposed study. The hemoglobin threshold for blood donation was set as 12.5 for males and females was 13.5 g/dl and 12.5 g/dl respectively. Among 370 (100%) adults, 17 (4.5%) adults refused to take part in the study, and 353 (95%) were agreed to take part in the study. The hemoglobin level of male and female participants was assessed. study participants were asked to sign the informed consent form. All those individuals who were at any type of medication, illness, known infection, anemia, had transfusion within less than 4 months, radio or chemotherapy were excluded from the study. This work is routinely done in the hematology section of Isra University Hospital.

Risk factor associated with HBsAg, HCV, HIV, and syphilis:

The association of HBsAg, HCV, HIV, and syphilis with risk factors such as age, marital status, education, and blood donation using chi square. HBsAg positivity was noted among unmarried, literate participants with age ≤30 years who went through repeated blood donations. HCV positivity was noted among unmarried, literate participants with age ≤30 years who went through repeated blood donations. A significant association was noted between HCV and repeated donors [χ2=4.05 p=0.04]. HIV positivity was noted among unmarried, literate participants with age ≤30 years who came to donate blood for first time. Syphilis positivity was noted among married, literate participants with age ≤30 years who went through repeated blood donations. **(Table 2)**

4. DISCUSSION

The safety of blood cannot be guaranteed because of certain limitations of blood screening programs. Different countries have different health standards therefore the national health systems must address the constraints that affects the blood screening. Such issues include incidence and prevalence of blood borne infections, blood bank management issues, and special requirements of transfusion. The microbial agents that are transmissible from blood to blood are particularly hazardous for blood transfusion services because such microbial agents cause morbidity and mortality in the blood recipients. Recently published comprehensive report highlights the weakness in the blood transfusion system in Pakistan(Ehsan *et al.*, 2020).

(Arshad *et al.*, 2016)from Karachi (most populated and capital city of Sindh province) carried out a blood donors screening study at National Institute of Blood Diseases and Bone Marrow Transplantation from January 2013 to June 2015. The sample size of the study was 16602 blood donors. The main findings of the study were 1) the mean age of blood donors was 28.6±2 2) among the blood donors the seropositivity of HBV was 1.84%, HCV was 1.7%, HIV was 0.04%, syphilis was 2.1%, malaria was 0.07%(Arshad *et al.*, 2016). In our study the mean age was 27.59±5.88. prevalence of HBV was 1.1%, HCV was 5.1%, HIV was 0.8%, syphilis was 2.3%. The comparison of these two reports showed that prevalence of HCV in the blood donors of Hyderabad was 3 times higher than blood donors of Karachi. The main reason of this difference might be that study from Karachi was conducted 4 years ago and increase in number of cases of HCV infection with time cannot be ruled out. Other reasons might be lack of awareness about routes of transmission of HCV in public and exposure history of blood donors to risk factor of HCV. To study, the potential risk factors of TTI among blood donors Rauf et al carried-out study among blood donors of Faisalabad (urban city of Punjab province) from May 2018 to February 2019. The study was based on 6594 blood donors. The mean of blood donors was 29±7. Among the blood donors the seropositivity of HBV was 1.12%, HCV was 3.24%, HIV was 0.18%, syphilis was

1.10% and malaria was 0.89%(Rauf & Cheema, 2019). In our study the mean age was 27.59±5.88. prevalence of HBV was 1.1%, HCV was 5.1%, HIV was 0.8%, syphilis was 2.3%. The comparison of these two reports shows that seropositivity trend of HBV among the blood donors was closer. Compared to blood donors of Faisalabad, the HCV is 2 times higher in among the blood donors of Hyderabad. In 2013, a report has summarized the seropositivity of HBV and HCV among blood donor of Hyderabad. In this report seropositivity of HBV among blood donors ranged from 1% to 4% and seropositivity of HCV among blood donors ranged from 3 to 6%(Tunio*et al.*, 2013). It was noted in our recently published work that prevalence of HCV in general population in Nawabshah was 14%. This indicated that HCV infection is increasing in general population too(Samo, *et al.*, 2020). Seropositivity of syphilis among blood donors of Faisalabad was less than blood donor of Hyderabad where the seropositivity of syphilis was 2.3%. The seropositivity of syphilis among blood donors of Hyderabad is consistent with the study from Tando Muhammad Khanfrom Indus University Hospital, Tando Muhammad Khan (a small town near Hyderabad, Sindh) have published the results of syphilis using sample size of 2002 from oct 2016 to February 2018, their report showed that prevalence of syphilis in blood donors of Tando Muhammad khan is 2.44% (n=44) (Jiskani, *et al.*, 2019).

Recently published report showed that among blood donors of Pakistan HBV seropositivity ranged from 0.18% to 4.12%, HCV seropositivity ranged from 1.29% to 10%, HIV seropositivity ranged up to 0.18%, syphilis seropositivity ranged from 0.11% to 3.01%, and malarial seropositivity ranged up to 1.2%(Ehsan *et al.*, 2020).

5. CONCLUSION

The present study concludes that TTI's are becoming potential threat to achieve safe blood transfusion. The mean age of blood donors was 27.59±5.88 years. The seropositivity of HBV among blood donors of Hyderabad was 1.1%, HCV was 5.1%, HIV was 0.8%, syphilis was 2.3%. There is dire need to launch an effective health education program to aware people about the prevention of infectious diseases. Healthy population is always good for safe blood donations.

Recommendation: We recommend that Government of Sindh should supply free HBV vaccine to all private and public sector blood banks if anyone who is HBV negative could be immunized, and Govt of Sindh should also distribute free condoms for safe sex to prevent HIV and syphilis in the population.

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