

# Frequency of Transfusion Transmitted Infections in Healthy Blood Donors in a Tertiary Care Hospital

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## ABSTRACT

**Objective:** To determine transfusion transmitted infectious disease (TTI) pattern in potential healthy replacement donors.

**Study Design:** Cross sectional study

**Place and Duration:** Diagnostic and Research Laboratory Liaquat University of Medical and Health Sciences Jamshoro, Hyderabad. Jan-2022-Dec 2022

**Methods:** Total 14,355 replacement donors of age 18-55 years were selected in this study as per inclusion criteria, which comprised of 25 questionnaire, evaluating donors for history of Injections, medicines, time since last donation, tattoos, not feeling well, dental work, sexual relationships, history of malaria / T.B, surgery, jaundice vaccination positive viral markers in the past followed by physical examination. SPSS 24.0 was used to analyze all data.

**Results:** There were 9635 (67.1%) males and 4720 (32.95) females in this study. Among all, 42.8% cases had age 18-25 years, 26.8% cases had 26-30 years, 16.6% cases had 31-35 years and 13.7% patients were from age group 36-55 years. Majority of the donors 32.3% had blood group B positive, followed by O positive in 29.9%, 22% donors had A positive and AB positive blood group found in 8.7% cases. According to screening results, most common infection was Hepatitis B Core Antibody found in 10% cases, anti-HCV found in 2.17% cases, HBsAg in 0.3% cases, ICT malaria in 0.05% cases, RPR 0.41% and HIV 1&2 in 0.1% cases.

**Conclusion:** HB core total antibody showed highest positivity in replacement donors despite stringent donor selection criteria, followed by Anti HCV. Syphilis, HBsAg, HIV and malaria showed lowest prevalences.

**Keywords:** Blood Donors, HCV, HBV, ICT Malaria

## INTRODUCTION

Globally, it is still difficult to get your hands on safe blood and blood products. Financially, unsafe blood transfusions are a major burden. Because of this, blood transfusion services have historically been underfunded and have had difficulty competing for a growing share of a healthcare system's limited resources. Blood safety is still being threatened by TTIs, and the situation in Pakistan is no different. Because transfusion is so central to contemporary medical practice, the spread of these pathogens is of paramount importance to the blood industry. Due to a lack of a sufficient supply of safe blood to meet the demand of the population and a rising burden of diseases caused by TTIs, the health care system in Pakistan has recognized Blood Transfusion as an important field. Changes are being made in Pakistan to move the country's blood transfusion system from a decentralized structure of individual blood banks to a more unified one based on Regional Blood Centres. Unfortunately, most hospitals in Pakistan provide blood transfusion services, and there is no functional separation of the process into separate institutions for effective "production" and "utilization" prior to the reform.

Blood transfusion safety relies heavily on the accuracy of the screening for transfusion-transmitted infections (TTIs). Up to 16 million new cases of hepatitis B and 5 million [1] new cases of hepatitis C are reported each year as a direct result of blood transfusions that contain infectious blood. Transfusion-linked hazards, such as transfusion-transmitted infections, are always present and account for 1% [2] of the overall risk for each blood unit transfused.

By reducing new cases by 90% and related mortality by 65%, the Global Health Sector Strategy (GHSS) on viral hepatitis aimed to eradicate this disease by 2030.[3] The GHSS strategy's central tenets are blood and injection safety, HBV vaccination, prevention of vertical transmission of HBV from mothers to children, and horizontal transmission of HBV and HCV via various

routes, as well as identification and treatment of existing chronic cases. As a basic preventative measure, checking blood supplies is essential.[4]

Most instances of viral hepatitis in the Eastern Mediterranean Region originate in either Pakistan or Egypt (EMR). With a prevalence rate of 5%, HCV infection is second worst in the world in Pakistan (about 8 million people). HCV is the most common transfusion-transmitted infection (TTI) in patients with thalassemia major who have undergone multiple blood transfusions, and the risk of HIV infection is increasing. In Pakistan, 2.5% of the population is infected with HBV[6]. There are also 150,000 new cases of HBV and 250,000 new cases of HCV each year. Infection rates with HCV have been observed to be quite high among blood donors in Hyderabad (3.52%). [8]

Reliance on replacement donors and paid donors is high in Pakistan, as it is in many underdeveloped countries. More than 1.5 million units are donated every year in Pakistan[11], and this is despite the fact that the prevalence of blood disorders like thalassemia and hemophilia, as well as the needs for hemodialysis, pregnancy, surgeries, and accident and emergency cases

As a result, determining the incidence of TTI in blood and blood products is a significant indicator for gauging the safety of blood transfusions and assessing the trend and epidemiology of infectious diseases in the general population. This research has led to recommendations for how to optimize blood transfusions in order to reduce the risk of transfusion-transmitted infections (TTIs), which are particularly common in the elderly, in young children, and in pregnant women.[12]

This study aimed to quantify the overall seroprevalence of major TTIs among blood donors. In this study, we hope to raise awareness about the need for better TTI screening techniques and to encourage more people to become blood donors.

**MATERIAL AND METHODS**

This cross-sectional study was conducted at diagnostic and research laboratory Liaquat university of medical and health sciences Jamshoro, Hyderabad and comprised of 14355 blood donors. All blood donors who weighed  $\geq 50$  kg were considered for the research. Donors with hemoglobin levels below 12.5 g/dL for women or 13.5 g/dL for men were not accepted. The standards of the American Association of Blood Banks for excluding donors were adhered to. Donor files missing required fields were also excluded.

It was the policy of the facility that former malaria patients might give blood once three months had passed after they had finished anti-malarial therapy. The donors were reportedly given pre-donation counseling by a nurse, according to the records. An extensive health history form was filled out by each possible donor. Included in this was data of a demographic kind (name, age, sex, marital status, profession, address, and contact numbers). The donor's age, gender, height, weight, current and past medical conditions, immunization, dental, surgical, and blood donation histories, as well as recent and past travel destinations, TTI risk, prior TTI-related results and alerts, and a basic medical assessment report were also included. At the tertiary care hospital in Islamabad, blood donors are routinely screened with gold standard methods, such as nucleic acid amplification technique (NAT) on cobas 6000 series for hepatitis B core antigen (HBcAg), HCV, and HIV; enhanced chemiluminescence immunoassay (ECLIA) on cobas e 601 for syphilis; and immunochromatographic test for anti-plasmodium parasite (ICT).

SPSS version 24 was used to analyze the gathered data. Gender, blood type, illness kind, and other qualitative factors were subjected to descriptive and analytical statistics. For each factor, the frequency and percentage were determined.

**RESULTS**

Among all, 42.8% cases had age 18-25 years, 26.8% cases had 26-30 years, 16.6% cases had 31-35 years and 13.7% patients were from age group 36-55 years.(figure 1)

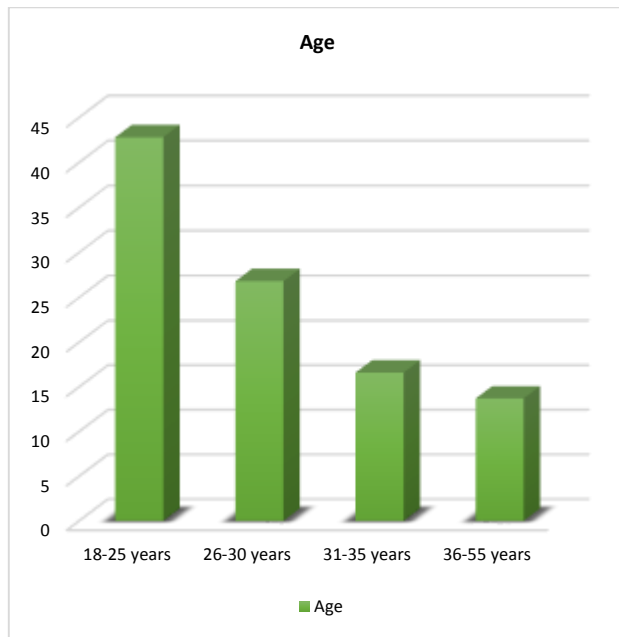


Figure-1: Age of the included donors

There were 9635 (67.1%) males and 4720 (32.9%) females in this study. The patients mean age was  $29.18 \pm 20.73$  years.(table 1)

Table-1: Demographics of the included donors

Variables	Frequency (14355)	Percentage
Mean age (years)	$29.18 \pm 20.73$	
Gender		
Male	9635	67.1
Female	4720	32.9

Majority of the donors 32.3% had blood group B positive, followed by O positive in 29.9%, 22% donors had A positive and AB positive blood group found in 8.7% cases.(figure 2)

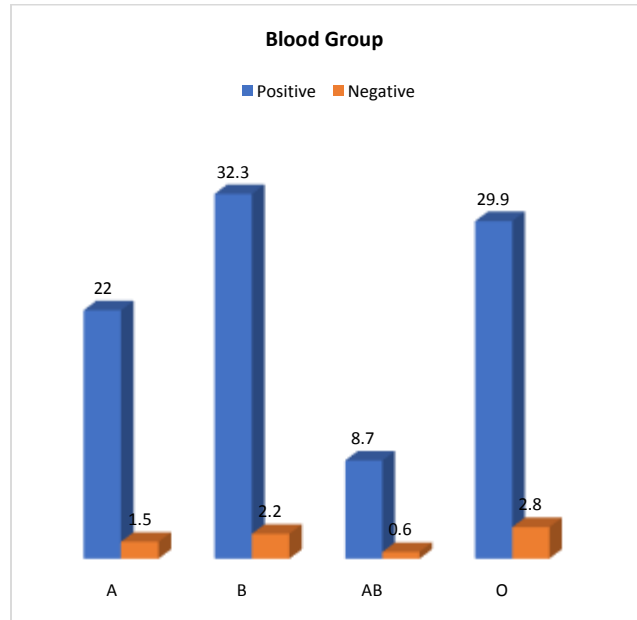


Figure-2: Blood of group of included patients

According to screening results, most common infection was Hepatitis B Core Antibody found in 10% cases, anti-HCV found in 2.17% cases, HBsAg in 0.3% cases, ICT malaria in 0.05% cases, RPR 0.41% and HIV 1&2 in 0.1% cases.(figure 3)

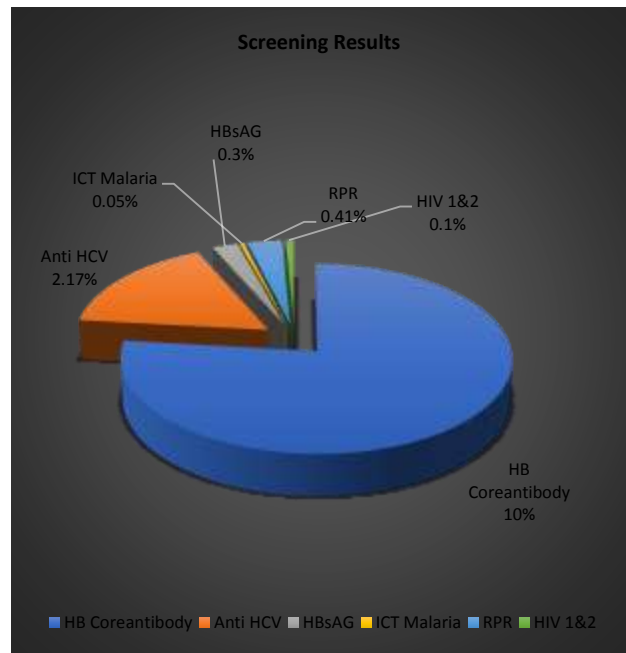


Figure-3: Outcomes of screening among blood donors

## DISCUSSION

There is a substantial body of evidence indicating that blood transfusions are a highly effective means of transmitting TTIs [13]. Over 1.5 million units of blood and blood products are transfused in Pakistan each year, according to the World Health Organization. Just 10% of blood donations are unpaid and voluntary, compared to the other 85% that are donated professionally or as replacements [14]. Blood screenings performed by blood banks and transfusion centers can provide valuable information on the prevalence of TTIs [13].

In our study, 42.8% cases had age 18-25 years, 26.8% cases had 26-30 years, 16.6% cases had 31-35 years and 13.7% patients were from age group 36-55 years. There were 9635 (67.1%) males and 4720 (32.9%) females in this study. Many physiological conditions in women, such as menstruation, lactation, and pregnancy, have been hypothesized to contribute to the relatively low percentage of female blood donors. Low hemoglobin levels were cited as the primary reason for postponing blood donations from women. [20] The patients mean age was 29.18±20.73 years. Results were comparable to the previous researches. [15,16] HCV seroprevalence in the study population (2.17%) is significantly higher than HBV seroprevalence (10%). As has been recorded by other studies, this represents a recent shift in predominance trend during the last decade. [17] The high proportion of HCV seropositivity represents an ever-increasing pool of asymptomatic carriers and chronically infected patients, while the declining HBV incidence rate may be attributable to vaccination programs and enhanced public health awareness campaigns. Manzoor I et al. reported a 7.69% prevalence of HCV in 2008 in Lahore [18], and Ujjan ID et al. reported an 8.63% prevalence in 2006 in Hyderabad [19]. The health care system is severely impacted by the rising incidence of viral hepatitis among blood donors.

Our findings of an HIV prevalence of 0.1% are in line with those of Siddiqui et al. [21] (0.24%) and Chandekar et al. (0.26%). [22] Yet, our research reveals an upward trend in the number of HIV-positive donors over the past decade. Pakistan, like the rest of South Asia, has a malaria problem. The summer and early fall are peak times for cases in the Punjab province. [23] Similar to prior research in Pakistan and India, we found that malaria was the study's least often reported TTI (2 instances; 0.004%). [22,24] The transfusion facility at this hospital did not begin testing blood donors for malaria until 2015. This likely explains the low prevalence of malaria in our data. While most participants in our study were located in the city of Islamabad, previous research has shown that malaria is more common in rural and poor socioeconomic situations. [23]

Similar to what was found by Arif et al., B+ (365; 0.7%) had the highest overall seroreactivity to TTIs among our blood donors from 2015-2019. [24] In our study, majority of the donors 32.3% had blood group B positive, followed by O positive in 29.9%, 22% donors had A positive and AB positive blood group found in 8.7% cases. Due to inadequate screening of blood in the past, the Pakistani population is thought to be at high risk of contracting hepatitis through transfusion. HBV spread further because of delayed vaccination. Before the development of blood screening technologies, several investigations revealed the high incidence of hepatitis among individuals with a previous blood transfusion history.

## CONCLUSION

HB core total antibody showed highest positivity in replacement donors despite stringent donor selection criteria, followed by Anti HCV. Syphilis, HBsAg, HIV and malaria showed lowest prevalences.

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