

# Prevalence of HBsAg Seropositivity among the Blood Donors-A Prospective Study

Dr. Sudhir Kumar Vujhini<sup>1</sup>, Dr. Kandukuri Mahesh Kumar<sup>2</sup>, Dr. Bogi Murali Krishna<sup>2</sup>, Dr. Shanthi Bonagiri<sup>3</sup>

<sup>1</sup>Associate Professor, Department of Transfusion Medicine and Immunohematology, Nizam's Institute of Medical Sciences, Punjagutta Rd, Punjagutta Market, Punjagutta, Hyderabad, Telangana 500082, India

<sup>2</sup>Assistant Professor, Department of Transfusion Medicine and Immunohematology, Nizam's Institute of Medical Sciences, Punjagutta Rd, Punjagutta Market, Punjagutta, Hyderabad, Telangana 500082, India

<sup>3</sup>Incharge HOD, Department of Transfusion Medicine and Immunohematology, Nizam's Institute of Medical Sciences, Punjagutta Rd, Punjagutta Market, Punjagutta, Hyderabad, Telangana 500082, India

\*Corresponding author: Dr. Kandukuri Mahesh Kumar | Received: 16.04.2019 | Accepted: 26.04.2019 | Published: 30.04.2019  
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## Abstract

Blood is a lifesaving resource; it can be infused to a needy patient from a healthy donor after proper screening and cross matching. Infected blood is also a source of transfusion transmissible infections particularly Hepatitis B & C, Human Immunodeficiency Virus, Malaria and syphilis. Stringent screening of each blood unit donated reduces the prevalence rate up to some extent. The objective of this study is to know the seroprevalence of HBsAg among the blood donors in a tertiary care hospital. It is a prospective study done for 3 years between January 2016 and December 2018 with a sample size of 55,376 donors. The overall prevalence among the blood donors in this study was 3.58 % and is more among the replacement donors within the age group 18-40 years. To reduce the prevalence of HBsAg blood transfusion services should be stringent in selecting a donor; proper pre and post donation counseling should be given to the donor. Implementation of more sensitive tests such as NAT for HBV that detects HBV infection earlier during the window period will further decrease the risk of transfusion transmitted HBV and improve the blood safety.

**Keywords:** Hepatitis B, HBsAg, Prevalence, Blood Donation, Transfusion Transmission Disease.

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## INTRODUCTION

Blood transfusion service (BTS) is an intrinsic and vital part of the healthcare system. Transfusion of blood and components of blood is a specialized treatment modality of patient which saves millions of lives worldwide each annum and also reduces morbidity.

The main objective of BTS is to ensure safety, adequacy, accessibility, and efficiency of blood supply at all levels [1]. It is familiar that blood transfusion is associated with a significant complications, a few complications are only trivial and others are sometimes potentially life threatening. The use of unscreened or improperly screened blood and blood components transfusion keep the patient at risk of acquiring many transfusion transmitted infections like Hepatitis B, Hepatitis C, Human Immuno-deficiency Virus (HIV), Malaria and Syphilis. Hepatitis B, Hepatitis C and HIV leads long term suffering. So, the blood should be meticulously screened prior to storage and issued to the needy patient on requirement. Hepatitis B virus (HBV) is the major cause of viral hepatitis globally and is

associated with clinical manifestations such as hepatomegaly, cirrhosis, and hepato-cellular carcinoma [2]. HBV is an enveloped, partially single stranded DNA virus infects the liver, causing hepatitis B infection [3, 4]. The virus replicates in the hepatocytes causing liver impairment [5]. The inflammation and the damage of the liver arise as a consequence of the immune response to the virus in the liver cells [6]. The hepatitis B surface antigen (HBsAg) in the serum is the initial serological marker to indicate HBV infection, either acute or chronic [7]. Worldwide over two billion people have been infected with HBV and more than 350 million have chronic HBV infection [8].

## AIM OF THE STUDY

To study the seroprevalence of HBsAg among the blood donors in a tertiary care hospital

## MATERIALS AND METHODS

This prospective study was conducted in a tertiary care hospital, Hyderabad between January 2016 to December 2018 and the total duration of this study was 3 years. Total sample size was 55,376 which

included both voluntary (7333 donors) and replacement donors (48043). All the donors were in the age group between 18 years and 60 years. Most of the donors were male and few were female donors. All the positive cases of HBV were noted day to day and all the positive and grey zone samples were re-tested for confirmation. Screening kits used were 4<sup>th</sup> generation Elisa- ERBA International- ERBA Mannheim and Chemiluminescence method (CLIA) by Abbott Architect. All kits and reagents were used as per

manufacturer's instructions/kit instructions. All the positive cases were documented in records.

## RESULTS

In this study, a total of the 55,376 donors were included, 48,043 were replacement donors and 7333 were voluntary donors. Out of total donors 665 donors were tested positive for HBsAg which constituted 1.2%. Year wise donor distribution with seropositivity is tabulated in Table-1.

**Table-1: Donor Distribution with Hepatitis B Seropositivity**

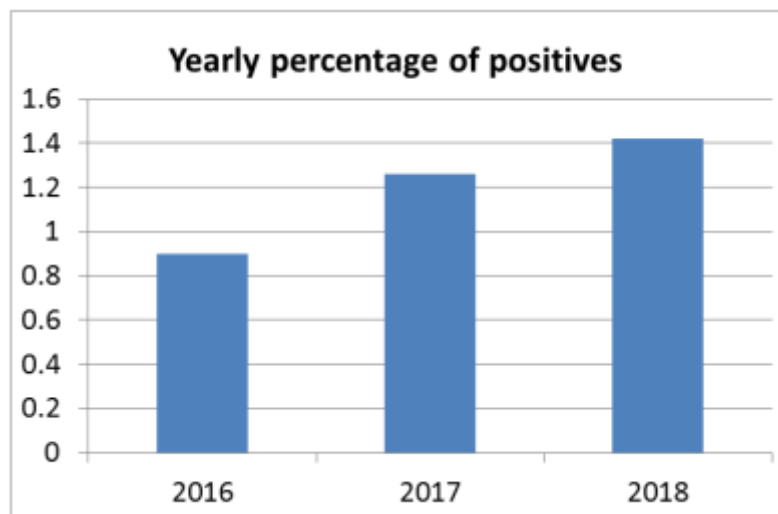
YEAR	DONATION		TOTAL	HBsAg POSITIVES
	Replacement	Voluntary		
2016	15550	2777	18327	166
2017	15853	2771	18624	236
2018	16140	2285	18425	263

In our study, out of 55,376 donors, only 103 were female donors and out of these only 2 female donors were tested positive for HBsAg. Majority of the positive cases were in the age group 18 years to 30 years followed by 41-50 years age group and least in the 51-60 years age group where the number of donors was also less in that particular group. Yearly wise

positivity increased from 2016 to 2018, positivity in year 2016 was 0.90 %, 2017 was 1.26 % and 2018 was 1.42 % (Chart-1). Total prevalence for the three years is 3.58 %. The prevalence of HBsAg positivity is more among replacement donors (3.14 % for all three years) and only 0.44 % for all the three years.

**Table-2: Age Distribution and HBsAg positivity**

YEAR	AGE (years)	NUMBER OF DONORS TESTED	POSITIVE %
2016	18-30	7497	87 (1.16 %)
	31-40	6208	50 (0.80 %)
	41-50	2480	24 (0.96 %)
	51-60	2142	05 (0.23 %)
2017	18-30	8099	124 (1.53 %)
	31-40	6151	65 (1.05 %)
	41-50	2382	38 (1.59 %)
	51-60	1992	09 (0.45 %)
2018	18-30	7802	168 (2.15 %)
	31-40	6350	56 (0.88 %)
	41-50	2394	31 (1.29 %)
	51-60	1879	08 (0.42 %)
TOTAL		55,376	665



**Chart-1: Showing Yearly percentage of HBsAg positives**

## DISCUSSION

Blood transfusion is a crucial component of health services and globally, millions of lives are being saved each year through this procedure [9]. Evaluation of the serological reactivity or positivity of the donated blood for transfusion transmitted infections is the integral part of the BTS. Serological testing or screening for HBV infection is one of the obligatory tests that are carried out customarily in the blood bank for each and every unit of donated blood. The primary purpose of screening donor blood for infectious disease markers is to prevent pathogen transmission to the recipients of blood and blood products. Risk of lethal infections such as HIV, HBV and HCV is highest when a contaminated blood is infused to a patient needing blood for life saving condition. Although infections spread by such infusions are less but the efficacy of this route is highest. Many people visit the blood banks of various hospitals and other blood donation centers across the country to donate blood to their dear ones who need blood for survival. This study showed that most donors were males and were aged between 18 and 30 years followed by 31-40 years. This observation is in correlation with the reports from the Ashanti and Northern Regions of Ghana, and in Western Uttar Pradesh, India [9-12]. Like in other studies, this study also dominated by male donors and the reason for this may be due to various socio-cultural influences [13-15]. In our study we observed a seroreactivity rate of 3.58% and 1.95% among male and females respectively. 1.95% incidence in female donors is due to less number and more reactivity of the donors. Singh K *et al.*, reported prevalence HBsAg, 0.65% in males and 0.25% in females [16]. Kochhar AK *et al.*, reported prevalence of 1.35% and 0.48% among male and female donors respectively [17].

The prevalence of HBsAg among the replacement donors was found to be 3.14% in this study which correlates with the study conducted by Gulia *et al.*, with prevalence rate of 2.69% [18]. The prevalence of HBsAg was significantly high in the first time donors when compared to that of the repeated donors. These results are in agreement with the previous study conducted among blood donors at Gondar University Teaching Hospital, Northwest Ethiopia between January 2003 and December 2007 [19]. The increased seroprevalence among the first time donors might be due to the fact that people who regularly donate blood were frequently subjected to screening many times. The lack of knowledge about HBV modes of transmission, its consequences, and its preventive measures is a major cause of increasing prevalence of HBV. Despite the implementation of effective and regular vaccination programs and campaigns, hepatitis B remains an important cause of morbidity and mortality worldwide. Understanding the epidemiology of the disease is essential in developing programs to prevent and treat this infection globally [20].

## CONCLUSION

To reduce the prevalence of HBsAg BTS should be stringent in selecting a donor; proper pre and post donation counseling should be given to the donor. Any history from the donor pointing towards liver disease should be deferred temporarily or permanently. Understanding the disease and self exclusion also reduces the seroreactivity in donated blood and wastage of resources. Implementation of more sensitive tests such as NAT for HBV that detects HBV infection earlier during the window period will further decrease the risk of transfusion transmitted HBV and improve the blood safety.

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