

## PREVALENCE OF HEPATITIS B VIRUS MARKERS IN BLOOD DONORS AT HAYATABAD MEDICAL COMPLEX PESHAWAR, PAKISTAN

Saleh Khan Afridi<sup>1</sup>, Sadiq Ullah Dawar<sup>2</sup>, Aman Ullah Afridi<sup>3</sup>, Abdul Majid<sup>4</sup>

### **ABSTRACT**

#### **OBJECTIVES**

*This study aimed to find out the prevalence of Hepatitis B Virus (HBV), and the ratio among the Hepatitis B Virus markers, including Hepatitis B surface Antigen (HBsAg), Hepatitis B surface Antibody (HBsAb), Hepatitis B envelop Antigen (HBeAg), Hepatitis B envelop Antibody and Hepatitis B core Antibody.*

#### **METHODOLOGY**

*A cross-sectional study was conducted from February to July 2022. Three hundred sixty blood donors were selected at Medical Teaching Institute Hayatabad Medical Complex Peshawar, Pakistan. The information about donors was received through a predesigned questionnaire.*

#### **RESULTS**

*The prevalence of HBV marker HBsAg was 2.8%, with the highest reactivity followed by HBcAb at 2.2% and HBeAb at 1.1%. Among HBV markers, no reactivity founded in HBsAb and HBeAg.*

#### **CONCLUSION**

*The highest positivity reactivity rate was found in HBsAg among HBV markers, while the second and third prevalent markers were HBcAb and HBeAb among blood donors.*

**KEYWORDS:** Prevalence, HBV Markers, Blood Donors, Hepatitis

#### **How to cite this article**

Afridi SK, Dawar SU, Afridi AU, Majid A. Prevalence of Hepatitis B Virus Markers in Blood Donors at Hayatabad Medical Complex Peshawar, Pakistan. J Wazir Muhammad Inst Paramed Tech. 2022;2(2): 36-40

#### **Correspondence**

<sup>1</sup>Saleh Khan Afridi, Clinical Technician, Department of Pathology, Hayatabad Medical Complex, Peshawar

☎: +92-315-6160160

✉: [salehfridi255@gmail.com](mailto:salehfridi255@gmail.com)

<sup>2</sup>Clinical Technician, Department of Pathology, Hayatabad Medical Complex, Peshawar

<sup>3</sup>Clinical Technician, Department of Pathology, Hayatabad Medical Complex, Peshawar

<sup>4</sup>Clinical Technician, Department of Pathology, Hayatabad Medical Complex, Peshawar

#### **INTRODUCTION**

Hepatitis B virus (HBV) belongs to the hepadnaviridae family and is a causative agent of hepatitis B infection, a DNA virus that is 50-100 times more contagious than HIV and ten times extra contagious than HCV.<sup>1</sup> HBV is an enveloped

double-stranded DNA virus that residues and multiplicate in hepatocytes, causing liver dysfunction, and after 30 to 60 days, exposure to HBV can be found in serum while remaining for different periods. The hepatitis B surface antigen is 22 nanometer in size and found on the outer surface of the virus also generate extreme quantity flow in blood in rounded and tubular form, and the central part consists of HBeAg, HBcAb isolated molecule of partly double-stranded DNA, and DNA depended on DNA polymerase.<sup>2</sup> The viral particle measures 42 nm in size and is surrounded by a lipoprotein envelope and HBsAg circulating in 2 forms in the blood: unbound viral particle protein form and bound protein form.<sup>3</sup> The discovery pride goes to Dr Baruch Blumberg, who discovered it in the American hemophilic patient serum after transfusing him the blood of an Australian.

Therefore, HBV has initially named the Australian Antigen that causes acute and chronic liver disease leading to cirrhosis, and hepatocellular carcinoma can be caused by infection.<sup>4</sup> Baruch Blumberg was discovered in 1965 and eventually recognized as a hepatitis B surface antigen. HBV infection is a significant health problem worldwide and has been recognized as a dominant risk factor for hepatocellular carcinoma and liver cirrhosis. When the hepatitis B virus infection occurs, the genome of the virus residue itself in the cell as a mini chromosome called covalently closed circular DNA.<sup>5</sup> The hepatitis B virus incubation period is an average of 120day ranging from 45-160days.<sup>6</sup> HBV chronically infects about 360 million out of 2 billion people infected by hepatitis B.<sup>7,8</sup> Worldwide, more than one million deaths occur due to liver cirrhosis and hepatocellular carcinoma. The most common cause of liver cirrhosis and hepatocellular carcinoma is HBV infection, although different drugs and vaccines are available for hepatitis B infection treatment.<sup>9</sup> The Hepatitis B virus chronically infects approximately 350 million people. Out of them, the number of infected people in the U.S and China is 1.5 million and 200 million. Complete eliminative treatment has been discovered to cure all chronically infected patients.<sup>10</sup> As hepatitis B virus infection is the highest risk for liver disease, it can also have many other than hepatic manifestations. New evidence shows that hepatitis B virus infection has a significant role in the new cases and progression of chronic renal disease, which affects morbidity and mortality in the general population.<sup>11</sup> The prevalence of chronic hepatitis B virus infection in adults is 5 %, while the ratio of chronic hepatitis B infection reaches a peak of approximately 90 % in children less than one year. The highest risk factor of most chronic manifestations occurs from infected mothers during birth or the first year of life.<sup>12</sup> The prevalence rates of HBV infection between 5 % - 7% are thought to be highly endemic as, with time, the HBV prevalence may change regularly, and essential to note in some countries and regions.<sup>13</sup> Most 87-90% of patients infected with hepatitis B produce immunity against the pathogen, clearing them, and the rest proportion of the infected patients become chronic carriers.<sup>14</sup> When the body produces antibodies against hepatitis B virus antigens showing immunity, the antigens of HBV disappear and cannot be detected as they can be detected in the infected person's blood before immunity is developed.<sup>15</sup>

## METHODOLOGY

The ethical approval committee approved this study of Gandhara University, Peshawar, Pakistan. A cross-sectional study has been held the determination of HBV infection prevalence and to find out the ratio among the HBV markers HBsAg, anti-HBs, HBeAg, anti-HBe and anti-HBc in the blood donors at Medical Teaching Institute Hayatabad Medical Complex Peshawar Pakistan. The study duration was six months, from February - July 2022. A total of 360 donors sample has been collected by using the following formula  $N = \frac{(1-p)^2 Z^2}{d^2}$ . A convenient sampling technique was used for the collection of samples. Data got from different professionals, including Government servants, labourers, farmers, students, Drivers, jobless and self-business donors through predesigned questionnaires. Data has been collected through a questionnaire based on blood donors with close-ended questions. The questionnaire was administered, and the questionnaire was filled in as per the respondent's answers. Each donor had to bleed with 3ml of whole blood after filling out the questionnaire and fulfilling the donation criteria. The heparinized tubes have been used for separating the plasma or serum. The plasma or serum was processed to detect HBV markers by Immune Chromatographic Technique using ABON HBV one-step hepatitis B virus combo Test Device.

## RESULTS

**Table 1: Occupation and Marital Status of the Donors**

		f	%age
Occupation	Govt. servant	98	27.22%
	Labor	78	21.66%
	Farmer	67	18.61%
	Students	56	15.56%
	Drivers	07	01.94%
	Jobless	44	12.22%
	Self-job	10	02.79%
Marital Status	Single	135	37.5%
	Married	225	62.5%

**Table 2: Distribution of Donors Based on Habitat**

Habitat	No of Donor	Positive	Negative
Rural	209	07 (1.94%)	202
Urban	151	03 (0.82%)	148

**Table 3: Distribution of Donors Based on Donation Trails**

Trail of donation	No of Donors	%age
1 <sup>st</sup> -time donation	192	53.34%
2 <sup>nd</sup> -time donation	11	03.05%
Regular donors	157	43.61%

**Table 4: Distribution Based on an Injury during Hair Cutting and Shaving and HBV Status**

Hx of Injury	Number	%age	HBV Positive	%age
Injured	84	23.33%	07	01.8%
Not injured	276	76.67%	03	0.83%

**Table 5: Prevalence of HBV Markers Positivity in Blood Donor**

HBV Markers	HsAg	HBsAb	HBeAg	HBeAb	HBcAb
Numbers	10	0	0	05	08
%Within HBV Marker	2.8%	0%	0%	1.4%	2.2%

## DISCUSSION

In the current study, our result states that the overall prevalence of HBV among blood donors was 2.5%. The prevalence of HBV markers, HBsAg, HBcAb and HBeAb, was 2.8 %, 2.2% and 1.4%, while the rest two markers, HBsAb and HBeAg, showed no reactivity, and hence their prevalence was zero. The ratio between the single and married donors was 37.5% and 62.5%. Among the participant, most were regular donors. The ratio among donors based on donation trials for 1<sup>st</sup> time blood donation, 2<sup>nd</sup> time blood donation and regular blood donation was 53.34%, 3.05% and 43.61%. Most of the donors were fresh donors, followed by regular donors while the ratio of 2<sup>nd</sup> time donors was low. Among the donors, the HBV-positive donors were mostly uneducated, belonged to a rural area and had a history of injury during hair cutting or shaving. In Iraq, 2.3% transfusion-induced hepatitis B virus prevalence at the blood bank and the prevalence of HBV-positive donors, while among infected donors, the result for both HBsAg and HBcAb was 0.2%.<sup>16</sup> The study shows similarity with the HBV positivity, which is 2.8%. However, the result of HBsAg and HBcAb have no similarity among the HBV-positive donors, which is 2.8% and 2.2% showing high prevalence among blood donors at Pakistan, Khyber Pakhtunkhwa Peshawar Hayat Abad Medical complex. Another study was arranged in central Nigeria to evaluate HBV markers in the blood sample of newly admitted students of sessions 2016 and 2017 at Nasarawa State University. The overall positivity ratio of HBsAg, HBsAb, HBeAg, HBeAb and HBcAb was 9.7%, 38.3%, 3.7%, 4.6% and 28.0%, respectively.<sup>17</sup> While our findings on the prevalence of HBV markers in the blood donors were quietly different concerning this study as the prevalence of the markers mentioned above At Hayat Abad Medical complex were 2.8%, 0%, 0%,

1.4% and 2.2% for HBsAg, HBsAb, HBeAg, HBeAb and HBcAb. In a study conducted in Conakry, Republic o Guinea, the overall detection rate of hepatitis B markers was 83.2%, while the detection rate of HBsAg was 16.4%.<sup>18</sup> World widely among infectious pathogens, HBV is one of the most common. The prevalence of HBV infection found among donors ranges from 2% to 18% through various studies all over the World. A study conducted in Yemen found the prevalence of HBsAg and Anti-HBcAb, and the rate was 2.0% and 10.3%.<sup>19</sup> Our current study on the prevalence of HBV markers has a very close result of HBsAg, which was 2.8%, while the prevalence of HBcAb has a difference of 2.2% in our current study. In many conditions, blood transfusion has lifesaving measures and plays an essential role in managing various medical and surgical procedures, but blood transfusion is not always safe, and with each transfusion, there is a chance of transfusion-transmitted infection. There are many problems due to which infection can be transmitted from an infected person to a non-infected person, including concealment of medical history, donation during the window period poor quality of testing.

## LIMITATIONS

This study didn't evaluate the other factors contributing to the prevalence of hepatitis B markers and their frequencies. There should be studies to find out the reasons for the increased prevalence of hepatitis B in rural areas.

## CONCLUSION

This study concluded that the positivity rate of HBsAg among HBV markers is the highest among blood donors, and the second prevalent marker is HBcAb, followed by the third prevalent marker HBeAb. Most of the donors with positive HBV markers were from rural areas. Among HBV markers positive donors have cut injuries during hair cutting and shaving from barbers.

**CONFLICT OF INTEREST:** None

**FUNDING SOURCES:** None

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**CONTRIBUTORS**

1. **Saleh Khan Afridi** – Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Final Approval
2. **Sadiq Ullah Dawar** – Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript
3. **Aman Ullah Afridi** – Supervision
4. **Abdul Majid** - Supervision



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