

## A Preliminary Prospective Study for Seroprevalance of Hepatitis B Positivity in Hospital-Based Population from Bundelkhand Region of Uttar Pradesh

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### Abstract

**Background and Objective:** The prevalence of infection often varies with geographical location. The aim of present study was to establish sero-prevalence of hepatitis B surface antigen among hospital based population in Bundelkhand region of Uttar Pradesh.

**Methodology & Study group:** The study included a total of 1800 cases, which were enrolled in the out-patient department of Government Medical College, Banda from January 2017 to August, 2017. All serum samples were screened for hepatitis B surface antigen (HBsAg) using rapid card method.

**Results:** Of the tested 1800 samples, a total of thirty-eight (2.11%) cases were found positive for hepatitis B surface antigen. Majority positive cases were in the age groups of 21-30 and 31-40, both having 23% and 21% positivity respectively. Out the total 38 positive cases, 25 cases were males (65%) and 13 cases were females (35%).

**Conclusion:** The study throws light on the magnitude of viral transmission in the rural community in Banda district of Uttar Pradesh state and provides a reference for future studies with a focus in rural areas.

**Keywords:** Hepatitis B; Hepatitis B surface antigen; Bundelkhand; Seroprevalence; Hospital based population.

### Introduction

Viral hepatitis, a cause of significant morbidity and mortality in India, consists of five unrelated human pathogens. Among them, hepatitis B virus (HBV) infection remains a significant global health problem as a major cause of chronic liver disease (CLD) within increasing risk of cirrhosis and hepatocellular carcinoma (HCC) (WHO Fact Sheet) [1]. Estimates of the World Health Organization (WHO) suggest that more than 2 billion people worldwide have been infected with HBV. Of these, approximately 240 million individuals have chronic (long-term) liver infections and at risk of serious illness and death, mainly from liver cirrhosis and hepatocellular carcinoma (HCC). More than 780,000 people die every year due to the acute or chronic consequences of Hepatitis B [1,2].

Based on the prevalence of Hepatitis B surface antigen (HBsAg), different areas of the world are classified as having high ( $\geq 8\%$ ), intermediate (2-7%) or low ( $< 2\%$ ) HBV endemicity. It has been found to be highest in sub-Saharan Africa and East Asia, where between 5-10% of the adult population is chronically infected. High rates of chronic infections are also found in the Amazon and the southern parts of eastern and central Europe. In the Middle East and the Indian subcontinent, an estimated 2-5% of the general population is chronically infected. Less than 1% of the population in Western Europe and North America is chronically infected [1,3].

Being second most populous country with one-fifth of the world's population, India accounts for a very large proportion of the HBV burden [4]. The country harbors almost 10-15% of all HBV carriers of the world and estimated to be home to around 40 million HBV carriers. About 15-25% of the carriers may develop cirrhosis and liver cancer and die prematurely. The infant and childhood infections are most likely to become chronic [5]. Of the 2.6 crore (26 million) infants born every year in India, approximately 10 lakhs (1 million) run the life-time risk of developing chronic HBV infection [6]. Such factors make it imperative to study the prevalence of disease in populations. Therefore, an observational study was planned in the Banda district of Bundelkhand region, which has predominantly rural population to assess the prevalence and various risk factors.

### Materials and Methods

#### Study area and population

The study was carried out from January, 2017 to August, 2017 for a period of 8 months at Government Medical College (a tertiary care hospital) in Banda district of Uttar Pradesh. All subjects visiting the out-patient department of the medical college and advised for HBsAg test, were included. The samples were collected for test at the central pathology laboratory of Government Medical College. Detailed information including demographic details like age, gender, occupation etc. was also taken.

## Specimen

Approximately 2-3 ml venous blood sample was collected aseptically from all patients who came with lab requisitions for the testing of HBsAg. The blood was allowed to clot for 30 min at room temperature and the serum was separated as per standard method in use and tested immediately.

## Hepatitis B infection assessment

HBsAg was determined using a commercially available rapid card method HyperCard (Reckon diagnostics). All serum samples which were reactive with the above test were rechecked in-house by a different rapid test, Crystal HBsAg (Span Diagnostics). Principle of the screening card test is based on one step immunochromatography sandwich ELISA. All the tests were performed in accordance with the manufacturer's instructions with adequate controls. The analytical sensitivity and accuracy of these qualitative immunoassays is as low as 0.5 mg/ml antigen in serum as per manufacturers' claims.

## Results

A total of 1800 cases were screened for HBsAg in the Department of Pathology laboratory from a period of January, 2017 to August 2017. Overall, thirty-eight (38) cases were found to be positive of hepatitis B surface antigen (HBsAg) in the serum sample, which gives a total prevalence positivity rate of 2.1% (Table 1). The study group was further segregated according to gender and different age groups. The studied population was divided into nine different age groups according to age, starting from 0-10 to >80 years.

Total Screened Serum Samples	Seroprevalance
1800	38
% seroprevalance	2.11%

**Table 1:** Percent Positivity in total screened samples.

As represented in Figure 1, majority positive cases were observed in population between 21 to 40 years with nine cases (24%) in the age group of 21-30 and eight cases (21%) in that of 31-40 years. However, Table 2 represents the total number of cases reported with each age group, along with the percent positivity. As evident from the Table 2, though more than five hundred serum samples were analysed in the age group between 21 to 30 years; only nine patients were found to be positive for HBs Ag (1.76%); whereas higher percent positivity (3.2%) was observed in the age group of 51-60 years (5/154). The gender wise

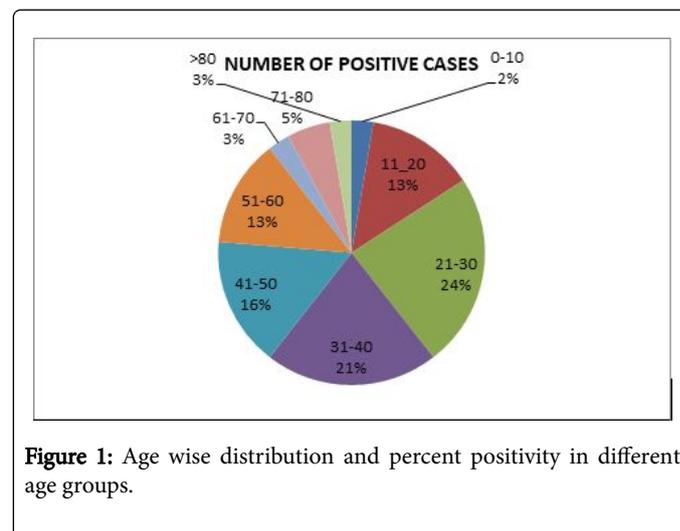
Sex	Number of Sera Tested	Number of Sera Tested Positive for HBsAg	Total Positive Percentage (%)	Percent Positivity
Males	1180	25	2.1 (25/1180)	65.7 (25/38)
Females	620	13	2.0 (13/620)	34.2 (13/38)

**Table 3:** Gender wise distribution of HbsAg positive patients.

## Discussion

There is a wide variation in the prevalence of HBsAg in different regions of our country as represented in Table 4. The percent prevalence has been reported from 1 to 3% in different cities or states.

analysis of the cases is also presented in Table 3. Out of total 38 positive cases, 65.7% were males (25/38) and rest 13 cases were females (34.2%). Majority positive cases were found in 21-40 years age group in both males and females; however over all difference in percent positivity was the same in both genders with 2% positivity in each group.



**Figure 1:** Age wise distribution and percent positivity in different age groups.

Age	No. of Sample Tested	HBsAg Positive Patients	Percentage
0-10	107	01	0.9
11-20	275	05	1.8
21-30	509	09	1.76
31-40	350	08	2.28
41-50	260	06	2.30
51-60	154	05	3.2
61-70	60	01	1.6
71-80	54	02	3.7
>80	31	01	3.2

**Table 2:** Age wise distribution of total and HBsAg positive cases.

In a 2015-16 study done in Andhra Pradesh, 3% prevalence of Hepatitis B has been reported [7]; whereas Quadri et al. [8] reported the prevalence of HBsAg to be 1.63%, in a hospital based study at Bijapur, Karnataka. Seroprevalence in hospital based population was found to be 0.87% in Jaipur by Sood et al. [9]. Batham et al. [10] in

their review and meta-analysis on 61 populations of India concluded true prevalence of 2.4% in non-tribal population and 15.9% prevalence in tribal population. However, Lodha and his co-workers have concluded HBsAg prevalence of 1-2% in their study [11]. A prevalence of 1.67% among patients at a rural tertiary health care center in South India has also been reported [12].

The present study, conducted over a period of 8 months on a total of 1800 samples for Hepatitis B surface antigen reports a percentage prevalence of 2.11%. Some other studies done in cities have found similar positivity, like 2.45% among twenty thousand blood donors of Kanpur city [13]; 2.31% in OPD patients in Udaipur, Rajasthan [14] and 2.25% in hospital based population in Karad, Maharashtra [15]. A study conducted by Dwivedi et al. [16] in Allahabad has found prevalence of 0.9% in pregnant females. All these studies approximately coincide with our study in terms of seroprevalence.

The prevalence of Hepatitis B varies from country to country and depends upon a complex mix of behavioral, environmental and host factors. In general, low prevalence is observed in countries with high standards of living e.g., Australia, North America or Europe and higher in countries with low socioeconomic levels such as South East Asia or South America. In a study conducted by Bhatta et al. [17] in hospital-based population at Kathmandu Medical College Hospital, Nepal, the prevalence rate of viral Hepatitis B was found to be 2.5% [18]. The prevalence of HBsAg in patients attending a surgical OPD in Rawalpindi, Pakistan has been reported as 2.28% [19].

In our study total number of males screened was 1180, out of which 25 were positive showing 2.11% positivity and total 620 were females, out of which 13 were positive showing 2.09% seroprevalence positivity. Thus a comparison of males and females out of total 38 positive cases, 25 were males whereas 13 were females. Our study shows no major difference between male and female prevalence positivity. One study by Alavian et al. [20] in West Iran found no major difference in seroprevalence among males and females [15]. However, most of the previous studies in India reported higher male prevalence viz. Sood et al. [9] reported HBsAg prevalence to be 1.04% and 0.58% respectively for males and females. Dutta et al. [18] have found 35.3% and 19.3% females. Singh et al. [21] have also noticed prevalence of 0.65 % and 0.25 % respectively in males and females in their study on blood donors, in which the prevalence was 0.62% [12].

In the study, highest percentage of positive seroprevalence among all age groups was found to be in 51-60 years age group, which is due to less patients getting screened for HBsAg compared to more young patients getting routinely screened. However, out of total 38 patients found positive for HBsAg, majority were found in the age groups of 21-40 years. Vazhavandalet al. [12] in their study also found maximum number of patients in 21-40 age groups among the positive patients.

The patients attending the Government hospital are mostly rural to semi urban population of Bundelkhand region of Uttar Pradesh, which is considered to be one of the most backward regions of India. Thus our study highlights more HBV seroprevalence in rural population of Banda district and provides an important reference for future studies on the epidemiology of infection.

Place of study	Year of study	No. of samples tested	Study population	Prevalence (%)
Jaipur	2010-2011	9515	General population	1.73

Bijapur	2010	4283	General population	1.63
Vijaypur	2013-2014	15230	General population	1.76
Andhra Pradesh	2015-2016	24028	General population	3.05
Punjab	2013-2014	3686	Antenatal females	1.11
Kanpur (UP)	2002-2006	20000	Blood donors	2.45
Banda (UP)	2017	1800	General population	2.1

**Table 4:** Comparison of Prevalence of HBV at Various Geographical Locations in India.

## Conclusion

It is important to carry out larger studies to better elucidate the epidemiology of HBV and identify the high prevalence areas. The present study helps to know the magnitude of viral transmission in the community and to know the high risk age groups. Future surveillance studies warranting investigations for this viral infection in a broader population will help us to determine combating threats by Hep B virus. In addition, epidemiologic studies like the present ones from different states of India would be helpful to estimate real statistics of Hepatitis B infection in India.

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