

## Seroprevalence of Hepatitis B at Tertiary Care Hospital.

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### ABSTRACT

**Background:** The burden of Hepatitis B caused by a hepatotropic virus, Hepatitis B Virus (HBV), is a significant public health problem in India, although a cost-effective vaccine is available at each corner of the world. It has been estimated that up to 10% of HBV global burden is shared by India alone. Each year approximately 0.1 million deaths occur due to HBV and its related illnesses in our country. The present study aims to determine actual prevalence of disease by active surveillance at tertiary care hospital. **Methods:** This is a prospective cross-sectional study conducted at tertiary care hospital western UP, from June 2018 to Dec 2018. 2-4 ml of blood sample from each patient was collected and sent to VRDL from different clinical OPDs and IPDs for routine screening of HBV and these all were included in this study. For this routine screening of HBV, Hepatitis B Surface Antigen (HBsAg) was used as a marker of infection. The technique used was Chemiluminescence ELISA method. The data was collected on a predesigned patient information sheet. **Results:** A total of 13613 samples were tested, and of these all, 653 were positive for HBsAg. Hence, the overall prevalence observed in this study was 4.8%. Among all seropositive cases, 341 (50.2%) were males and 312 (47.8%) females with P value of (P >0.05). The majority of cases 50.1% were in the age group of 16-30 years, and among these, females were dominant with 32.8% over 17.3% males. **Conclusion:** Thus, this study concludes that HBV infection is still a public health problem which should be among the prioritized health problem in our country.

**Keywords:** HBV, Seroprevalence, HBsAg and Chemiluminescence ELISA.

### INTRODUCTION

World Health Organization (WHO) estimated that more than 250 million people suffer with chronic Hepatitis B Virus (HBV) infection resulting in end stage liver diseases, cirrhosis and hepatocellular carcinoma as a late complications.<sup>[1]</sup> WHO has classified burden of HBV defined as hepatitis B surface antigen positive (HBsAg) severity based on the prevalence of infection, into high endemicity (>8%), intermediate (2-7%) and low endemicity (<2%).<sup>[2]</sup> Each year approximately 0.1 million deaths occur due to HBV and its related illnesses in our country.<sup>[3]</sup> It has been estimated that up to 10% share of global prevalence of HBV is borne by India alone. The carrier rate of HBV in India may vary in the different regions and is often quoted as being 4.7% but as per the classification of HBV prevalence, India is in intermediate range (prevalence range 2-7%).<sup>[4]</sup>

HBV is transmitted by percutaneous or mucosal exposure to infected blood or other body fluids. The

most common modes of transmission of infection are perinatal (mother to child), unsafe sexual practices, needle sharing and occupational or health care related.<sup>[5]</sup> HBV infection may result in subclinical or asymptomatic infection, acute self-limited hepatitis or fulminant hepatitis. Chronic HBV infection may also develop which can lead to cirrhosis and hepatocellular carcinoma.<sup>[6]</sup> Development of chronic infection depends upon the age of the person at the time of infection. It is 90% in infected infants, 25 - 50% in children infected between 1 to 5 years of age and 6-10% in older children and adults.<sup>[7]</sup> HBV infection continues to remain a significant global health problem including India. Although the cost-effective vaccine are available for the prevention of the HBV but still prevalent as high degree in our society. Therefore, the present study aimed to the determine prevalence of HBV by screening HBsAg among patients attending at tertiary care hospital.

### MATERIALS AND METHODS

#### Study area

The study was conducted at Viral Research and Diagnostic Laboratory (VRDL) in Department of Microbiology, Uttar Pradesh University of Medical Sciences, Saifai. This medical University is situated in western part of Uttar Pradesh, India which mostly caters the rural and semi urban population.

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**Study design and period**

This is a prospective cross-sectional study which includes laboratory proven positive and negative cases, and was conducted from June 2018 – Dec 2018. All patients advised screening during the study period were included in the study.

**Laboratory setting**

In order to strengthen the infrastructure for timely diagnosis of viral epidemics and continuous monitoring of existing as well as new viral strains, the Department of Health Research (DHR) established Viral Research & Diagnostic Laboratories (VRDLs) a medical college level at this Medical University, which at this time is dealing with more than 15 viruses prevalent in this area. For the screening purpose, detection of HBsAg done by Chemiluminescence ELISA (ARCHITECT HBsAg assay, Abbott Diagnostics, Germany) method as per manufacturer's instructions. In brief, the ARCHITECT HBsAg assay is a two-step immunoassay, using chemiluminescent microparticle immunoassay (CMIA) technology for the quantitative determination of HBsAg in human serum and plasma. In the first step, sample and anti-HBs coated paramagnetic microparticles are combined. HBsAg present in the sample binds to the anti-HBs coated microparticles. After washing, acridinium-labeled anti-HBs conjugate is added in the second step. Following another wash cycle, Pre-Trigger and Trigger Solutions are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs) and determine the qualitative results.

**Data collection and results analysis**

As routine practice we maintain all precision and precaution as per the guidelines of Good Laboratory Practice to ensure the quality of test result and authenticity of the generated data. The data were

collected and results were analyzed by using Microsoft Excel version 10.

**Ethical Approval:** A written ethical approval was obtained by University Ethics Committee "E.C. No.148/2017/Dean/UPUMS".

**RESULTS**

The present study included 13613 sera samples for screening of HBsAg during the study period. Of these, 653 samples were positive for HBsAg by chemiluminescence ELISA method. Thus, the seroprevalence of HBV was 4.8% as observed in present study. Among all seropositive cases, 341 (52.2%) males and 312 (47.8%) of females were found seropositive. The gender-based distribution found was approximately equal, and the difference was not found statistically significant (P value > 0.05). The mean of age mean±SD of males was 41.4±18 years, and for females was 30.5± 13.8 years. The overall mean of age (mean± SD) observed for all positive individuals was 36.2± 17 years.

The gender and age wise distribution of positive cases is shown in Table no1. The age group 0 -15 years observed as least positive group. Moreover, the age group 16-30 year was most prominent group as observed in current study. The gender-based distribution was also analyzed since a high frequency of female cases were observed as 214 female among 327 infected cases in age group 16-30 years.

As mentioned above the majority of positive cases were seen in age group 16-30 years, it was 2.5 folds more in comparison with age group 31-45 years and 2.8 folds more with age group 46-60 years. Similarly, it was recoded that the frequency of female among age group 16-30 years was many fold more as against other age groups, 4 folds more in 31-45 years group and 9.7 folds more from age group 46-60 years group etc. [Table 1]

**Table 1:**

Gender distribution	Age group distribution					Total
	0-15 Years	16-30 Years	31-45 Years	46-60 Years	>60 Years	
Male	11 (1.7%)	113 (17.3%)	72 (11%)	94 (14.4%)	51 (7.8%)	341 (52.2%)
Female	07 (1.1%)	214 (32.8%)	52 (07.9%)	22 (3.4%)	17 (2.6%)	312 (47.8%)
Total	18(2.8)	327 (50.1%)	124 (18.9%)	116 (17.7%)	68 (10.4%)	653 (100%)

**DISCUSSION**

The burden of HBV is a significant public health problem in India despite an effective vaccine. It is assumed that this might be due to lack of awareness which is significantly low among the general population. The prevalence of HBV differs in different regions, depending on the proportion of HBsAg seropositive populations. The global

epidemiology of HBV infection is categorized as high, intermediate and low as categorised by WHO.<sup>[2]</sup> The present study presents an overall seropositivity at this Tertiary Care Hospital as 4.8%. These observations coincides with the other studies and is contributing to the already available burden in our society. An Indian meta-analysis study support our data by quoting the carrier rate as an average 4.7% of HBV in our country.<sup>[8]</sup> Moreover, HBsAg

prevalence among general population ranges from 0.1% to 11.7%, being between 2% and 8% in most of studies.<sup>[4,9,10]</sup> The gender based seroprevalence, males being slightly high in comparison to females, was not statically significance ( $P>0.05$ ). The present data suggests that the burden of HBV is approximately and equally distributed in our society among both genders. The recent study by Gebreegziabher et al.<sup>[11]</sup> found that the prevalence of HBV in males was higher (59.8%) than female (40.2%), and another study from Ethiopia reported no deference among male and female.<sup>[12]</sup> In contrast, a study from Kenya reported that the prevalence was higher in females while another study from Seoul,<sup>[13]</sup> Korea reported that both genders equally contributed to the burden of HBV infection.<sup>[14]</sup> The diversified data were available regarding gender susceptibility of HBV infection. Thus, the risk of contracting HBV did not correlate with gender. This study shows low seroprevalence of HBV infections found in age group (0 -15 years) and least in higher age groups which reflects the efforts of effective health services and vaccination in neonates and infants. These findings are also supported by other studies among children and adolescent age groups.<sup>[11,15]</sup>

Higher seroprevalence was observed in age group (16-30 years), which itself contributes 50.1% of the total prevalence in current study. This statistic discloses lack of awareness among general population about vaccination and risk of exposer about HBV. higher rate of infection among adults has also been reported by Khan F et al.,<sup>[16]</sup> who found youngest age group (21-30 years) having highest frequency 34.9% of HBsAg and age group 31-40 years being the second 23.83% most common. Rokade HG et al.,<sup>[17]</sup> have reported an increasing prevalence among 15 - 45 years age group and found 51.9% individuals HBV positive. Although, the present study shows that female frequency was dominant in this age group (16-30 years) but the increased frequency among women in this age group (15-30 years) reveled that most of women underwent antenatal routine HBsAg screening at our hospital. A study on age-specific prevalence of HVB infection in young pregnant women reveled that higher prevalent in adult female.<sup>[18]</sup>

In 2015; WHO published guidelines for prevention and treatment of chronic HBV infection to promote several strategies for reducing the future burden which include, (a) that the vaccination of neonatal and infant is necessary to prevent vertical transmission and provoke lifelong immunity against future HBV exposures, (b) antiviral therapy for pregnant women who having chronic infection of HBV to prevent mother to child transmission and (c) making a proper approach to prevent the transmission to health care workers, surgical and dental invasive procedure of patients or any contact with body fluid of chronic patient to healthy

person.<sup>[19]</sup> The vaccination of newborn is essential especially in high burden countries, the first dose has to be given within 24 hours of birth and rest of the doses late in infancy.<sup>[20]</sup> The WHO guideline, can help prevent vertical and horizontal transmission of HBV infection and can not only reduce the burden but make the society HBV free.

## CONCLUSION

HBV is an important cause of mortality and morbidity especially in developing countries. The seroprevalence of HBV is intermediate according WHO definition. Thus the study indicates that HBV infection is still a public health problem which should be among the prioritized health problems in the country. Thus strengthening of existing preventive strategies including vaccination, early case detection, prompt treatment, and most importantly, the general awareness in general population can reduce the burden of this disease.

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