

Seroprevalence of Hepatitis B surface antigen in hospital based population of Jaipur, Rajasthan

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Abstract

Background: Hepatitis B infection is one of world's major infectious diseases with about 350 million chronic carriers. Seroprevalence of Hepatitis B virus infection in any country provides significant information to the program managers and health planners to control and manage the infection. As very few data is published on the seroprevalence of Hepatitis B virus infection in Jaipur, Rajasthan. So this article evaluates the available data from 2 years to estimate the prevalence of the infection. **Objective:** The study was conducted to know seroprevalence of HBV infection in Jaipur, Rajasthan. **Methodology:** The study population comprise of 74787 patients from SMS Hospital Jaipur, Rajasthan. Screening of HBsAg was performed by using ELISA kit (Sandwich ELISA) and seropositivity was calculated and stratified by sex and age. Statistical analysis was performed using chi-square test. **Results:** Out of 74787 sera which were studied, 3092(4.13%) were seropositive cases. Among positive cases, the seroprevalence in males and females were 4.7% (2297) and 2.9% (795) respectively. The frequency of HBV among age group 0-20, 21-40, 41-60 and > 60 was 9.21% (285), 40.39% (1249), 34.79% (1076) and 15.58% (482) respectively. Among the positive cases, male preponderance ($p < 0.001$) was seen and majority were in the age group of 21 to 40 years. **Conclusion:** Seroprevalence of HBsAg was found in the national average of 2-7%. This study highlights HBV infection rate in the community in the part of India. **Keywords:** Seroprevalence, Hepatitis B.

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INTRODUCTION

Hepatitis B is the causative agent of viral hepatitis. It can cause both acute and chronic liver diseases. The common mode of transmission are vertical transmission from Hepatitis B Virus (HBV) infected mother to the newborn child, sexually active heterosexuals and homosexuals persons, through contaminated blood, use of contaminated needles, infants or children in highly endemic areas and from visitors of highly endemic

region^{1,2}. About 2 billion people worldwide have serological evidence of current or past HBV infection and about 350 million people are chronically infected with this virus³. The prevalence of HBV varies geographically and it can be classified into high, moderate and low endemic patterns. About 45% of the world population live in the region of high endemicity, defined as areas where prevalence of hepatitis B surface antigen (HBsAg) is 8% or more. These highly endemic regions are Southeast Asia and Sub-Saharan Africa. Around 43% of population live in moderately endemic region such as Mediterranean countries and Japan, in which seroprevalence of HBsAg is 2-7%. The low endemic region like Western Europe and North America constitutes 12% of the world population where seroprevalence of HBsAg is less than 2%.^{4,5,6} Seroprevalence of Hepatitis B can be determined by detecting the presence of hepatitis B surface antigen in a community or general population⁷. The prevalence estimation in general population is important information to program managers and health planners for controlling and managing the infection. But in developing countries

like India seroprevalence studies are difficult to conduct in general population because of socioeconomic hurdles and logistic difficulties⁸. Therefore present study was conducted to estimate the seroprevalence of HBV infection in both sexes and in different age groups at SMS hospital, Jaipur (Rajasthan).

MATERIAL AND METHODS

This study was carried out in Clinical Microbiology section of Central Laboratory of SMS Medical College and attached hospital, Jaipur, Rajasthan. It was carried out over period of 2 years i.e. from Jan 2012 to Dec. 2013. A total of 74787 serum samples were collected from patients attending outpatient departments and admitted indoor patients to various wards of SMS hospital. Five ml of venous blood sample were collected from patients and sera were separated. Hepatitis B surface antigen (HBsAg) was detected using Sandwich ELISA (HEPALISA) procured from J. Mitra and Co. Pvt, Ltd. All the tests

were performed in accordance with Manufactures' instructions with adequate controls. All reactive samples and their fresh samples were tested again using the same ELISA kits. Samples showing both fresh test and repeat test positivity with same ELISA kit were considered positive.

RESULTS

Sera of 74787 patients were tested for HBsAg over a period of two years from Jan 2012 to Dec 2013. Out of 74787 patients 48047(64.20%) were males and 26740(35.75%) were females. Total 3092 patients were positive for HBsAg with the prevalence rate 4.13%. Prevalence was higher in males (3.071%) compared to females (1.063%) as shown in table 1. Analysis of age distribution of HBsAg positivity reveals a high prevalence (40.39%) among 21-40 years followed by 34.79% in 41-60 years age as shown in table 2.

Table 1: Sex wise distribution of HBsAg sample

Total sample of HBsAg tested	Total positive samples	Total males tested	Positive males	Total females tested	Positive females
7,4787	3092(4.13%)	4,8047(64.2%)	2297(3.071%)	26740(35.75%)	795(1.063%)

Chi-square = 159.467 with 1 degree of freedom; p = 0.000

Table 2: Age and sex wise distribution of HBsAg positive samples

Sr. No.	Age (in years)	Total number of HBsAg positive sample	Percentage (%) positivity	Total number of positive male	Total number of Positive female
1	0-20 yrs	285	9.21%	195(6.30%)	90(2.91%)
2	21-40 yrs	1249	40.39%	873(28.23%)	376(12.16%)
3	41-60yrs	1076	34.79%	864(27.94%)	212(6.85%)
4	Above 60 yrs	482	15.58%	365(11.80%)	117(3.78%)

Chi- square = 454.272 with 3 degrees of freedom p = 0.000

DISCUSSION

In our study of hospital based population the prevalence of HBsAg was 4.13%. This study was conducted over 2 yrs and a large number of samples were tested. There are several studies conducted on seroprevalence of HBsAg in India. Choudhary A reported that 3-4% of Indian population are HBV infected with highest prevalence among aborigines of Andamans and Arunachal Pradesh³. Batham *et al* reported a prevalence of 2.4% in nontribal population and 15% in tribal population in India¹³. Smita Sood and Shirish Malvankar have noted 0.87% prevalence of HBsAg in hospital based population. The relatively low prevalence in their study could be due to the fact that it was conducted in a private hospital usually catering economically privileged class patients⁸. Similarly in a study conducted on hospital based population at Kathmandu Medical College, Nepal prevalence rate was found to be 2.5%¹⁴ and prevalence was 2.28% in patients attending a surgical OPD in Rawlpindi, Pakistan¹⁵.

Sex specific prevalence

Seroprevalence of HBV among males and females in our study was 4.7% and 2.9% respectively. In accordance with our study Dutta *et al*⁹, Sood *et al*⁸, Sayed A Quadri *et al*⁷ Vazhavandal G *et al*¹⁰ Rachna Behal *et al*¹¹, also reported higher male preponderance. The possible cause of higher prevalence in males in general population may be due to higher exposure to occupational HBV risk factor¹⁰ and plasma disappearance rate of HBsAg in males is lower than in females¹².

Age specific prevalence

The present study reveals significant trend of HBV seropositivity with relation to age. The seroprevalence of HBsAg was highest among 21-40 years (40.39%) and it is lowest among 0-20 years (9.21%). The prevalence of HBV infection shows a decrease trend in the lower age groups as shown in the table². The decline in seroprevalence of HBsAg in 0-20 yrs is attributed to the effect of universal immunisation programme. Higher prevalence among 21-40 yrs in India and other countries

in Asia pacific region is may be due to higher exposure to occupational risk factors as well is risky behaviours among young individuals.

CONCLUSION

HBV causes a considerable disease burden in India with a significant loss of human life. The patients attending our hospital represent a mix of poor and rich as well as urban and rural population. Therefore our study hints at the HBV infection rate in this part of country and it highlights the importance of presenting integrated information and educational programmes for preventing and controlling HBV transmission.

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