Seroprevalence of Hepatitis-B surface antigen among the patients reporting at tertiary care Hospital from India

Patil SR¹, Ghorpade MV², Patil SS³, Pawar SK⁴, Mohite ST⁵*

Abstract:

Background: Hepatitis B is a potentially life–threatening liver infection caused by the hepatitis B virus. It is a global health problem. Objectives: To estimate the Seroprevalence of HBsAg and its age and sex wise distribution in a hospital based population. Materials and Methods: Serum samples collected over a period of 12 months from patients attending OPDs and admitted to various IPDs of Krishna Hospital and Medical Research Center Karad, were included in the study. Seroprevalence of Hepatitis B surface antigen among hospital based general population was determined using a third generation ELISA. Statistical analysis: Percentages, chi square test. Results: A total number of 7373 patients were screened for HBsAg, among them 3238 (43.92%) were males and 4135 (56.08%) were females. The seroprevalence of HBsAg was 166(2.25%). The seroprevalence of HBsAg was higher in males 85(2.63%) as compared to females 81(1.96%). The highest seroprevalence was found to be among 51-60yrs age group (5.24%)

Key words: Hepatitis B, Seroprevalence, India, HBsAg

Introduction:

Hepatitis B is a potentially life –threatening liver infection caused by the hepatitis B virus. It is a global health problem. It can cause chronic liver disease and chronic infection and puts people at high risk of death from cirrhosis of the liver and liver cancer. More than 240 million people have chronic (long term) liver infections. About 600000 people die every year due to the acute or chronic consequences of hepatitis B¹. HBV is distributed worldwide, but its prevalence varies significantly between different populations of the world. Based on the prevalence of HBV surface antigen (HBsAg) carrier rate in the general population, Sub-Saharan African, East Asian and Alaskan populations are classified as high HBV endemicity (HBsAg carriage > 8%), while the populations of southern parts of Eastern and central Europe, the Amazon basin, the Middle East and the Indian subcontinent are classified as intermediate HBV endemicity (HBsAg carriage 2-7%), and the populations in western and northern Europe, North America, and Australia are classified as low endemic (HBsAg carriage < 2%) regions².

HBV belongs to the family of DNA viruses that preferentially infect hepatocytes and are referred to as hepadnaviridae³. Each complete virion consists of an inner core (nucleocapsid or hepatitis core antigen, HBCAg) surrounded by an outer protein coat or envelope (the hepatitis B surface antigen, HBsAg)³. The HBV genome is a circular, partially double-stranded DNA of approximately 3,000 base pairs. There are four overlapping open reading frames (ORF), which encode for the envelope, precore/core, polymerase, and X proteins. The envelope ORF encodes for the large middle and small surface glycoprotein’s of HBsAg. The precore/core ORF is translated into a precore polypeptide,

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which is secreted as hepatitis B 'e' antigen, which is detectable in the blood as HBeAg and HBcAg, which is only detected in the liver\(^3\). The hepatitis B surface antigen (HBsAg), a serological marker for HBV was first demonstrated by Blumberg in 1963\(^4\). Of all the viral hepatitides, HBV is the most complicated infection with respect to interpretation of serologic tests\(^3\). Both acute and chronic HBV infections are characterized by the presence of hepatitis B surface antigen (HBsAg) and the absence of antibodies to HBsAg (anti-HBs)\(^3\).

Transmission of HBV is predominantly via parenteral means, even though this infection is also transmitted by sexual contact and acupuncture. Mother–to–child transmission and occupational transmission from HBV infected patients to health care workers are also major modes of transmission. One of the major distinctive features of HBV infection is that risk of developing chronic liver disease varies greatly with age of acquiring the infection. For neonates and infants who acquire HBV, the risk of chronicity is almost 90%, while it decreases to 30% for children 1-5yr, and up to 2% for older children and adults\(^5\).

According to the WHO report on prevention of HBV in India\(^6\), HBsAg prevalence among general population ranges from 0.1% to 11.7%, being between 2% to 8% in most studies. HBsAg prevalence rate among blood donors ranged from 1% to 4.7%. Considering, on an average, HBsAg carrier rate of 5%, the total number of HBV carriers in the country was estimated to be about 50 million that forms nearly 15% of the entire pool of HBV carriers in the world and is the second largest pool of chronic HBV infections in the world\(^6\). A tertiary care hospital catering to the needs of a large population represents an important center for serological surveys. In this part of western Maharashtra there is limited data on the Seroprevalence of Hepatitis B surface antigen. So present study was carried out to estimate the Seroprevalence of HBsAg and its age and sex wise distribution in a hospital based population.

**Materials and methods:**
The present study was carried out in the Department of Microbiology, Krishna Institute of Medical
Table 2: Age and sex distribution of the hospital-based population with hepatitis B seropositivity

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No of males with HBsAg detected (%)</th>
<th>No of females with HBsAg detected (%)</th>
<th>Total HBsAg positive cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>00(0)</td>
<td>00(0)</td>
<td>00(0)</td>
</tr>
<tr>
<td>10-19</td>
<td>6(2.08)</td>
<td>1(0.39)</td>
<td>7(1.28)</td>
</tr>
<tr>
<td>20-30</td>
<td>14(1.84)</td>
<td>43(1.68)</td>
<td>57(1.72)</td>
</tr>
<tr>
<td>31-40</td>
<td>15(2.47)</td>
<td>11(2.69)</td>
<td>26(2.56)</td>
</tr>
<tr>
<td>41-50</td>
<td>17(3.48)</td>
<td>7(2.24)</td>
<td>24(3)</td>
</tr>
<tr>
<td>51-60</td>
<td>21(5.51)</td>
<td>11(4.78)</td>
<td>32(5.24)</td>
</tr>
<tr>
<td>Above 61</td>
<td>12(2.04)</td>
<td>8(2.68)</td>
<td>20(2.26)</td>
</tr>
<tr>
<td>Total</td>
<td>85(2.63)</td>
<td>81(1.96)</td>
<td>166(2.25)</td>
</tr>
</tbody>
</table>

Table 1: Age and sex distribution of the hospital-based population

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No of males tested (%)</th>
<th>No of females tested (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>125(62.8)</td>
<td>74(37.2)</td>
<td>199</td>
</tr>
<tr>
<td>10-19</td>
<td>289(55)</td>
<td>256(47)</td>
<td>545</td>
</tr>
<tr>
<td>20-30</td>
<td>759(22.9)</td>
<td>2556(77.1)</td>
<td>3315</td>
</tr>
<tr>
<td>31-40</td>
<td>608(59.8)</td>
<td>409(40.2)</td>
<td>1017</td>
</tr>
<tr>
<td>41-50</td>
<td>488(61)</td>
<td>312(39)</td>
<td>800</td>
</tr>
<tr>
<td>51-60</td>
<td>381(62.4)</td>
<td>230(37.6)</td>
<td>611</td>
</tr>
<tr>
<td>Above 61</td>
<td>588(66.4)</td>
<td>298(33.6)</td>
<td>886</td>
</tr>
<tr>
<td>Total</td>
<td>3238(43.9)</td>
<td>4135(56.1)</td>
<td>7373</td>
</tr>
</tbody>
</table>

The seroprevalence of HBsAg was 166(2.25%). The seroprevalence of HBsAg was higher in males 85(2.63%) as compared to females 81(1.96%). The difference was statistically borderline significant ($\chi^2 = 3.662$ ; df= 1 ; $p = 0.05$ ). The highest seroprevalence was found to be among 51-60yrs age group (5.24%) in both males (5.51%) and females(4.78%). The low seroprevalence (1.28%)was reported in 10-19yrs age group and the seroprevalence was 3% and 2.56% in the 41-50yrs and 31-40yrs age group respectively.

Discussion:
The Seroprevalence of HBsAg in present study was found to be (2. 25%).India has been placed into the intermediate zone of prevalence of hepatitis B (≥ 2-8%) so present study finding correspond to that. Smita sood and Shrish Malvankar have reported Seroprevalence of hepatitis B surface antigen of 0.87% in a hospital based population of Jaipur, Rajasthan. Another study carried out in hospital based population from Bijapur Karnataka reported the prevalence of HBsAg was 1.63%. Sri Krishna et al have reported the prevalence of 1.86% among blood donars of Bangalore. A low prevalence of 0.62% has been reported among blood donars from...
coastal Karnataka. A community based study carried out in Tamilnadu reported the prevalence of HBsAg was 5.7% (95% CI 4.7-6.8). The results of the meta-analysis of true prevalence data of hepatitis B among non tribal population is 2.4 (95% CI: 2.2%-2.7%). True prevalence among tribal population is 15.9% (95% CI:11.4%-20.4%). Lodha et al did a systematic review of literature and concluded that the true prevalence of hepatitis B in India was 1 to 2%. In a study carried out at Kathmandu Medical college Teaching Hospital prevalence of viral hepatitis B was found to be 2.5%. In a similar hospital based study carried out at Dharan Nepal HBsAg prevalence rate was found to be 5%. Another study conducted in Sarkhet Valley, HBsAg prevalence rate was found to be 8.8% in the hospital patients.

The prevalence of HBsAg in patients attending surgical OPD at Fauji Foundation hospital, Rawalpindi, Pakistan has been reported as 2.28%. Seroprevalence of Hepatitis B was 2.11% to 3.53% in Rawalpindi, and 4% from Jamshoro (Sindh). Prevalence of Hepatitis B varies from country to country and depends upon a complex mixture of behavioural, environmental and host factors. In general it is lowest in countries or areas with high standards of living (eg. Australia, North America, North Europe) and highest in countries or area where socioeconomic level is lower (eg. China, South-East Asia, South America).

In this study prevalence of HBsAg was higher in males than females which was statistically borderline significant. Similar observation was reported by many other studies. There is no explanation for the higher prevalence in males in general population but probably females clear the HBV more efficiently as compared to males.

In the present study, highest prevalence was found to be among 51-60yrs age group (5.24%) in both males (5.51%) and females (4.78%). In a study carried out at Kathmandu prevalence was found to be higher in males and most commonly in young and productive age group followed by older age groups. A community based study carried out in Tamilnadu reported that age specific prevalence for the overall exposure to HBV, HBsAg, HBeAg was not significantly different in different age groups, however age-specific overall exposure to HBV was highest in younger age group (15-20yr). In that study prevalence of hepatitis B infection was not found to be significantly associated with age group and sex. In another population studies, the HBsAg carrier rate is observed to increased directly with age up to a peak and then to decline among the older age group. In a study carried out among high risk groups of Pakistani population the proportion of Hepatitis B reactive cases was fairly similar across different age categories.

There is limited data about the blood born hepatitis i.e. hepatitis B and hepatitis C in Western Maharashtra. Recently carried out study in Western Maharashtra has reported the Seroprevalence of HCV among hospital based population was 0.38%. Present study reported Seroprevalence of HBsAg as well as its age and sex-wise distribution will provide a good reference for future studies to understand and assess the magnitude of disease in a community and for its control and prevention.

**Conflict of interest:** None
References:


12. Ashish Batham, Dherian Narula, Tanmay Toteja, V. Sreenivas and Jacob M. Puliyel Systematic Review and Meta-analysis of Prevalence of Hepatitis B in India. Indian Pediatrics ,2005, 42(9):663-674


