

**Original article**

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

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**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

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**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 B<sup>1</sup>. 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 having 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%)regions<sup>2</sup>.

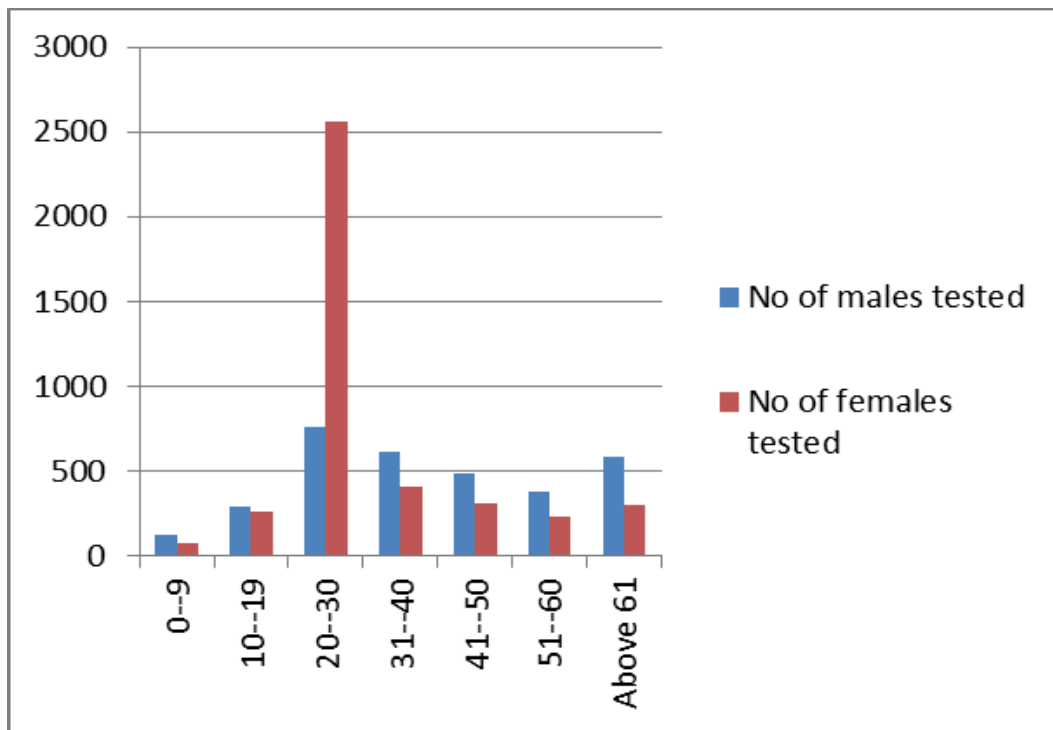
HBV belongs to the family of DNA viruses that preferentially infect hepatocytes and are referred to as hepadnaviridae<sup>3</sup>.Each complete virion consists of an inner core (nucleocapsid or hepatitis core antigen, HBcAg) surrounded by an outer protein coat or envelope (the hepatitis B surface antigen, HBsAg) <sup>3</sup>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<sup>3</sup>. The hepatitis B surface antigen (HBsAg), a serological marker for HBV was first demonstrated by Blumberg in 1963<sup>4</sup>. Of all the viral hepatitises, HBV is the most complicated infection with respect to interpretation of serologic tests<sup>3</sup>. 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)<sup>3</sup>.

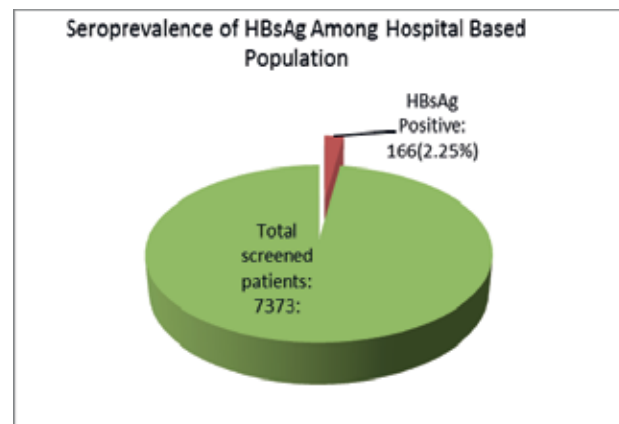
Transmission of HBV is predominantly via parenteral means, even though this infection is also transmitted by sexual contact and acupuncture. Mother-to-child transmission and occupational transmission from HBV infected patients to health care workers are also major modes of transmission. One of the major 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<sup>5</sup>.

According to the WHO report on prevention of HBV in India<sup>6</sup>, 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<sup>6</sup>. 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**

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

Sciences, Deemed University Karad, Maharashtra, India. Patients who registered at the OPDs or were admitted to the Krishna hospital and Medical Research center- a tertiary care teaching hospital and were advised to undergo hepatitis B screening were included in the study. The blood samples were collected between March 2010 and February 2011. Blood sample was collected from all patients for the testing of HBsAg. The blood was allowed to clot for 45 minutes at room temperature and the serum was separated after centrifugation at a low speed. The serum was then subjected to test.

Samples were tested by HBV Kit-ErbaLisa ELISA (Microwell ELISA test for detection of hepatitis B surface antigen (HBsAg) in human serum/plasma, Transasia Bio-Medicals Ltd). All the tests were performed in accordance with manufacturer's instructions with adequate controls and the absorbance of the solution in the wells were read at 450nm within 15 minutes of the final step by ELISA reader. The reactive samples were retested in duplicates, if found reactive was considered as repeatedly reactive.

Ethical clearance was obtained from Institutional Ethics Committee.

**Statistical analysis**-The results were analyzed using 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. Table 1 and Figure 1 shows age and sex distribution of hospital-based population.

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

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

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 ( $\geq 2-8\%$ )<sup>2</sup> 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<sup>7</sup>. Another study carried out in hospital based population from Bijapur Karnataka reported the prevalence of HBsAg was 1.63%<sup>8</sup>. Sri Krishna et al have reported the prevalence of 1.86% among blood donors of Bangalore<sup>9</sup>. A low prevalence of 0.62% has been reported among blood donors from

coastal Karnataka<sup>10</sup>. A community based study carried out in Tamilnadu reported the prevalence of HBsAg was 5.7% (95% CI 4.7-6.8)<sup>11</sup>. 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%)<sup>12</sup>. Lodha et al did a systematic review of literature and concluded that the true prevalence of hepatitis B in India was 1 to 2%<sup>13</sup>. In a study carried out at Kathmandu Medical college Teaching Hospital prevalence of viral hepatitis B was found to be 2.5%<sup>14</sup>. In a similar hospital based study carried out at Dharan Nepal HBsAg prevalence rate was found to be 5%<sup>15</sup>. Another study conducted in Sarkhet Valley, HBsAg prevalence rate was found to be 8.8% in the hospital patients<sup>16</sup>.

The prevalence of HBsAg in patients attending surgical OPD at Fauji Foundation hospital, Rawalpindi, Pakistan has been reported as 2.28%<sup>17</sup>. Seroprevalence of Hepatitis B was 2.11% to 3.53%<sup>18,19</sup> in Rawalpindi, and 4% from Jamshoro (Sindh)<sup>20</sup>. 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)<sup>21</sup>.

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<sup>7, 8, 15, 16</sup>. 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<sup>22</sup>.

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<sup>14</sup>. 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<sup>11</sup>. In another population studies, the HBsAg carrier rate is observed to increase directly with age up to a peak and then to decline among the older age group<sup>23</sup>. 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<sup>24</sup>.

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%<sup>25</sup>. 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:

- World Health Organization: Hepatitis B.WHO fact sheet. <http://www.who.int/mediacentre/factsheets/fs204/en/index.html>
- Lavanchy D: Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures: a review. *J Viral Hepat* 2004, 11:97-107
- Hollinger BF, Liang JT. *Hepatitis B virus*. vol 2. 4th ed.Philadelphia: Lippincott Williams and Wilkins; 2001.
- Blumberg BS. Australia antigen and the biology of hepatitis B. *Science* 1977; 197:17-25.
- Hyams KC. Risks of chronicity following acute hepatitis B virus infection: a review. *Clin Infect Dis* Apr 1995; 20 :992-1000.
- Prevention of Hepatitis B in India- An Overview. World Health Organization South-East Asia Regional office, New Delhi;2002.
- Sood S, Malvankar S. Seroprevalence of Hepatitis B surface antigen, antibodies to the Hepatitis C virus, and human immunodeficiency virus in a hospital-based population in Jaipur, Rajasthan. *Indian J Community Med* 2010;35:165-9
- Sayed A. Quadri, H.J. Dadapeer, K. Mohammed Arifulla and Nazia Khan. Prevalence of Hepatitis B Surface Antigen in hospital based population in Bijapur, Karnataka, Al Ameen *J Med Sc i* 2013; 6(2) :180-182
- Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors?. *Indian J Pathol Microbiol* 1999; 42:411-416.
- Singh K, Bhat S, Shastry S. Trend in seroprevalence of Hepatitis B virus infection among blood donors of coastal Karnataka. *India J Infect Dev Ctries* 2009; 3(5):376-379.
- KURIEN *et al*: Community prevalence of hepatitis B infection & modes of transmission in Tamil Nadu, India. *Indian J Med Res* 121(5),2005 :670-675
- Ashish Batham, Dherian Narula, Tanmay Toteja, V. Sreenivas and Jacob M. Puliye Systematic Review and Meta-analysis of Prevalence of Hepatitis B in India. *Indian Pediatrics* ,2005, 42(9):663-674
- Lodha R, Jain Y, Anand K, Kabra SK, Pandav CS. Hepatitis B in India: A review of disease epidemiology. *Indian Pediatr* 2001;38:1318-22.
- Bhatta, C. P., B. Thapa, and B. B. Rana. Seroprevalence of hepatitis "B" in Kathmandu Medical College Teaching Hospital (KMCTH). *Kathmandu University Medical Journal* 2003, 1(2): 113-116.
- Bhatta CP. Prevalence of viral hepatitis B in BPKIHS Dharan Nepal. *Journal of Nepal Medical Association*. 2000, 39 (135): 281-283.
- Shrestha Santos M. Seroepidemiology of viral hepatitis in Surkhet, Nepal. *Journal of the Institute of Medicine*, March 1989: 1-10.
- Chaudhary I A0 , Khan SS, Majrooh MA, Alvi AA. Seroprevalence of hepatitis B and C among patients reporting in a surgical OPD at Fauji Foundation Hospital, Rawalpindi: Review of 5 year literature. *Pak J Med Sci* 2007;23:514-7.
- Chaudhary IA, Khan SA, Samiullah. Should we do hepatitis B and C screening on each patient before surgery: Analysis of 142 cases. *Pak J Med Sci* 2005;21(3):278-80.
- Ali N, Khattak J, Anwar M, Tariq WZ, Nadeem M,Irfan M, et al. Prevalence of Hepatitis B surface antigen and Hepatitis C antibody in young healthy adults.*Pakistan J Pathol* 2002;13(4):3-6.
- Almani SA, Memon AS, Qureshi AF, Memon NM.Hepatitis viral status in Sindh. *Professional Med J* 2002;9(1):36-43.
- WHO, World Health Forum, 4 (2), 1983 :135-141.
- Qamer S, Shahab T, Alam S, Malik A, Afzal K. Age specific prevalence of Hepatitis B surface antigen in pediatric population of Aligarh, North India. *Indian J Pediatr* 2004;71:965-7.
- Szmues W, Sirsch RL, Prince AM et al.Hepatitis B surface antigen in blood donors furthers observations. *Journal of Infections Diseases*. 1997 ,131 :111-117.
- Memon et al : Hepatitis B and C prevalence among the high risk group of Pakistani population. A cross sectional study.*Archives of Public Health* 2012,70:9
- Patil Satish R, Ghorpade M V, Supriya Satish Patil, Shinde R V., Mohite S T: Seroprevalence of Antibodies to the Hepatitis C virus in a Hospital-Based Population: A study from western Maharashtra, India. *International Journal of Collaborative Research on Internal Medicine & Public Health*,2014,6(4):102-108 .