

## Seroprevalence of Hepatitis B Virus infection in patients visiting a tertiary care hospital in Central India

Bharat Singh<sup>1</sup>, Saurabh Jayant<sup>2</sup>, Ranjana Dehariya<sup>3</sup>, Ankita Poddar<sup>4</sup>, Trupti Bajpai<sup>5</sup>

<sup>1</sup>Assistant Professor, Department of Microbiology, Sri Aurobindo Medical College & PG Institute, Indore, Madhya Pradesh, India

<sup>2</sup>Assistant Professor, Department of Microbiology, LN Medical College, Bhopal, Madhya Pradesh, India

<sup>3</sup>PG III Year, Department of Microbiology, MGM Medical College, Indore, Madhya Pradesh, India

<sup>4</sup>PG III Year, Department of Microbiology MGM Medical College, Indore, Madhya Pradesh, India

<sup>5</sup>Assistant Professor, Department of Microbiology, Sri Aurobindo Medical College & PG Institute, Indore, Madhya Pradesh, India

Received: 01-07-2021 / Revised: 25-07-2021 / Accepted: 02-08-2021

### Abstract

**Background:** Hepatitis B Virus infection (HBV) continues to be one of the urgent public health priorities globally. It has been a devastating cause of morbidity and mortality. Understanding the epidemiology of the dreadful HBV is very much essential to carry out infection control and treatment. **Aim:** The present prospective study aims at evaluating the seroprevalence of HBV infection in a tertiary care centre located in central India. **Methods and Material:** The present prospective study was conducted from January 2021 to June 2021 for the period of six months. Serum samples were screened for detection of HBsAg by ELISA test method (Erbalisa, TransasiaBiomedicals Ltd., Daman, India). The positive samples were further subjected to rapid immunochromatographic test (Hepacard, J Mitra & Co. Pvt. Ltd., New Delhi, India). **Results:** A total of 10,972 patient samples were tested for HBsAg, among which 225 (2.05 %) samples were reported as positive. Among these, 180 (80%) samples were from admitted patients and 45 (20%) were from outpatients. Out of the 180 seropositive inpatient samples 64.4% were from male patients and 35.5% were from female patients. Out of the 45 outpatient samples 64.4% samples were from males and 35.5% were from female patients. The overall HBsAg seropositivity was high in the age group 31~40 years followed by 21~30 years in case of both male and females. **Statistical Analysis:** The collected data was transferred to the computer and Microsoft Excel 2000 (version 9) Analysis Tool Pack was used for analysis of data. Chi-square test was performed and  $p \leq 0.05$  was considered statistically significant. **Conclusion:** In the present study, HBV seroprevalence was 2.05 %. Maximum positive cases were detected among male patient that mostly belonged to young adult population. High seroprevalence in our region demands general health awareness among the community people, early screening and active immunization as a part of prophylaxis. **Keywords:** Enzyme Linked Immunosorbant Assay, Hepatitis B Surface Antigen, Hepatitis B Virus, Immunochromatographic test, Seroprevalence.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Hepatitis B Virus infection (HBV) is a significant public health problem affecting billions of people globally. It is a devastating cause of morbidity and mortality responsible for thousands of deaths every year.[1-3] The disease progresses silently, often leading to advanced and terminal stages like decompensate chronic liver disease, liver cirrhosis and hepato cellular carcinoma. [1, 4-6] HBV is a highly infectious, hepatotropic, double-stranded Deoxyribose Nucleic Acid (dsDNA) virus of size ranging around 40~42 nms. [1,2,7] The various modalities of viral transmission include perenteral, perinatal and sexual modes of transmission. [4-

endemicy category (with prevalence of 2~7 %). [1,4,5]The diagnosis of HBV infection is usually based on clinical symptoms along with the diagnosis of serological markers. Hepatitis B surface antigen (HBsAg) is the most prominent serological marker that makes its appearance in the patient even before the biochemical markers of the disease become evident. It persists throughout, during acute phases of disease. [2,5,7] Hence, it has been used as a most commonly used diagnostic marker to diagnose HBV infection among patients as well as carriers.[10] With this background the present study was undertaken, to estimate the seroprevalence of HBsAg among the patients visiting a tertiary care hospital in the Central India. It can also serve to provide an indirect estimate of disease burden in the community.

### Materials & Methods

The present prospective study was conducted from January 2021 to June 2021 in the Department of Microbiology of a teaching tertiary care hospital based in Central India. All the patients of both the sexes & all age groups who visited our hospital Out Patient Department (OPD) and In Patient Department (IPD) and were advised HBV screening on the basis of clinical findings or as a part of pre Operative (pre-Op) or Ante Natal profile (ANC) were included in the

### \*Correspondence

#### Dr. Trupti Bajpai

Assistant Professor, Department of Microbiology, Sri Aurobindo Medical College & PG Institute, Indore, Madhya Pradesh, India.

E-mail: [truptiu@rediffmail.com](mailto:truptiu@rediffmail.com)

6,8,9] Based on the prevalence data of HBV infection in India, World Health Organization (WHO) has placed it in the intermediate

study. The patients who were not requested for HBV screening were excluded from the study. Confidentiality of the patients was maintained at all the levels of study. The study was approved by the institutional ethical committee.

Five ml. of venous blood sample was collected under aseptic conditions by venepuncture of all the patients and transported immediately to the Serology laboratory for HBV screening. Samples were allowed to clot at room temperature for about 30 minutes. Serum was separated by centrifugation at the speed of 3000 rpm for 10 mins. The screening of HBV in all the collected samples was done by detection of HBsAg by commercially available ELISA test kit (Erbalisa, TransasiaBiomedicals ltd., Daman, India). The samples that were found to be positive by ELISA were also subjected to single step rapid Immunochromatographic test (Hepacard, J Mitra & Co. Pvt. Ltd., New Delhi, India). All the tests were done in accordance with the manufacturer's instructions. The data of patients that were found to be positive for HBsAg were statistically analyzed with the chi square test and results were considered significant if the p value was < 0.05. The statistical analysis was done using MS office excel 2010. No confirmatory tests were done. Reports were released by advising the confirmation of test results through confirmatory methods. [1,2,5,7,9]

After doing serum analysis, counseling was given for participants who were infected with HBV and they were referred for work up and treatment of Hepatitis B.

#### Statistical Analysis

The collected data was transferred to the computer and Microsoft Excel 2000 (version 9) Analysis Tool Pack was used for analysis of data. Chi-square test was performed and  $p \leq 0.05$  was considered statistically significant.

#### Results

A total of 10,972 patient samples were tested for HBsAg, among which 225 (2.05 %) samples were reported as positive. Seventeen patients were excluded from the study because either they did not come for follow up to provide the second sample or they left against medical advice before the sample could be collected or because the sample tested positive by only one of the test method.

Out of 225 HBsAg positive samples, 180 (80%) samples were from admitted patients and 45 (20%) were from outpatients. The difference was found to be statistically significant. ( $p < 0.05$ ). Among the 180 seropositive inpatient samples 116 (64.4%) were from male patients and 64 (35.5%) were from female patients. Out of the 45 outpatient samples 29 (64.4%) samples were from males and 16 (35.5%) were from female patients. The differences were not found to be statistically significant ( $p = 3.66958E-13$ ). The overall HBsAg seropositivity was high in the age group 31~40 years (46.2%) followed by 21~30 years (29.6%) and 31~40 years (45%) followed by 21~30 years (31.25%) in case of both male and female respectively. Here, the differences were found to be statistically significant ( $p = 0.0455$ ). Lowest HBsAg seropositivity was found in 1~10 years of age (0.44% in case of male and 0% in female patients) (Table/Fig.1)

**Table 1: Age-wise seroprevalence of HBV infection among male and female patients**

AgeGroup(Years)	IPD(180)				p-value	OPD(45)				p-value
	Male(116)		Female(64)			Male(29)		Female(16)		
	N	%	N	%		N	%	N	%	
0-10	00	0	00	0	1.10699E-08	00	0	00	0	0.0455
11-20	01	0.8	00	0		01	3.4	00	0	
21-30	35	30.1	21	32.8		08	27.5	04	25	
31-40	55	47.4	29	45.3		12	41.3	08	50	
41-50	12	10.3	11	17.1		04	13.7	02	12.5	
>51	14	12.0	03	4.6		04	13.7	02	12.5	

#### Discussion

In the present prospective study, the seroprevalence of HBsAg was found to be 2.05% among the patients who visited our tertiary care hospital. Our results rightly confirm the position of India into the intermediate endemicity zone of Hepatitis as conferred according to the World Health Organization (2~7% seropositivity). A prevalence rate of 2.07% in our study corresponds with the study conducted by Sachan et al. where seroprevalence was found to be 1.9%. [11] Our result was higher than those reported in the studies conducted by Palange et al., Naik et al., Mathur A et al., Parimala et al., Naqshbandi et al., Mathur P et al. Mindoli et al. and Bulle et al. [1,5,8-10,12-14] Our results were lower than those reported by Khatoon et al., Tao Jao et al., Kumar et al., Zhang et al., Gokhale et al., Bula et al. and Mazuka et al. [2-4,6,15-17] The worldwide variation in the seroprevalence of HBsAg in different geographical regions may be due to the differences in the study settings, sample size, data collection methods, diagnostic tools, patient profiles, population studied, age group studied, behavioral and environmental differences and variable host factors. [1,5,9] Our results clearly represents the features like low socioeconomic level, lack of awareness regarding effective improved vaccination and safe transfusion measures in our population.

In our study, maximum seropositive patients were from Inpatient department (80%). Similar data was reported by Khatoon et al also. [2] In the population, most of the cases were detected when the patient was admitted to our hospital with different ailments or when tests were including liver disorders or done as a part of pre-Op or ANC profiles.

Our study reported comparatively larger number of men found to be HBsAg positive (64.4%) as compared to women (35.5%). The results were in concordance with those reported by Palange et al., Khatoon et al., Kumar et al., Naik et al., Mathur A et al. and Parimala et al. [1,2,4,5,8,9] The higher preponderance of male population could be due to higher exposure of men to the risk factors such as IV drug abuse, multiple sexual partners and unprotected sexual practices. It has also been hypothesized that females have less exposure to various risk factors and their immune system clears the HBV rapidly and more efficiently as compared to males. [1,2,5,7] However few studies have either reported no difference among the seroprevalence in males and females while few have reported higher prevalence in females than males. [4]

The overall seroprevalence was found to be high in our case in sexually active groups ranging from 21 to 40 years of age and minimum seropositivity was found in 0~10 years of age. Similar results were also reported by Khatoon et al., Kumar et al., Naik et al., Mathur A et al., Mathur P et al. and Ingale et al. [2,4,5,8,12,18] However, Palange et al. and Parimala et al. [1,9] reported a higher seropositivity in the age group of 41 to 50 years. However, there was a wide seroprevalence reported in different age groups. In the present study, high HBsAg seroprevalence was found among 21 to 40 years of age. High seropositivity observed after second decade of life is due to higher exposure to occupational and non occupational risk factors and interaction in society due to high risk behavior among young individuals. Further absence of prevalence in younger age groups could be due to prevention of perinatal transmission of HBV

by immunization and also it may be due to absence of occupational and non occupational risk factors among younger population. [2,5] The present finding actually reflects the patient population being served in our tertiary care centre and indirectly provides an estimate of the burden in the community.

#### Acknowledgements

The authors wish to thank the Chairperson and Dean of the institute for providing laboratory facilities and healthy working atmosphere during the study period. The authors are also thankful to the technical staff of the institute for providing necessary helping hand during the endeavour.

#### Conclusion

Our data has once again confirmed the positioning of India in the intermediate endemicity category as classified by WHO. In order to reduce the extensive burden of disease, our study demands awareness in general population, effective early screening of cases and prompt treatment. Above all, strengthening of preventive healthcare strategies including implementation of immunization program for management of HBV infection is the need of an hour.

The present study highlights the predominance of HBV infection in economically productive age groups. Our aim in future should be directed towards formulating strategies to further reduce seroprevalence rate. A continuous surveillance would further provide better insight of this infection in our region and also the impact of preventive measure in the population at risk.

#### References

- Palange P, Thate R. Seroprevalence of Hepatitis B Surface Antigen among patients attending a tertiary care hospital, Telangana, South India. *Perspectives in Medical Research*. 2019; 7(3):38-43.
- Khatoun R, Jahan N. Evaluation of Seroprevalence of Hepatitis B virus infection among patients attending a hospital of semi-urban North India using rapid immunoassay test. *Nigerian Postgraduate Medical Journal*. 2016; 23:209-214.
- Tao J, Zhang W, Yue H, Zhu G, Wu W, Gong W et al. Seroprevalence of Hepatitis B Virus infection in Shenzhen, China, 2015-2018. *Scientific Reports*. 2019; 9:13948.
- Kumar M, Verma RK, Nirjhar S, Singh M. Seroprevalence of Hepatitis B at tertiary care hospital. *Annals of International Medical and Dental Research*. 2019; 5(3):5-7.
- Naik TB, Sathish JV, Wadekar MD. Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among patients attending a tertiary care hospital at Chamarajanagar, Karnataka, India. *International Journal of Current Microbiology and Applied Sciences*. 2018; 7(1):1279-1284.
- Zhang H, Li Q, Sun J, Wang C, Gu Q, Feng X et al. Seroprevalence and risk factors for Hepatitis B infection in an adult population in Northeast China. *International Journal of Medical Sciences*. 2011; 8(4):321-331.
- Gebremariam AA, Tsegaye AT, Shiferaw YF, Reta MM, Getaneh A. Seroprevalence of Hepatitis B Virus and associated factors among health care professionals in university of Gondar hospital, Northwest Ethiopia. *Advances in Preventive Medicine*. 2019; 2019:1-5.
- Mathur A, Goyal LK, Gupta AK, Hooja N, Yadav RN. Seroprevalence of Hepatitis B Virus among patients at a tertiary care centre in Rajasthan. *Scholars Academic Journal of Biosciences*. 2019; 7(1):13-17.
- Parimala TV. A retrospective study on seroprevalence of Hepatitis B Surface Antigen among patients in a tertiary care hospital, South India. *International Journal of Current Microbiology and Applied Sciences*. 2016; 5(11):329-333.
- Naqshbandi I, Qadri SYA, Yasmeen N, Bashir N. Seroprevalence and risk factors of Hepatitis B virus infection among general population of Srinagar Kashmir. *International Journal of Contemporary Medical Research*. 2016; 3(4):1050-1054.
- Sachan D, Varghese J, Joseph J, Srinivasan V, Jayanthi V, Rela M. HBsAg positive patient characteristics in hospital and blood donation camps. *ISRN Hematology*. 2013:675191.
- Mathur P, Gupta PS, Singh R, Parihar G, Sharma P. Seroprevalence of Hepatitis B Surface Antigen and Anti-Hepatitis C Virus antibody in a hospital-based population in Ajmer, Rajasthan, India. *International Journal of Current Microbiology and Applied Sciences*. 2016; 5(10):1023-1029.
- Mindolli PB, Salmani MP. Hepatitis B virus seroprevalence among hospital based general population in a tertiary care centre. *International Journal of Current Microbiology and Applied Sciences*. 2015; 4(10):964-67.
- Bulle PA, Tekam S, Gedam DS, Gujar V, Deshmukh D. Prevalence of Hepatitis B Surface Antigen (HBsAg) positivity among general population in Yavatmal (Maharashtra), India. *International Journal of Current Microbiology and Applied Sciences*. 2016; 5(7):513-517.
- Gokale SK, Sonth SB, Solabannavar SS. Seroprevalence of Hepatitis B Virus among patients at a tertiary care centre in North Karnataka, India. *International Journal of Current Microbiology and Applied Sciences*. 2017; 6(9):755-757.
- Bula A, Gaddam SR. 2017. Seroprevalence of Hepatitis B surface antigen positive patients attending a tertiary care hospital in Srikakulam, Andhra Pradesh. *Annals of Pathology and Laboratory Medicine*. 2017; 4(1):96-99.
- Mazuka JD, Rwema JOT, Ntihabose CK, Dushimiyimana D, Umutesi J, Nisingizwe MP et al. Prevalence of Hepatitis B surface Antigen (HBsAg) positivity and its associated factors in Rwanda. *BMC Infectious Diseases*. 2019; 19(1):381.
- Ingale H, Medhekar P, Hirani N, Chowdhary A. Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among patients at a tertiary care hospital in Mumbai, India. *International Journal of Current Microbiology and Applied Sciences*. 2017; 6(4):722-726.

**Conflict of Interest: Nil**

**Source of support: Nil**