

Study on Seroprevalence of Hepatitis B Surface Antigen among Patients Visiting Tertiary Care Centre

Vedavati B I¹, Nazeema Tabaseera², Vathsalya M. R³, Rahul Attavar⁴

¹Assistant Professor, Department of Microbiology, ²Professor and HOD, Department of Microbiology, ^{3,4}Tutor, Department of Microbiology, Kodagu Institute of Medical sciences, Madikeri.

How to cite this article: Vedavati B I, Nazeema Tabaseera, Vathsalya M. R et. al. Study on Seroprevalence of Hepatitis B Surface Antigen among Patients Visiting Tertiary Care Centre. Indian Journal of Public Health Research and Development 2023;14(2).

Abstract

Introduction: Hepatitis caused by hepatitis B virus is potentially a fatal liver infection. It causes acute and chronic liver disease and puts people at high risk of death from cirrhosis and hepato-cellular carcinoma. The study of the prevalence of a disease helps in establishing the magnitude of the problem.

Aim: To estimate HbsAg sero-positivity among patient attending tertiary care centre.

Materials and Methods: Present study was conducted in department of microbiology at district hospital attached to Kodagu institute of medical sciences from june 2019 to may 2021. A total 20,676 samples were tested for hepatitis B surface antigen using qualitative one step rapid immune chromatographic test kit. Details of various socio-demographic variables of the patients were collected. The test results of the patient were noted and analyzed.

Results: Total of 20,676 serum samples were tested of which 135 (0.65%) were sero-positive for HBsAg. Among 135 sero-positive, 55 (0.26%) were males and 80(0.38%) were female patients. The age ranging from 21-31 years showed the highest prevalence. 8.88% had HIV & HBV co-infection.

Conclusion: Present study highlights the prevalence of hepatitis B infection among patients attending tertiary care centre in Kodagu. Apart from knowing the sero-prevalance, age & sex correlation, HIV;HBV co-infection was also assessed, it was found that the prevalence was higher in young adults. Knowing the prevalence leads to better understanding about the magnitude of the disease in a particular geographical area and highlights the importance of control measures.

Key Words: Acute and chronic Hepatitis ,Hepatitis B infection (HBV), Hepatitis, HIV- HBV coinfection, Immunochromatography.

Introduction

Hepatitis B infection is a global and public health affliction. [1] Hepatitis B virus (HBV) is one of the prime cause of severe liver disease, leading to

morbidity and mortality, not only because of the acute illness but also due to its chronic sequelae like chronic hepatitis, cirrhosis, and hepatocellular carcinoma.[2] HBV is distributed worldwide, prevalence however

Corresponding Author: Vedavati B I, Assistant Professor, Department of Microbiology, Kodagu Institute of Medical sciences, Madikeri - 571201, Karnataka state, India.

E-mail: drbivedu@gmail.com

varies significantly between different regions of the world but is more rampant in tropical and developing countries. [3] India is at the intermediate endemic level of hepatitis B prevalence between 2% and 7% among the populations studied. [3]

A large number of patients suffering from HBV infection are asymptomatic. About 2 billion people (or 30% of world population) worldwide have serological evidence of current or past HBV infection and an estimated 296 million people living with chronic hepatitis B.[4,5,6] HBV infections are known to be the 10th leading cause of death worldwide and approximately 1 million deaths annually from HBV related chronic liver diseases including severe complications such as liver cirrhosis and hepatocellular carcinoma (HCC). HCC is the 5th most frequent cancer worldwide. [5,7]

HBV are DNA viruses belonging to hepadnaviridae family and measuring 40-42 nm in diameter with an outer lipoprotein envelope that contains envelope glycoproteins (or surface antigens). The most abundant protein on the virion surface is hepatitis B surface antigen (HBsAg) or S protein.[2] The inner core contains DNA dependant polymerase. [8] HBV has a strong predilection to infect liver cells.

HBV is a blood borne virus which is transmitted predominantly through parenteral means, contact with HBV-contaminated blood and body fluids, during blood transfusions, sharing of needles and syringes by drug users, accidents that involve blood exposures and contact with a broken skin, acupuncture and tattooing . Occupational transmission from HBV infected patients to health care workers are also major modes of transmission having fourfold increased risk of acquiring HBV infection compared to general population. Hepatitis B is also spread by sexual route and mother -to - child transmission is also quite common. [1,9,10]

Most of the HBV infected individuals do not experience any symptoms. It is a silent killer causing liver disease including chronic hepatitis,

hepatocellular carcinoma and cirrhosis related end stage liver disease, with many carriers not realising that they are infected with the virus and can transmit the disease to healthy population.[2,5]

The silent nature of the disease with severe morbidity and mortality necessitates early and reliable diagnostic methods. [11] It is difficult to differentiate hepatitis B from hepatitis caused by other viral agents on clinical grounds, hence laboratory diagnosis is essential, thus diagnosis is based on laboratory findings of serological markers.[2] HbsAg being the first sero hall marker of HBV infection which was earlier called as Australia antigen is used for rapid detection of HBV. [12] It becomes detectable 2 to 10 weeks after exposure and its persistence for more than 6 months suggest chronic HBV infection or development of a carrier state. [2,9]

HIV & HBV co infection has also become a major factor in co morbidity & mortality sharing the similar transmission routes, people at risk of HIV are also at a high risk of HBV infection.[13] Underlying HIV infection increases the chance of HBV chronicity and antiretroviral treatment regimens have been shown to increase the risk of hepatotoxicity.[14] Since HBV is more infectious than HIV, to understand the magnitude of transmission in the community and for prevention and treatment, this study was conducted to tackle epidemiological data of HBV infection of patients attending our health care centre along with age and sex related prevalence.

A tertiary care centre attached to medical college, catering to the needs of a huge population thus represents an effective centre for serological surveys. The present study highlights the prevalence of HBV infection and HIV -HBV coinfection, thereby providing reference for future studies on epidemiology of HBV infection and also to formulate strategies to reduce the seroprevalence rate.

Objectives of the study; To estimate HbsAg seropositivity among patient attending tertiary care centre

Materials & Methods

The present retrospective study was conducted at district hospital attached to Kodagu Institute Of Medical Sciences, Madikeri, over a period of 2 years from June 2019 to May 2021 after obtaining institutional ethics committee clearance (Ref: KOIMS/IEC/06/2021-22).

Inclusion criteria;

Both inpatients and outpatients who were advised HbsAg serological investigation based on the clinical findings of HBV infection, as a part preoperative screening and antenatal screening were included in the study.

Exclusion criteria:

Patients with previously diagnosed Hepatitis B infection were excluded from the study.

Sample size; A total of 20,676 samples tested over a period of two years.

After receiving Fresh blood samples in Non EDTA vacutainers, serum was separated by centrifugation. The sera was then analyzed by “ABON Biopharm co ltd Hepatitis B surface antigen detection” Test kit, a qualitative one step rapid test for HbsAg that utilizes the principle of agglutination of antibodies with respective Antigen in immune chromatography format using the standard protocol. Qualitative detection of HbsAg was done and interpretation of the result was done according to the manufacturer’s instruction. The test results of the patient were noted and analyzed. Details of various socio demographic variables age, sex, type of work, etc were collected.

Statistical analysis; The test results of the patient were noted and analyzed. Statistical analysis was done by tabulating the data & analyzed using Microsoft Excel & SPSS version 20 for windows. Chi square test was applied wherever necessary.

Results

A total of 20,676 patients tested over a period

of two years showed that 135(0.65%) patients were sero positive for HBsAg surface antigen. Among 135 seropositive, 55 (0.26%) were males and 80(0.38%) were female patients. The observations made from the study are shown in following tables and figures

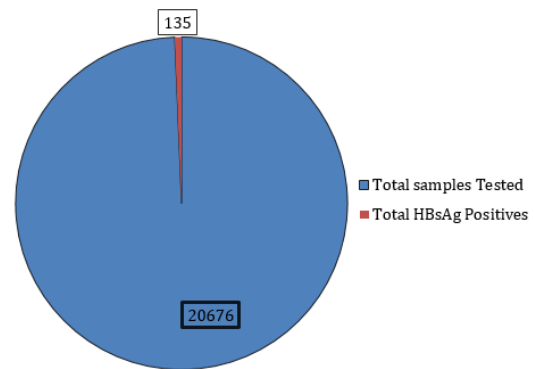


Fig - 1: Prevalence of HBsAg.

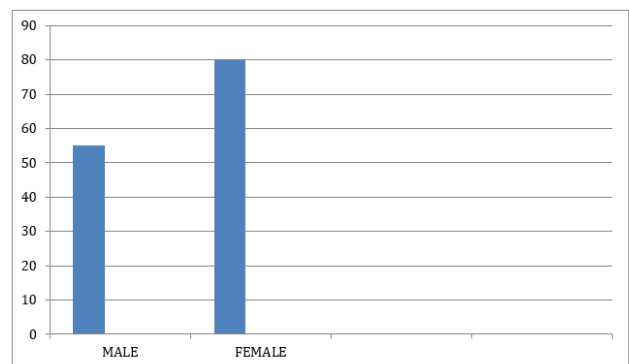


Fig - 2; Sex distribution of HBsAg sero positive patients.

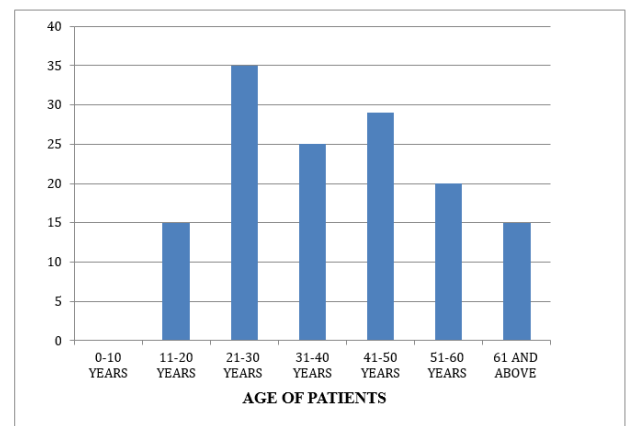


Fig - 3; Age distribution of HBsAg Positive Patients

Table - 1: HIV & HBV co infection

GENDER	HBV & HIV COINFECTION
MALE	11
FEMALE	1
TOTAL	12

Among 135 HBsAg sero positive patients 12 (8.63%) were positive for HIV .

Discussion

The prevalence of hepatitis B virus infection varies among different geographical location. It depends upon a complex of environmental, behavioral & host factors. Generally prevalence is lesser in high standard countries and vice versa. However vaccination, diagnosis and treatment of HBV also plays a major role in the prevalence and prognosis of the disease. HBV immunization has decreased the prevalence of HBV infection in health care workers.

Because of common routes of transmission, frequent co-infection of HBV and HIV is common. 5-25% of people living with HIV are also infected with HBV. However, the management of HIV/HBV co-infection has become increasingly important since the management of the co-infected patients is complex, as the presence of one infection can affect the management of the other in a number of ways. Therefore, to achieve the WHO viral hepatitis elimination target, evidence at the regional level to know the prevalence of viral hepatitis infections and liver disease may prove valuable.

In present study out of 20,676 serum samples 135(0.65%) were sero positive for HBsAg. A study conducted by Thriпти et al shows seroprevalence of 0.58%^[15] and study by Sood S et al. have noted 0.87% prevalence which are concordant to present study.^[16] Study by K.S Rashmi et al. shows positivity rate of 2.12% (287/13560) and study by sayed A Quadi et al. 1.63% which was higher in comparison to our study.^[11,17] Another study by lodha R et al. has concluded 1-2% as positives and study by Manish dwivedi et al. shows prevalence of 0.9%.^[18,19]

In present study We reported higher prevalence in females (0.38%) than males (0.26%) which is concordant with study conducted by Sudheendra kulkarni et al. [females (59. 90%) and males (40.05%)].^[20] Study by Megha et al and Patil S.R showed prevalence of 2.65 % and 2.63% in males and 2.03%, 1.96% in females respectively.^[1,5] HBV infected women can transmit the infection to their newborns, children, other household members and sexual partners or spouses. Vertical transmission contributes significantly to the chronic HBV infections.^[8]

Prity P. Narwade et al. showed majority of patients belonged to 21 - 40 yrs of age.^[7] Which is concordant to our study showing similar age specific prevalence between 21 - 30 age group followed by 41 -50 and 31 - 40 age group. Studies by kumar S et al showed age range 31-45 years was found to have highest prevalence rate with seropositivity of 5.38 %.^[8] Sudheendra kulkarni et al. showed high prevalence in age group between 21-30 years.^[20] Prevalence is more in economically productive age groups leading to a loss to the economy. This could be because of the increased exposure of this population to the risk factors like parenteral drug abuse, promiscuity, higher exposure to occupational risk factors etc.

In present study among 135 HBsAg sero positive samples 8.63% were positive for HIV. A study done by Manisha jain et al in patients infected with HIV the prevalence of co-infection with HBV was found to be 9.9%.^[21] Study by Jayatha surkar et al showed 8.33% HIV reactive cases that was also found to be reactive for HBsAg.^[12] Study by Suneeta koli. et al. showed that Among 1160 HIV infected patients, prevalence of HBsAg was 16.6 %^[14] and a study by Nyalika B S shows 8% of coinfection.^[9] This study throws light on the seroprevalence of hepatitis B infection and seroprevalence of HIV/HBV coinfection and also highlights the necessity of awareness about viral hepatitis in community and amongst population with high risk behaviour.

Limitation;

The present study had some limitations. Study would have been made more clinically oriented if correlation with other marker like Liver function

tests was done and also by knowing history including risk factors of patients. Implication of HBV or HCV coinfection in patients with HIV is a serious concern in developing countries, hence to know the real magnitude of the infection sero-prevalence of all hepatitis viruses is required.

Conclusion

India's stands in the intermediate zone in prevalence of hepatitis B. Hence present study on seroprevalence of HBsAg and its association to HIV with age / sex distribution provides good source of data for future studies to understand and assess the magnitude of disease in community and is a cause for concern and warrants urgent intervention. Such studies also outlines the optimal treatment options whether the patient is treated for HBV first, HIV first or HIV and HBV together.

Ethical clearance; Taken from institutional ethics committee.(Ref: KOIMS/IEC/06/2021-22)

Funding: Nil

Conflict of Interest; Nil

References

1. Patil SR, Ghorpade MV, Patil SS, Pawar SK, Mohite ST .Seroprevalence of Hepatitis-B surface antigen among the patients reporting at tertiary care Hospital from India. *Bangladesh Journal of Medical Science* Vol. 15 No. 03 July'16. Page : 455-459 .
2. Razia Khatoon, Noor Jahan.Evaluation of Seroprevalence of Hepatitis B Virus Infection among Patients Attending a Hospital of Semi-urban North India Using Rapid Immunoassay Test.*Niger Postgrad Med J* 2016;23:209-14.
3. Parimal H. Patel, Alka B. Nerurkar , Mehul R. Patel. Seroprevalence of Hepatitis B Surface Antigen in patients attending a tertiary care hospital Valsad, South Gujarat, India.*International Journal of Medical Microbiologyand Tropical Diseases*, July-September, 2016;2(3):103-106
4. Smita Sood. Serological evaluation of Hepatitis B virus in out patient department patients of a private hospital in North -west India. *National Journal of Community Medicine*.Volume 4.Issue 3 | July - Sept 2013.
5. Megha Sharma, Shweta Bohra, S.K. Mehra, Rajeev Shah.Seroprevalence of Hepatitis B Virus Infection among OPD Patients Attending Tertiary Care Hospital.*International Archives of BioMedical and Clinical Research* | April-June 2017 | Vol 3 | Issue 2
6. WHO. Global progress report on HIV, viral hepatitis and sexually transmitted infections. Geneva: WHO; 2021. Accessed on 14/9/22
7. Prity P. Narwade, Sanjaykumar R. More, Suresh K.Kandle, Vimal S. Rathod and Supriya M. Emekar. 2019. Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among Patients Attending a Tertiary Care Hospital. *Int.J.Curr.Microbiol.App.Sci*. 8(03): 1014-1018. doi: <https://doi.org/10.20546/ijcmas.2019.803.123>
8. Kumar S , Sayal P , Budhani D, Kumar S.Seropositivity of hepatitis b surface antigen in tertiary care center : issues & considerations .*International Journal of Medical Research and Review*.October, 2016/ Vol 4/ Issue 10.
9. Nyalika, B.S. (2021)Prevalence and Associated Factors of Hepa-titis B Surface Antigen (HBsAg) among People Living with HIV (PLWHIV) Attend-ing at CTC Mawenzi Regional Hospital Kilimanjaro, Northern Tanzania. *Advances in Infectious Diseases*, 11, 216-231.<https://doi.org/10.4236/aid.2021.112020>
10. Mueller et al. Prevalence of hepatitis B virus infection among health care workers in a tertiary hospital in Tanzania.*BMC Infectious Diseases* (2015) 15:386 DOI 10.1186/s12879-015-1129-z .
11. K S Rashmi, Syeda Misbah-UI-Khair, K L Ravikumar. Profile of Hepatitis B 'e' Antigen and Antibodies to Hepatitis B 'e' Antigen in Hepatitis B Seropositive Patients at a Tertiary Care Hospital in Bengaluru, India. *International Journal of Scientific Study* | October 2015 | Vol 3 | Issue 7.DOI: 10.17354/ijss/2015/447
12. Jayeeta Sarkar, Bhaswati Bandyopadhyay et al. HIV-HBV Coinfection among Individuals Attending the ICTC of a Tertiary Care Hospital in West Bengal, Indi Hindawi Publishing Corporation ISRN Virology Volume 2013,Article ID 180150, 3 pages <http://dx.doi.org/10.5402/2013/180150>
13. Ranjbar, R et al. "HIV/HBV Co-Infections: Epidemiology, Natural History, and Treatment: A Review Article." *Iranian Red Crescent medical journal* vol. 13,12 (2011): 855-62.
14. Suneeta Koli.C. P. Girish Kumar. V. Selvaraj. R. Prabu1 C. Chandrasekar.A. S. Valan J. Suria Kumar.

- K. Raja. Profile and prevalence of HBV among HIV affected individuals attending the largest public HIV care center in India. *Virus Dis.* (July–September 2016) 27(3):215–219 DOI 10.1007/s13337-016-0323-y.
15. Trupti B. Naik, J.V. Sathish and Mita D. Wadekar, Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among Patients Attending a Tertiary Care Hospital at Chamarajanagar, Karnataka, India, *Int.J.Curr. Microbiol.App.Sci* (2018) 7(1): 1279-1284.
 16. Sood S and Malvankar S. Seroprevalence of Hepatitis B Surface Antigen, Antibodies to Hepatitis C virus and Human immunodeficiency virus in a Hospital Based Population in Jaipur, Rajasthan, *Indian J Community Med* 2010; 35(1):165-169.
 17. Sayed A. Quadri¹, H.J. Dadapeer², K. Mohammed Arifulla and Nazia Khan. Prevalence of Hepatitis B Surface Antigen in hospital based population in Bijapur, Karnataka. *Al Am een J Med Sci* 2013; 6(2):180-182. US National Library of Medicine enlisted journal. ISSN 0974-1143.
 18. Lodha R, Jain Y, Anand K, Kabra SK, Pandava CS. Hepatitis B in India: A Review of disease epidemiology. *Indian Pediatr* 2001; 38:1318-22.
 19. Manish Dwivedi, Sri Prakash Mishra, Vatsala Misra, Arvind Pandey, Sanjay Pant, Rita Singh and Manju Verma. Seroprevalence of hepatitis B infection during pregnancy and risk of perinatal transmission. *Indian J Gastroenterol* 2011; 30(2):66-71.
 20. Sudheendra Kulkarni, Chandrakanth Chillarge. Seroprevalence of hepatitis b surface antigen infection among outpatients attending a tertiary care centre. *Indian Journal of Microbiology Research* 2020;7(3):270-272.
 21. Manisha Jain, Anita Chakravarti, Vikas Verma, Preena Bhalla. Seroprevalence of hepatitis viruses in patients infected with the human immunodeficiency virus. *Indian Journal of Pathology and Microbiology* -52(1), January -March 2009.