

Seroprevalence of Hepatitis B Surface Antigen in patients attending a tertiary care hospital Valsad, South Gujarat, India

Parimal H. Patel^{1,*}, Alka B. Nerurkar², Mehul R. Patel³

¹Assistant Professor, ²Professor & Head, ³Tutor, Dept. of Microbiology, GMERS Medical College, Valsad, Gujarat

***Corresponding Author:**

Email: drparimal2010@gmail.com

Abstract

Introduction: Hepatitis B is contagious liver disease due to infection caused by Hepatitis B virus; it is spread by blood, semen or other body fluids of infected person by inoculation. Hepatitis B virus infection is widespread occurring worldwide with more than one third of the world's population being affected. India is considered to have an intermediate (2-7%) level of hepatitis B virus infection endemicity. Every year, one million Indians are at risk for hepatitis B virus infection and about 100,000 die from it. Aim of the study was to determine prevalence of Hepatitis B virus infection in patients attending a tertiary care Hospital at Valsad, South Gujarat, India.

Materials and Methods: This retrospective study was carried out in patients attending GMERS hospital, Valsad, South Gujarat during March 2015 to February 2016. Serum samples were collected and screened for HBsAg (Hepatitis B surface Antigen) by ELISA method.

Result: Of 11,145 patients tested in this period 298(2.67%) were found to be positive for HBsAg, which includes 180(3.43%) males and 118(1.99%) females, and the most common affected age group was 21- 30 years.

Conclusion: The present study shows the intermediate level of prevalence 298(2.67%) of Hepatitis B infection, in younger age group affecting more males. Combined and coordinated effort of community and health care provider may help to reduce prevalence of this infection.

Keywords: HBsAg, Hepatitis B, Seroprevalence, ELISA, Intermediate level

Access this article online

Website:

www.innovativepublication.com

DOI:

10.5958/2455-6807.2016.00016.7

Introduction

Hepatitis B virus infection (HBV) is a common public health problem affecting about two billion people in the world. 5-10% of adult and up to 90% of neonate develop chronic illness.^{1,2,3,4} Hepatitis B is endemic throughout the world, but more common in tropical and developing countries, its prevalence varying from country to country, it depending on host and environmental factors.⁴ According to WHO and NCDC countries are classified as having high (8% or more), intermediate (2-7%), or low (less than 2%) HBV endemicity based on the prevalence of hepatitis B carrier state in the general population. India is at the intermediate endemic level of hepatitis B, with hepatitis B surface antigen prevalence between 2% and 7% among the populations studied. The prevalence does not vary significantly by region in the country. The number of HBsAg carriers in India have been estimated to be over 40 million.^{4,5} Chronic HBV infection is a major cause of liver cirrhosis and primary cell carcinoma.

HBV is a blood borne virus and is transmitted by sexual, parenteral and perinatal route. The important source of infection is blood of a carrier. It is a heat

stable and can survive outside the body for at least 7 days, as little as 0.00001ml of infected blood or infected material by Hepatitis B virus can be an infectious. The incubation period 30 to 180 days. The virus may be detected within 30 to 60 days after infection and can persist and develop into chronic hepatitis B.^{5,6} Virus may also be present in body fluids and excretions (saliva, breast milk, semen, vaginal secretion, urine & bile) and feces. HBsAg is the first marker to appear in blood after infection.⁶

Clinically HBV infection is indistinguishable from other hepatitis, several markers are available to diagnose it, from which HBsAg is the first antigen to appear after infection.

The aim of this study was to determine prevalence of Hepatitis B virus infection in patients attending the tertiary care Hospital at Valsad, South Gujarat, India.

Materials and Methods

This retrospective study was carried out from March 2015 to February 2016 on patients attending OPD & IPD at tertiary care hospital. Blood sample of all suspected patients and also all preoperative patients were referred to the Microbiology laboratory for HBsAg testing. The serum was separated and used for the test.

For the qualitative detection of HBsAg, ELISA method was used. The test procedure and interpretation of result was done according to standard protocol and manufacturer's instructions. The test result of patients were noted and analysed.

Result

The study was conducted from March 2015 to February 2016. A total of 11,145 samples which include 5234 male and 5911 female, were tested for HBsAg. Out of which 298 (2.67%) were positive. The prevalence of hepatitis B virus infection was found to be high amongst males than female, Sex distribution of seropositivity of HBsAg shown in Table 1.

In this hospital based study prevalence of HBsAg was high in age group 21-30 years followed by 31-40 years. Age group wise numbers of positive patients is shown in Table 2.

Table 1: Sex distribution of seropositivity of HBsAg

| Sex | Total no. of tested sample | Total no. of HBsAg positive | Total positive (in %) |
|--------|----------------------------|-----------------------------|-----------------------|
| Male | 5234 | 180 | 3.43 |
| Female | 5911 | 118 | 1.99 |

Table 2: Age group wise number of positive patients

| Age group in year | Number of HBsAg positive patients |
|-------------------|-----------------------------------|
| 1-10 | 02 |
| 11-20 | 29 |
| 21-30 | 94 |
| 31-40 | 74 |
| 41-50 | 56 |
| 51-60 | 28 |
| 61-70 | 11 |
| 71-80 | 4 |

Discussion

Prevalence of HBsAg varies widely in different countries depending upon their living standards. In developed and developing countries it also affects differs in age group and mode of transmission, its prevalence is lowest in countries or areas with high

standards of living and highest in countries or areas with low socioeconomic levels. Currently India belongs intermediate endemicity zone with more than 40 million Hepatitis B infected patients, Most of the patients of Hepatitis B infections are unaware of it and may lead to serious complication like cirrhosis or carcinoma of liver.^{4,5,7,8,9}

The seroprevalence of HBsAg of 2.67% was noted in our tertiary care hospital population, which is similar to study done by *Garima Mittal*¹⁰ but different from study conducted by *Sood et al*¹¹ from Jaipur which showed seroprevalence of HBsAg to be 0.87%. Some other study also shows the variation in prevalence of it which is shown in Table 3. There is a wide variation in HBsAg prevalence in different geographical regions in India.

In almost all age group males are affected more than a females which are similar to study done by *Balamurugan R et al*¹⁰ and others, they also show the male predominance in hepatitis B virus infection.^{11,13,14,15} Males are more susceptible to infection due to difference in immune response, it is also found that female develop anti-HBs antibody more rapidly than male, it may be the reason of it.^{15,16}

The highest prevalence was seen in 21-30 years followed by 31-40 and 41-50 age groups which is similar to study done by *Sood S. et al*¹², *Warda Baha et al*¹⁷, *Brian J. McMahon et al*¹⁸ and study done by *Balamurugan R. et al*¹⁰. While study of *Tripathi PC et al*¹³ show highest prevalence in 31-40 years followed by 21-30 years, so it can be concluded that highest prevalence in 21-40 years, indicating horizontal transmission, which may be due to unsafe injection practices, intravenous drug abuse, unsafe sexual practices. Comparison of present and other studies for overall prevalence, male predominance and for the prevalence in different age group for infection shown in Table 3.

Table 3: Comparison of Sero prevalence of HBsAg with other studies

| Age group in year | Number of HBsAg positive patients Present study <i>N=11145(5234Male, 5911 Female)</i> | | | Number of HBsAg positive patients Balamurugan et al ⁹ <i>N=67903(34111 Male, 33792 Female)</i> | | | Number of HBsAg positive patients Tripathi PC et al ¹² <i>N=30428(28046Male, 2382 Female)</i> | | | Number of HBsAg positive patients Surendra Karki et al ¹³ <i>N=33255(28989 Male,4266 Female)</i> | | | Number of HBsAg positive patients Karandeep Singh et al ¹⁴ <i>N=30428(28046 Male, 2382 Female)</i> | | |
|-------------------|--|--------|-------|--|--------|-------|---|--------|-------|--|-----------|-------|--|--------|-------|
| | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| 1-10 | 2 | 0 | 2 | 9 | 2 | 11 | 0 | 0 | 0 | 20(<20 yr) | 0(<20 yr) | 0 | - | - | - |
| 11-20 | 9 | 20 | 29 | 29 | 18 | 47 | 3 | 1 | 4 | | | | - | - | - |
| 21-30 | 46 | 48 | 94 | 165 | 116 | 281 | 6 | 11 | 17 | 66 | 4 | 70 | - | - | - |
| 31-40 | 50 | 24 | 74 | 193 | 80 | 273 | 20 | 4 | 24 | 56 | 2 | 58 | - | - | - |
| 41-50 | 41 | 15 | 56 | 160 | 68 | 228 | 10 | 3 | 13 | 26 | 2 | 28 | - | - | - |
| 51-60 | 18 | 10 | 28 | 128 | 49 | 177 | 7 | 2 | 9 | 3 | 0 | 3 | - | - | - |
| 61-70 | 10 | 1 | 11 | 100 | 27 | 127 | 4 | 1 | 5 | - | - | - | - | - | - |
| >70 | 2 | 2 | 4 | 25 | 9 | 34 | 1 | 1 | 2 | - | - | - | - | - | - |
| Total | 190 | 118 | 298 | 809 | 369 | 1178 | 51 | 23 | 74 | 171 | 8 | | - | - | 189 |
| Positivity (%) | 3.43% | 1.99% | 2.67% | 2.37% | 1.09% | 1.73% | 1.97% | 1.28% | 1.69% | 0.58% | 0.18% | 0.53% | 0.65% | 0.25% | 0.62% |

Age group wise data not available for Karandeep Singh et al¹⁴

Annually in India unsafe therapeutic injection practice is contributing more in transmission and outbreak of disease, 1.89 billion are estimated to be unsafe because inadequate sterilization, faulty injection techniques and improper injection waste disposal.^{19,20,21} 1.1million IV drug user are estimated and from them 2.7-10.8% show positivity for HBsAg.^{22,23,24,25} The risk of transmission of HBV following sexual exposure depends on the type of exposure, the viral load of the source.²⁶ The prevalence of HBV in heterosexuals is high in those with multiple sexual partners; the risk of developing HBV infection is particularly high in homosexual and there is also a significant risk associated with unprotected insertive anal intercourse.^{27,28,29,30,31}

Conclusion

The seroprevalence of HBsAg shows that, this area is in intermediate endemicity zone. Males and younger age group are more affected probably due to horizontal transmission. It can be concluded that combined and coordinated efforts of public and public health provider (e.g. guidance regarding risk factors, transmission of disease and prophylaxis etc.) may help to reduce the horizontal transmission of infection which may help to decrease in the prevalence rate.

Reference

1. Lee WM. Hepatitis B virus infection. *N Engl J Med* 1997;337:1733-45.
2. Lok AS, Heathcote EJ, Hoofnagle JH. Management of hepatitis B: 2000 -Summary of a workshop. *Gastroenterology* 2001; 120:1828-53.
3. Lavanchy D. Public health measures in the control of viral hepatitis: A world health organization perspective for the next millennium. *J Gastroenterol Hepatol* 2002;17-S4:s452s459.
4. Quarterly Newsletter from the National Centre for Disease Control (NCDC) 2014;3(1).
5. World Health Organization. Hepatitis B. World Health Organization Fact Sheet No. 204 (Updated July 2015). <http://www.who.int/mediacentre/factsheets/fs204/en/>.
6. Ananthanarayan and Paniker's text book of microbiology 8th edition pp 540-542.
7. Pankaj Puri. Tackling the Hepatitis B Disease Burden in India. *Journal of Clinical and Experimental Hepatology* 2014;4(4):312-319.
8. B N Tandon, S K Acharya, A Tandon Epidemiology of hepatitis B virus infection in India. *Gut*. 1996;38(2):56-59.
9. Balamurugan R et al. Prevalence of Hepatitis B Surface Antigen among Patients Attending a Rural Teaching Hospital at Puducherry. *Indian j Microbiol Res* 2015;3(1)74-75.
10. Garima Mittal, Pratima Guptay, Rohit Guptaz, Vivek Ahujaz, Manish Mittalx, Minakshi Dhark. Seroprevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections in Uttarakhand, India. *J Clin Exp Hepatol*. 2013;3(4):296-300.
11. 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.
12. Puri Chandrashekher Tripathi, Trinain Kumar Chakraverti, Nileshkumar Ramniklal Khant. Seroprevalence of hepatitis B surface antigen and antibody to hepatitis C virus at a tertiary care centre in Telangana. *Int J Res Med Sci*. 2015;3(1):297-300.
13. Surendra Karki, Prakash Ghimire, Bishnu Raj Tiwari, Manita Rajkarnikar HBsAg serosurveillance among Nepalese blood donors. *Annals of tropical medicine and public health*. 2008;1(1):15-18.
14. Karandeep Singh, Sudha Bhat, Shamee Shastry. Trend in seroprevalence of Hepatitis B virus infection among blood donors of coastal Karnataka, India. *J Infect Dev Ctries* 2009;3(5):376-379.
15. World Health Organization. Hepatitis B. <http://www.who.int/csr/disease/hepatitis/whocdscsrlyo20022/en/index3.html>.
16. W. Thomas London and Jean s. Drew. Sex differences in response to hepatitis B infection among patients receiving chronic dialysis treatment. *Proc. Natl. Acad. Sci. USA* 74(6):2561-2563.
17. Warda Baha et al Prevalence and risk factors of hepatitis B and C virus infections among the general population and blood donors in Morocco. *BMC Public Health* 2013;13:50-8.
18. Brian J. McMahon, Wallace L. M. Alward, David B. Hall, William L. Heyward, Thomas R. Bender, Donald P. Francis and James E. Maynard. Acute Hepatitis B Virus Infection: Relation of Age to the Clinical Expression of Disease and Subsequent Development of the Carrier State. *J Infect Dis* 1985;151(4):599-603.
19. IPEN Study Group Injection practices in India. *WHO South-East Asia J Public Health*. 2012;1:189-200.
20. Murhekar M.V., Rao R.C., Ghosal S.R., Sehgal S.C. Assessment of injection-related practices in a tribal community of Andaman and Nicobar islands, India. *Public Health*. 2005;119:655-65.
21. Rajasekaran M., Sivagnanam G., Thirumalaikolundu Subramanian P., Namasivayam K., Ravindranath C. Injection practices in southern part of India. *Public Health*. 2003;117:208-213.
22. Aceijas C., Friedman S.R., Cooper H.L., Wiessing L., Stimson G.V., Hickman M. Estimates of injection drug users at a national and local level in developing and translational countries, and gender and age distribution. *Sex Transm Infect*. 2006;82(suppl. 3):10-17.
23. Sandesh K., Varghese T., Harikumar R. Prevalence of hepatitis B and C in the normal population and high risk groups in north Kerala. *Trop Gastroenterol*. 2006;27:80-83.
24. Mahanta J., Medhi G.K., Paranjape R.S. Injecting and sexual risk behaviours, sexually transmitted infections and HIV prevalence in injecting drug users in three states in India. *AIDS*. 2008;22:S59-S68.
25. Devi K.S., Brajachand N., Singh H.L., Singh Y.M. Co-infection by human immunodeficiency virus, hepatitis B and hepatitis C virus in injecting drug users. *J Comm Dis*. 2005;37:73-77.
26. Alter MJ et al. Hepatitis B virus transmission between heterosexuals. *JAMA* 1986;256(10):1307-10.
27. Alter MJ et al. importance of heterosexual activity in the transmission of hepatitis B and non-A, non-B hepatitis. *JAMA* 1989;262(9):1201-5.
28. Corona R et al. Risk factors for hepatitis B virus infection among heterosexuals attending a sexually transmitted diseases clinic in Italy: role of genital ulcerative diseases. *J Med Virol* 1996;48(3):262-6.
29. Catterall RD. Some observations on the epidemiology and transmission of hepatitis B. *British Journal of Venereal Diseases* 1978;54(5):335-40.
30. Hahne SJ et al Hepatitis B virus transmission in the Netherlands: a population-based, hierarchical case-control study in a very low-incidence country. *Epidemiol Infect* 2008;136(2):184-95.
31. Kingsley et al. Sexual transmission efficiency of hepatitis B virus and human immunodeficiency virus among homosexual men. *JAMA* 1990;264(2):230-4.

How to cite this article: Patel PH, Nerurkar AB, Patel MR. Seroprevalence of Hepatitis B Surface Antigen in patients attending a tertiary care hospital Valsad, South Gujarat, India. *International Journal of Medical Microbiology and Tropical Diseases* 2016;2(3):103-106.