

Original article

Prevalence of hepatitis-B surface antigen (HBsAg) positivity in Solapur District, Maharashtra State, India

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Abstract

Background: Hepatitis B virus is a partially double-stranded circular DNA virus and is a member of the *Hepadnaviridae* family. The virus consists of a core capsid which contains viral DNA and this is surrounded by an envelope containing surface antigen (HBsAg). Both whole, incomplete virus particles, consisting entirely of HBsAg, are produced during replication of HBV. The HBsAg particles vary greatly in morphology and are found in high concentrations in early acute infection and continue to be produced in chronic disease.¹ **Objectives:** Diagnostic potential of Hepatitis-B surface antigen (HBsAg) positivity and its prevalence was evaluated among volunteers from various localities in Solapur District, Maharashtra State, India. **Methodology:** The prevalence of hepatitis B surface antigen (HBsAg) was studied from Solapur, Maharashtra State, India, among 767 volunteers (male 470 and female 297), aged 05-55 years volunteers, who required medical check-ups. Blood samples, collected during March to May 2010, were tested for HBsAg using a third-generation ELISA kit. **Results:** Of the 767 volunteers, male 1.82% and female 1.17% were positive for HBsAg. The results revealed that hepatitis B infection in the target group was below the intermediate endemicity. **Conclusion:** This study demonstrates that proper training of new entrants in the medical field can be pivotal in preventing HBsAg and it is advocated that a programme for education, vaccination and prophylaxis must be implemented in all healthcare set ups.

Key words: HBsAg, Hepatitis B surface antigen, HEPALISA, Jaundice, seroprevalence.

Introduction

HBsAg ELISA is used for the qualitative determination of hepatitis B surface antigen (HBsAg) in human serum or plasma. This test is indicated for the screening of blood and blood products to be used for transfusion and an aid for the diagnosis of existing or previous hepatitis B infection. Hepatitis B surface antigen (HBsAg) and Hepatitis C (HCV) antibodies, similar to that which has existed for HIV since 1988.¹

Hepatitis B surface antigen (HBsAg) appears 1-7 weeks before biochemical evidence of liver disease or jaundice. Three weeks after the onset of acute hepatitis almost half of the volunteers will still be positive for HBsAg. In

the chronic carrier state, the HBsAg persists for long periods, even for life with no seroconversion to the corresponding antibodies. Abha et. al., [2] studied that the incidence of HBsAg positivity among high risk hospital personnel. Tribal population of Udaipur District in Southern Rajasthan, the prevalence of HBsAg observed by Jain [3]. The various international researcher Mahoney and Stewart [4] progress toward the elimination of hepatitis B virus transmission among health care workers in the United States. The detailed study on hepatitis B virus studied by Hollinger. [5] After initial HBV infection, a proportion of patients fail to clear infectious material from the blood stream and

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become chronic carriers. Shi et. al [6] studied that the hepatitis B immunoglobulin injection in pregnancy to interrupt hepatitis B virus mother-to-child transmission. Hamida et al. [7] observed the maternal and neonatal seroprevalence of Hepatitis B surface antigen (HBsAg) in Tripoli, Libya. Therefore, screening for HBsAg is highly desirable for all donors, pregnant women and people in high-risk groups.

Materials and Methods

Among 767 volunteers (male 470 and female 297), aged 05-55 years ((mean = 30 years), who required medical check-ups at D.B.F Dayanand College of Arts and Science, Solapur, Sri Siddheshwar sugarcane factory, Solapur, deaf and dumb School, Akkalkot, District: Solapur, deaf and dumb School, Mulegaon, Solapur and Gayamata Balakashram, Pandharpur, District: Solapur. Blood samples, collected during March to May 2010 at Solapur, Maharashtra State, India.

Specimen

A 5-ml venous blood sample was collected in a pilot tube from all volunteers, for the testing of HBsAg. The blood was allowed to clot at room temperature and the serum was separated after centrifugation at a low speed. The serum sample was then subjected to requested tests.

HBsAg Testing Kit

HEPALISA (Microwell ELISA Test for the detection of Hepatitis B surface antigen (HBsAg) in human serum / plasma) J. Mitra and Co. Ltd. A-180, Okhla Ind.Area, Phase -1, New Delhi 110020, India.

Kit Lot Number: EBVO1039

Protocol Name: HEPALISA HBsAg

Laboratory procedures

HEPALISA well are coated with monoclonal antibodies specific for HBsAg. A serum specimen is added to the antibody coated HEPALISA well together with enzyme conjugated polyclonal antibodies. HBsAg, if present, will form an antibody-HBsAg-antibody-enzyme complex. The plate is then washed to remove unbound material. Finally, a solution of substrate is added to the wells and incubated. A blue color will develop in proportion to the amount of HBsAg present in the specimen. The enzyme-substrate reaction can be stopped and the result is visualized by naked eye or read by EIA plate reader for absorbance at the wavelength of 450 nm. All the testing done at Smt. Gopabai Damani Blood Bank, Solapur, Maharashtra State, India.

Statistical analysis

Prevalence percentage, frequency, abundance and Chi-square test for independence of sex and positivity of HBsAg are measure by standard statistical analysis methods.

Table 1: Sex specific HBsAg positivity prevalence percentage

Sr. No	Total No.	HBsAg + ve	Prevalence %
Volunteers (Male and Female)	767	23	2.99
Male	470	14	1.82
Female	297	09	1.17

The difference in positivity between males (1.82%) and females (1.17%) was statistically significant.

Table 2: Chi-square test for independence of sex and positivity of HBsAg: Observed Frequencies

Sex	HBsAg + ve	HBsAg -ve	Total
Male	14	456	470
Female	09	288	297
Total (Male + Female)	23	744	767

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Table 3: Chi-square test for independence of sex and positivity of HBsAg: Expected frequencies

Sr. No	HBsAg + ve	HBsAg -ve	Total
Male	14.09387223	455.9061278	470
Female	8.906127771	288.0938722	297
Total (Male + Female)	23	744	767

Calculated value: 0.967455903

Table value: 3.841469149

Results

The results of a study in Solapur, Maharashtra State, India, among 767 volunteers (male 470 and female 297), aged 05-55 years, who required medical check-ups. Blood samples, collected during March to May 2010, were tested for HBsAg using a third-generation ELISA kit. Of the 767 volunteers, male 14(1.82%) and female 09(1.17%) were positive for HBsAg. Lack of awareness and carrier state seems to be the reason for this increased prevalence among the volunteers. Table-1 shown that the sex specific HBsAg positivity prevalence percentage and Table-2 shown that the Chi-square tests for independence of sex and positivity of HBsAg: observed frequencies and Table 3 shows the expected frequencies. The results shows on Table 2 and Table 3 as a calculated value 0.967455903 was less than table value 3.841459149. Both calculated and table values shows that the sex and positivity are statistically independent.

Discussion

Sohrabi [8] observed seroepidemiologic study of hepatitis B and measuring contamination in laboratory personnel in Tehran. In Nepal Shrestha [9] observed the seroepidemiology of hepatitis B. Hovig et. al., [10] studied that the antibody to hepatitis-B surface antigen among employees in the National Hospital, Oslo, Norway. In Northern India, Tripathi et.al., [11] find the low prevalence of Hepatitis B Virus and Hepatitis C Virus co-infection in patients with Human Immunodeficiency Virus. Batham et. al. [12] systematically reviewed the meta-analysis of prevalence of hepatitis B in India. Kotwal and Kelkar [13] observed the hepatitis-B antigen in endemic hepatitis at Aurangabad. Hepatitis B positivity among medical

personnel studied by Gupta et al. [14] and hepatitis-B virus infection in hospital personnel pointed out by Elavia and banker. [15] The prevalence of chronic HBsAg carriers in India, it was 5% and in Sri Lanka, it was 1% for the year 2000. [16-17] Singh et al. [18] studied the screening for hepatitis B and C viral markers among nursing students in a tertiary care hospital in India. Transfusion-transmitted infection of hepatitis B virus observed by Niederhauser et al. [19] Five-year studied in India by Meena et. al. [20] observed that the prevalence of hepatitis B virus and hepatitis C virus among blood donors at a tertiary care hospital. The results compared to the above studies, moreover, in Solapur, Maharashtra State, India, a study showed that the prevalence rate of HBsAg positive volunteers was 2.99% and positivity was significantly more among the males.

Considering the findings of HBsAg positive volunteers in our study and similar studies both at home and abroad, we would like to emphasize that the overall prevalence percentage of the HBsAg infection is less as compared to the past finding.. The present result shows that the prevalence percentage is decreased due to awareness of education and vaccination.

Acknowledgements

The authors thank Dr. P.K. Joshi, Secretary and Dr. Rajiv Pradhan, Joint Secretary for their excellent technical assistance as well as the doctors and technicians of Smt. Gopabai Damani Blood Bank (Indian Red Cross Society) Solapur for their help in blood collection during this study.

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