Original Research Article

Prevalence of hepatitis-B surface antigen in subjects attending OPD of Tertiary care institution

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Received: 14-04-2021 / Revised: 13-05-2021 / Accepted: 26-06-2021

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 and 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.**Aim:** Diagnostic potential of Hepatitis-B surface antigen (HBsAg) positivity and its prevalence was evaluated among OPD Patients. **Methodology:** The prevalence of hepatitis B surface antigen (HBsAg) was studied among 767 subjects (male 470 and female 297), aged 05-55 years volunteers, who required medical check-ups. Blood samples, collected were tested for HBsAg using a third-generation ELISA kit. **Results:** Of the 767 subjects, 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.

Keywords: HBsAg, Hepatitis B surface antigen, HEPALISA, Jaundice, seroprevalence.

Introduction

Viral hepatitis is a systemic infection affecting predominantly the liver, caused by infection with one of the hepato-tropic viruses, hepatitis A through E. The cause of viral hepatitis B is a HBV (Hepatitis B virus), a type 1 DNA virus of a family *Hepadnaviridae*.
The course of hepatitis B may be extremely variable. The incubation period varies from 30–180 days. If HBsAg (Hepatitis B surface antigen) remains positive for more than 6 months it is called chronic hepatitis B virus infection. The diagnosis of HBV infection is accomplished by testing for a series of serological markers of HBV. In absence of other tests, presence of HBsAg is usually taken as a marker for chronic HBV infection. HBeAg (Hepatitis B virus envelope antigen) is an indicator of active intra-hepatic viral replication therefore its presence in blood is a marker for its infectivity[1-4].
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 HBsAgpersists for long periods, even for life with no seroconversion to the corresponding antibodies. Abhaet. 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 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. Screening for HBsAg is highly desirable for all and specially high- risk groups people, before any surgical procedure. Therefore, this study was conducted to evaluate the prevalence of Hepatitis B in subjects attending OPD of our institution.

Materials and Methods

This prospective study was conducted at Department of Microbiology at Patna Medical College and Hospital, Patna. The study was approved by the institutional ethical and research

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committee. The study was conducted from September 2020 to March 2021. An informed and written consent was taken from all the participating subjects prior to the commencement of the study.

The study sample consisted of 767 volunteers (male 470 and female 297), aged 05-55 years (mean = 30 years), who attended OPD of our institution and were referred for hepatitis B screening.

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).

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.

Statistical analysis

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

Results

The results of our study with 767 Subjects (male 470 and female 297), aged 05-55 years, who required screening check-ups. Blood samples, collected during the study period, 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 subjects. Table-1 shows the sex specific HBsAg positivity and prevalence percentage. Table-2 shows 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.

Table 1: Sex specific HBsAg positivity prevalence percentage.

	Total No.	HBsAg + ve	Prevalence %
Overall	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

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

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. Hoviget. al., [10] studied the antibody to hepatitis-B surface antigen among employees in the National Hospital, Oslo, Norway. In Northern India, Tripathi et.al., [11] found the low prevalence of Hepatitis B Virus and Hepatitis C Virus co-infection in patients with Human Immunodeficiency Virus. Bathamet. 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, showed that the prevalence rate of HBsAg positive volunteers was 2.99% and positivity was significantly more among the males.

Conclusion

Considering the findings of HBsAg positive subjects 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.

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Conflict of Interest: Nil
Source of support:Nil