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Seropositivity rate of Hepatitis B Surface Antigen (HBsAg) among patients attending a Tertiary Care Hospital in South India

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ABSTRACT:

Introduction: Hepatitis B virus infection is a global public health problem and causes a spectrum of diseases ranging from self-limiting hepatitis to acute fulminant and chronic hepatitis leading to complications like liver cirrhosis and hepatocellular carcinoma. The diagnosis of HBV infection is based on clinical symptoms coupled with laboratory findings of serological markers. HBsAg acts as a hallmark of HBV infection as it is the first serological marker to appear in acute HBV infection and its persistence for more than 6 months suggest chronic HBV infection or development of a carrier state.

Material and Methods: This is a retrospective study conducted from Jan 2021 – Dec 2021(1 year) in the Department of Microbiology, MIMS, Mandya which mostly caters the rural and semi urban population. The data was collected from the records maintained in the laboratory. All patients advised screening for Hepatitis B virus from various clinical depatments during the study period were included in the study. A total of 13188 patients were included in the present study.

Results: Among 13188 patients included in the present study, 244 (1.85%) were reactive for HBsAg. Among the reactive patients, 148 (60.7%) were males, 96 (39.3%) were females. (Not statistically significant , p>0.05). Among seropositives, seropositivity was highest in 21-40 years age group (41.9%) followed by 41-60 years (35.2%).

Conclusion: HBV is an important cause of mortality and morbidity in developing countries. This study showed 1.85% seroprevalence of HBsAg with male preponderance (60.7%) . Seropositivity was highest in 21-40 years age group (41.9%) followed by 41-60 years (35.2%).The study indicates that HBV infection is still a public health problem which should be among the prioritized health problems in our country.

Keywords: Hepatitis B Surface Antigen**,** seropositivity, serological marker

Introduction

HBV is a double stranded DNA virus belonging to genus orthohepadnavirus and family hepadnaviridae with 10 genotypes. [1]Hepatitis B virus infection is a global public health problem and causes a spectrum of diseases ranging from self-limiting hepatitis to acute fulminant and chronic hepatitis leading to complications like liver cirrhosis and hepatocellular carcinoma. The primary route of transmission of HBV infection is by parenteral like transfusion of blood and its products, dialysis, pricks by contaminated needles, accidental inoculation of infected blood during surgical and dental procedures, immunization, tattooing, ear/nose pricking , perinatal transmission from infected mother to child and sexual transmission .[2]

WHO has classified burden of HBV defined as hepatitis B surface antigen positive (HBsAg) severity based on the prevalence of infection, into high endemicity (>8%), intermediate (2-7%) and low endemicity (<2%).2Each year approximately 0.1 million deaths occur due to HBV and its related illnesses in our country. The carrier rate of HBV in India may vary in the different regions and is often quoted as being 4.7% but as per the classification of HBV prevalence, India is in intermediate range (prevalence range 2– 7%).[3]

The diagnosis of HBV infection is based on clinical symptoms coupled with laboratory findings of serological markers. HBsAg acts as a hallmark of HBV infection as it is the first serological marker to appear in acute HBV infection and its persistence for more than 6 months suggest chronic HBV infection or development of a carrier state. [4]

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HBsAg circulates in blood as viral particle-bound protein form or as free noninfectious protein presenting as 22-nm spherical or tubular particles (free form predominates). [5]
Hepatitis B surface antigen (HBsAg) appears 1-7 weeks before biochemical markers of liver disease become evident and remains in almost half of them even after 3 weeks after the onset of disease[6]. This study was conducted to help in assessing the magnitude of Hepatitis B virus and thus plan for its control and prevention.

MATERIAL AND METHODS

This is a retrospective study conducted from Jan 2021 – Dec 2021(1 year) in the Department of Microbiology, MIMS, Mandya which mostly caters the rural and semi urban population. The data was collected from the records maintained in the laboratory. All patients advised screening for Hepatitis B virus from various clinical depatments during the study period were included in the study. Ethical approval was obtained from institutional ethical committee. A total of 13188 patients were included in the present study.

Procedure: 3- 5ml blood sample was collected from patients using sterile plain vacutainers with standard precautions, and the serum was separated by centrifugation. Needle was destroyed using a needle destroyer and then discarded. Serum sample was tested for HBsAg by CMIA. Detection of HBsAg was done by Chemiluminescence (ARCHITECT i1000 HBsAg assay, Abbott Diagnostics, Germany) method as per manufacturer's instructions. In brief, the ARCHITECT HBsAg assay is a two-step immunoassay, using chemiluminescent microparticle immunoassay (CMIA) technology for the quantitative determination of HBsAg. For HBsAg, in the first step, sample and antiHBs coated paramagnetic microparticles are combined. HBsAg present in the sample binds to the anti-HBs coated microparticles. After washing, acridinium-labeled anti-HBs conjugate is added in the second step. Following another wash cycle, PreTrigger and Trigger Solutions are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs) and determine the qualitative results.

Statistical analysis- Data was entered in Microsoft Excel for analysis The results are analyzed using chi-square test. The significance level and association of variables is tested by 95% confidence interval (CI) and p-values < 0.05 taken as statistically significant. Descriptive statistics are used for categorical variables and expressed in percentages.

RESULTS:

A total of 13188 patients were included in the present study. Among them, 244 (1.85%) were reactive for HBsAg. Among the reactive patients, 148 (60.7%) were males, 96 (39.3%) were females. (Not statistically significant , $p>0.05$). Among seropositives, seropositivity was highest in 21-40 years age group (41.9%) followed by 41-60 years (35.2%).

Table 1: Seroprevalence of HBsAg

Total cases	Seropositive		Seronegative	
No.	No.	Percentage	No.	Percentage
13188	244	1.85	12944	98.15

Fig 1: Seroprevalence of HBsAg

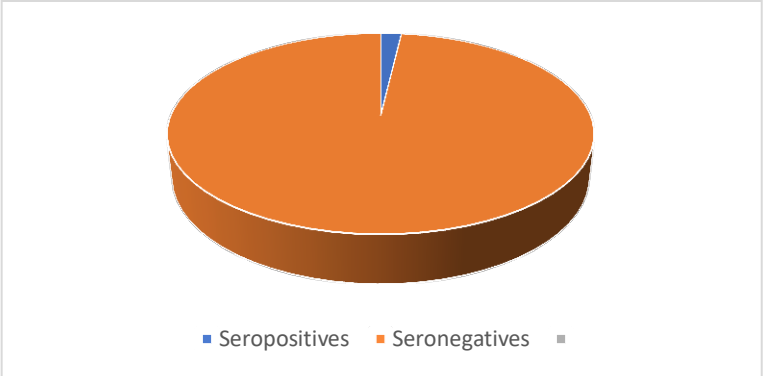

Table 2: Seropositivity for HbsAg according to Gender

Gender	Seropositive cases	%
Male	148	60.7
Female	96	39.3
Total	244	100

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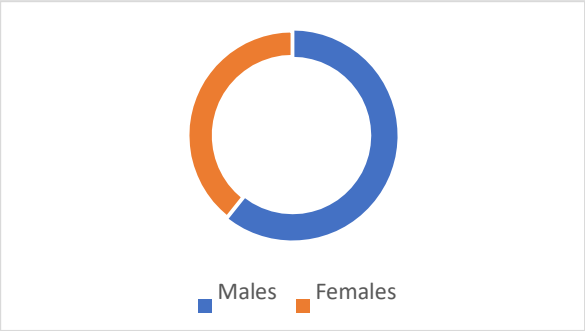

Fig 2: Gender wise seropositivity (%)

Table 3 : Age-wise distribution of study population & seropositives

Age group in years	Total no. of subjects (%)	Seropositives(%)
0-20	341 (2.6%)	5 (2.0%)
21-40	4455 (33.8%)	102 (41.9%)
41-60	5500 (41.8%)	86 (35.2%)
61-80	2688 (20.3%)	49 (20.1%)
>80	204 (1.5%)	2 (0.8%)
TOTAL	13188 (100%)	244 (100%)

DISCUSSION

Among 13188 subjects in the present study, 244 (1.85%) were reactive for HBsag. Among the reactive patients, 148 (60.7%) were males, 96 (39.3%) were females. Male preponderance was seen. Among seropositives, seropositivity was highest in 21-40 years age group (41.9%) followed by 41-60 years (35.2%).

In a study by Tripathi *et al*.[7]a total of 4369 serum samples were tested for HBsAg detection and they showed seroprevalence of HBsAg was 1.69% with highest prevalence in 31-40 years followed by 21-30 years.

Gokhale *et al*., screened 3604 sera and found 96 (2.66%) were HBsAg sero-positive with seroprevalence of 72% in males and 28% in females. Among the positive cases, a majority were in the age group of 21 to 40 years, with a male preponderance ($p<0.05$)[8] The recent study by Gebreegziabher *et al*.9 found that the prevalence of HBV in males was higher (59.8%) than female (40.2%), and another study from Ethiopia reported no deference among male and female.[10] It is hypothesised that females probably clear the HBV more efficiently in comparison with males.[11]

A hospital based study conducted by Patil *et al*.,[12]found 2.99% HBsAg seropositivity in Karad district. Sood *et al*. [13] has noted 0.87% prevalence in a study of HBsAg prevalence in hospital based population. Tripti *et al*[14] at Chamarajanagar Institute of Medical Sciences, Chamarajanagar collected secondary data from laboratory registers of patients tested for HBsAg from January 2016 to August 2017.The proportion of samples tested positive for HBsAg was 0.56 %. In their study, out of 39 seropositive cases, 24 (61.53%) were in the age group of 21 – 40 years followed by 11 (28.2%) cases in the 41 – 60 years age group.

The prevalence of hepatitis B varies from country to country and depends upon behavioral, environmental and host factors.

In our study, higher seroprevalence (41.9%) was observed in age group 21-40 years. This shows lack of awareness among general population about vaccination and risk of exposer about HBV. Higher rate of infection among adults has also been reported by Khan F *et al*.,[15] who found youngest age group (21-30 years) having highest frequency 34.9% of HBsAg and age group 31-40 years being the second 23.83% most common. Rokade HG *et al*.[16] have reported an increasing prevalence among 15 - 45 years age group and found 51.9% individuals HBV positive.

CONCLUSION

HBV is an important cause of mortality and morbidity especially in developing countries. This study showed 1.85% seroprevalence of HBsAg with male preponderance (60.7%) . Among seropositives, seropositivity was highest in 21-40 years age group (41.9%) followed by 41-60 years (35.2%).The study indicates that HBV infection is still a public health problem which should be among the prioritized health problems in our country. Thus strengthening of existing preventive strategies including vaccination, early case detection, prompt treatment, and creating awareness in general population can reduce the burden of this disease.

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