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Research Article

STUDY OF HEPATITIS B SURFACE ANTIGEN TO ASSESS THE OCCURRENCE OF HBV INFECTION IN A TERTIARY CARE HOSPITAL

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ABSTRACT
*Background***:** Hepatitis B infection has become a major public health problem affecting approximately 30% of world population and about 2 billion people have serological evidence of either current or past infection. HBsAg prevalence rates among general population in India ranges from 0.1% to 11.7%.
*Aim***:** To determine the occurrence of Hepatitis B infection in a patients attending a tertiary care Hospital.
Materials and Methods: A retrospective study was conducted in the Department of Microbiology, BGS GIMS Bangalore from June 2017 to May 2018. A venous blood sample of 5 ml was collected from patients with standard precautions. The blood was allowed to clot for 45 minutes at room temperature and the serum was separated by centrifugation. The serum was then subjected to one step rapid immunochromatographic assay (ICA) (Hepacard diagnostic enterprises) kit for detection of HBsAg following the manufacturer's instructions.
*Results***:** Total of 3157 serum samples were tested for HBs Ag during the study period. Out of which 1196 were males (37.89%) and 1961 were females (62.12%). Out of 3175 serum samples, 48 were reactive to HBsAg (1.52%). Age wise distribution of Seroprevalence of HBsAg was found to be highest in the age group of 21- 40 years with a seropositivity of 56 % (27/48), followed by 31.2% in the age group of 41- 60 years.
Conclusion: In our study, Seroprevalence is higher in sexually active and economically productive age groups who are exposed mostly to high risk behaviours. However ours is hospital based study, so further community based studies and multicentric studies are required to study epidemiological factors.

Keywords: *HBsAg, HBV, Seroprevalence,*

INTRODUCTION
Hepatitis B infection has become a major public health problem affecting approximately 30% of world population and about 2 billion people have serological evidence of either current or past infection.[1] Countries have been divided into three groups (high, intermediate and low) according to Hepatitis B virus (HBV) endemicity. India falls in the intermediate endemicity zone (prevalence of 2–7%, with an average of 4%) (Ray, 2017). Nearly three-quarters of the global HBV infection pool is in Asian countries. India alone contributes to 10% of the HBV carriers in the world (Kumar *et al.*, 2013).

Hepatitis B infection causes a spectrum of disease ranging from self limiting hepatitis to acute fulminant and chronic hepatitis leading to sequelae like liver cirrhosis and hepatocellular carcinoma, which remains the 10th leading cause of death and 5th most frequent cancer worldwide (Trupti *et al.*, 2018).

The primary routes of transmission are parenteral transmission like transfusion of blood and its products, dialysis, needle stick injury , accidental inoculation of infected blood during surgical and dental procedures, immunization, tattooing, ear/nose pricking etc., perinatal transmission from infected mother to child and sexual transmission (Bula and Santhosh, 2017).

Serodiagnosis of HBV infection depends on, whether the infection is acute or chronic. Hepatitis B surface antigen (HBsAg) is the first seromarker to appear in blood and indicates an active HBV infection. Hepatitis B surface antigen (HBsAg) appears 1-7 weeks before biochemical markers of liver disease or jaundice become evident and remains positive in 50% of patients, even after 3 weeks of onset of disease

Trupti *et al.,* (2018). HBsAg prevalence rates among general population in India ranges from 0.1% to 11.7% (Megha *et al.,* 2017).

A hospital based study on Seoprevalence of Hepatitis B surface antigen (HBsAg) gives an indirect estimate of disease burden in the community (Megha *et al.,* 2017).

Aims and objectives:

1. To determine Seroprevalence of Hepatitis B virus infection.
2. To determine age, sex, department wise distribution of Seropositive cases.

MATERIALS AND METHODS

- **Study design**: Retrospective study
- **Duration of study: 1 year**

A retrospective study will be conducted in the Department of Microbiology, BGS GIMS, Bengaluru from June 2017 to May 2018. All the Patients who were referred by clinicians for HBsAg viral marker were included in the study.

Sample Collection and Test Procedure:

A venous blood sample of 5 ml was collected from patients with standard precautions. The blood was allowed to clot for 45 minutes at room temperature and the serum was separated by centrifugation. The serum was then subjected to one step rapid immunochromatographic assay (ICA) (Hepacard diagnostic enterprises) kit for detection of HBsAg following the manufacturer's instructions.

The reactive samples were retested in duplicates with fresh blood samples, if found reactive were considered as reactive.

Statistical Analysis: The data is analyzed using appropriate SPSS software version 20. Percentage analysis of the data will be given.

RESULTS

Total of 3157 serum samples were tested for HBs Ag during the study period. Out of which 1196 were males (37.89%) and 1961 were females (62.12%). Maximum serum samples for testing were from OBG department (1246 cases) mostly as a part of antenatal routine check up.

Out of 3157 serum samples, 48 were reactive to HBsAg, thus giving a Seroprevalence rate of 1.52%. The prevalence of HBsAg was 2% (24/1196) in males and 1.2% (24/1961) in females. Out of 1246 antenatal cases screened, 6 were reactive, with prevalence rate of 0.4 %.(Table-1)

Table 1: Gender wise Seroprevalence of HBs Antigen among study population

Gender	Positive N (%)	Negative N(%)	Total N (%)
Male	24(2%)	1172 (98%)	1196 (100%)
Female	24(1.2%)	1937(98.8%)	1961 (100%)
Total	48 (1.52%)	3109 (98.48%)	3157(100%)

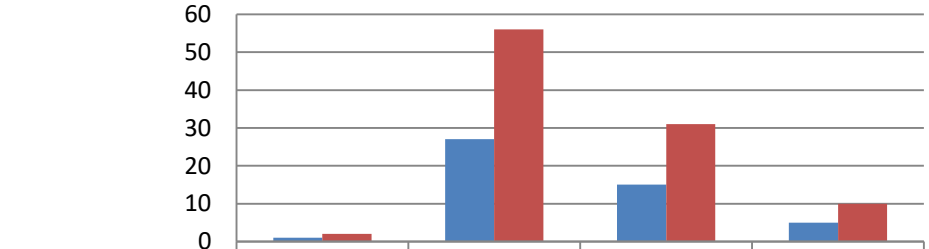
**p value - 0.08, not statistically significant*

Age wise distribution of Seroprevalence of HBsAg was found to be highest in the age group of 21-40 years with a seropositivity of 56 % (27/48), followed by 31% in the age group of 41-60 years. (Chart 1)

The majority of seropositive samples were from Medicine department (50%), followed by OBG (21%), General surgery (19%), Orthopaedics (6%) and ENT (4%) (Chart 2).

Among seropositive cases, maximum reactive cases were from Outpatient Department (64.5%) compared to In –Patients department (35.4%) (Chart 3).

Chart 1 - Age wise distribution of positive cases



	0-20	21-40	41-60	61-80
POSITIVE CASES N	1	27	15	5
%	2	56	31	10

Chart 2 - Department wise distribution of positive cases N = 48

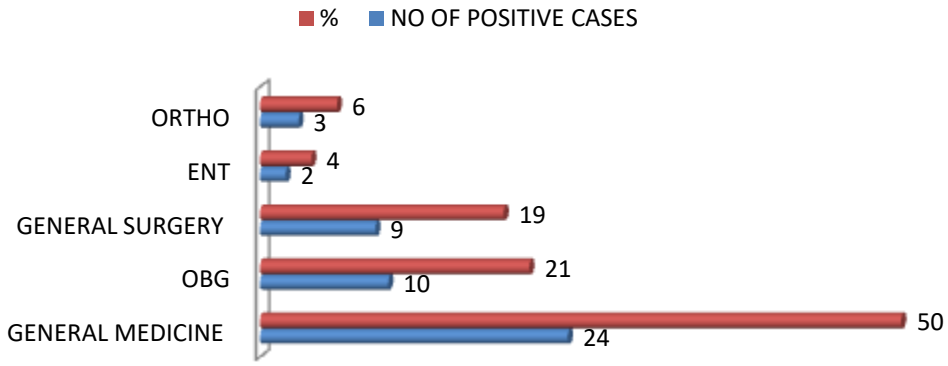
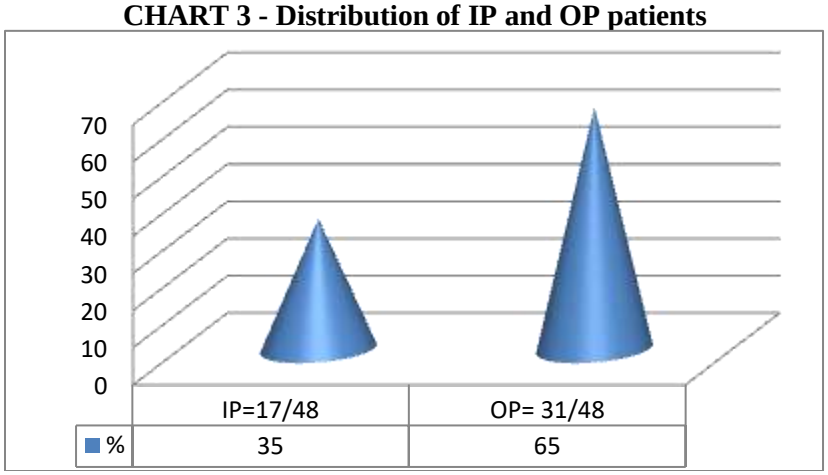


CHART 3 - Distribution of IP and OP patients



DISCUSSION

Hepatitis B virus infection is a global health problem , with 2 billion people (or 30% of world population) worldwide having serological evidence of either current or past HBV infection, and an estimated 350 million people harbor chronic infection (Qamer *et al.*, 2004; and Lavanchy, 2004).

Diagnosis of HBV infection is usually through serological and virogical markers. Hepatitis B Surface antigen (HBsAg) is the hallmark of HBV infection and is the first serological marker to appear in acute HBV infection, and persistence of HbsAg for more than six months suggests chronic HBV infection Kao (2008).

In our present study, the Seroprevalence was found to be 1.52 %. In India overall prevalence of HBV infection is reported to be 1-2% (Lodha *et al.,* 2001). Thus, our study also has the same prevalence rate…However the prevalence from various studies may show wide range, from 0.87 % to 5.1% , lowest being reported by Sood *et al.,* (2013) and highest being reported by Dinesh *et al.,* (2017).

According to WHO, Hepatitis B prevalence is 6.2% in the Western Pacific Region, 6.1% in the African Region, 3.3% in the Eastern Mediterranean Region, 2.0% in the South-East Asia Region and1.6% in the European Region. Wide variation in the prevalence may be because of the type of population studied, different geographical region, genetic factors, health factors and socioeconomic status. In general, it is lowest in countries or areas with high standards of living like effective vaccination, improved sanitation and safe transfusion measures (eg Australia, North America, North Europe) and highest in countries or areas with low socioeconomic levels (eg China, South East Asia, and South America) (Mathur *et al.,* 2019).

In our study, Seroprevalence of HBV Infection was higher in male patients (2%) than in females(1.22%). However this difference is not statistically significant as p value is 0.08..Many studies have reported higher prevalence in males including Parimala (2018); Chakraborthy *et al,* (2015); and Trupthi *et al*, (2018). No possible explanation has been given for the higher prevalence in males in the general population but probably higher exposure to occupational HBV risk factors like multiple sexual partners, unprotected sex activities, sharing of needles in IV drug abusers and tattooing in man and also high immune response helps in clearing of HBV more rapidly and efficiently in females as compared to males (Trupti *et al.,* 2018; Parimala 2018; Chakraborty *et al.,* 2015).

In our study, seroprevalence was highest in the age group of 21-40 years (56.2%) , followed by 41-60 yrs (31%) and lowest in the age group of 0-20yrs and more than 60 yrs age group. It is in concordance to studies conducted by Mathur *et al.,* (2019) Vazhavandal *et al.,* (2014); Trupti *et al.,* (2018) and is in discordance with studies conducted by parimala et al, Megha S et al, that showed high prevalence rate in >41 yrs age group. High prevalence in sexually active adults may be because of high risk of exposure.

Transmission of infection from mother to fetus is one of the major mode of transmission of HBV, so if pregnant women are screened before delivery, it is possible to prevent infection in neonates by immunization. Seroprevalence in our study was found to be 0.4% which is lowest compared to other studies conducted by Vanitha and Hanumanthappa (2012); Singla and Chander (2008) and Olokoba *et al.* (2009).

Maximum reactive cases in our study were from Outpatient Department (64.5%). Majority of HBV infections are asymptomatic carriers, thus can transmit infection to healthy people.. The patients presenting to the OPDs of a hospital are generally those seeking treatment for mostly community acquired ailments hence the estimation of seroprevalence of hepatitis B surface antigen in such patients can be considered as a surrogate marker of HBV infection (Megha *et al.,* 2017).

CONCLUSION

In our study Seroprevalence is higher in males, sexually active and economically productive age groups who are exposed mostly to high risk behaviors. However ours is hospital based study, so further community based studies and multicentric studies are required to study epidemiological factors.

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