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Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among Patients Attending a Tertiary Care Hospital

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A B S T R A C T

Hepatitis B virus (HBV) infection continues to be a serious public health problem globally. The seroprevalence of Hepatitis B surface antigen among patients attending a tertiary care hospital is useful in assessing true nature of problem, which can help to estimate the magnitude of HBV infection and aid in devising preventive measures. The present study was done to evaluate the seroprevalence of hepatitis B surface antigen among patients attending a tertiary care hospital. The present study was carried out in Department of Microbiology, at a tertiary care hospital, from Jan 2013 to Dec 2018. A total of 57256 patients were included in the study whose venous blood samples were collected, and serum was tested for the presence of HBsAg using a rapid one step chromatographic immunoassay test kit (OSCAR Laboratories Pvt. Ltd. Delhi). Out of 57256 patients whose blood samples were tested, 1089 were found to be positive for HBsAg giving the prevalence rate as 1.90%, with 602(2.86%) males and 487(1.34%) females. The majority of the positive patients belonged to age group 21-40 years (2.11%). The present study shows seroprevalence rate of HBsAg is 1.90% in economically productive groups. This type of study can be an alternative option for community based studies to formulate strategies for its control and prevention.

Introduction

Hepatitis B virus (HBV) 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 (Quadri *et al.*, 2013; Sood *et al.*, 2013).

HBV infection is the 10th leading cause of death and HBV related hepatocellular carcinoma (HCC) is the 5th most frequent cancer worldwide (Quadri *et al.*, 2013). About more than 2 billion of the world population has serological evidence of past or recent HBV infection and there are more than 350 million chronic carriers of this infection. Approximately 1 million persons die annually from HBV related chronic liver diseases

including severe complications such as liver cirrhosis and hepatocellular carcinoma (HCC) (Privisani *et al.,* 2002)

The prevalence of HBV infection varies from country to country depending on host and environmental factors. According to WHO (World Health Organisation) 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 HBV with prevalence between 2% to 7% among the populations studied (Who's Certified, 2002). The prevalence does not vary significantly by region in the country (Parimal *et al.,* 2016). 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 etc., perinatal transmission from infected mother to child and sexual transmission (Quadri *et al.,* 2013).

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 (Khatoon *et al.,* 2016).

Detection of HBsAg is the most commonly used test for diagnosing acute HBV infections as well as for detecting carriers (Naqshbandi *et al.,* 2016). Immunochromatography assays (ICA) are economical and do not require special instrumentation for analysis and have been recommended for routine use in clinical microbiology laboratories for detection of HBsAg (Sato *et al.,* 1996). The speed, sensitivity and simplicity of the immunochromatography assay (ICA) method makes it more attractive, particularly for large scale surveillance studies (Torlesse *et al.,* 1997; Kaur *et al.,* 2000). With this background, the present study was undertaken to evaluate seroprevalence of HBsAg among patients.

Materials and Methods

The present study was carried out in Department of Microbiology, at a tertiary care hospital from Jan 2013 to Dec 2018.Under aseptic precautions from each patient 3 ml of venous blood was withdrawn in a labelled plain vacutainer tube. The blood was allowed to clot followed by centrifugation of the tube at 3000 rpm for 15 minutes to separate serum (Colle *et al.,* 1999). Then, according to manufacturers instruction two drops of serum was tested for the presence of HBsAg using a rapid one-step immune chromatography assay test kit (OSCAR) based on antigen capture or sandwich principle and results were interpreted at 20 minutes. The appearance of red coloured line, one each in the test T region and control C region interpreted that the sample was positive for presence of HBsAg, whereas, appearance of red coloured line only in control C region interpreted that sample was negative for HBsAg.

Results and Discussion

The study was conducted from Jan 2013 to Dec 2018. A total of 57256 patients were screened for HbsAg of that 1089(1.90%) were positive for HbsAg.

Among the positive cases the seroprevalence of HbsAg was found to be high amongst males i.e. 602(2.86%) than females i.e. 487(1.34%). Genderwise prevalence of HbsAg is shown in Table 1.

In this hospital based study prevalence of HbsAg was high in the age group of 21-40 years (2.11%) followed by 41-60 years (2.03%) and lowest in 0-20 years (0.71%). Age wise and year wise prevalence of HbsAg shown in Table 2.

Table.1 Gender wise Prevalence of HbsAg

Year	Male tested	Male positive	Female tested	Female positive	Total tested	Total positive
2013	3012	95 (3.1%)	5879	78 (1.32%)	8891	173 (1.94%)
2014	3157	113 (3.5%)	9097	105 (1.15%)	12254	218 (1.77%)
2015	2735	101 (3.6%)	6653	81 (1.21%)	9388	182 (1.93%)
2016	3312	89 (2.6 %)	4580	67 (1.46%)	7892	156 (1.97%)
2017	3810	91 (2.38%)	4694	72 (1.53%)	8504	163 (1.91%)
2018	5031	113(2.2%)	5296	84(1.58%)	10327	197(1.90%)
Total	**21057**	**602(2.86%)**	**36199**	**487(1.34%)**	**57256**	**1089(1.90%)**

Table.2 Year wise and age wise prevalence of HbsAg

Year	0-20 yrs		21-40 yrs		41-60 yrs		>60 yrs		Total	
	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive
2013	900	6	3675	76	2701	59	1615	32	8891	173(1.94%)
2014	682	4	5127	96	3881	71	2564	47	12254	218(1.77%)
2015	648	3	3629	85	3006	64	2105	30	9388	182(1.93%)
2016	767	6	2930	66	2486	48	1709	36	7892	156(1.97%)
2017	638	8	3234	69	2952	57	1680	29	8504	163(1.91%)
2018	721	4	3742	81	3220	73	2644	39	10327	197(1.90%)
Total	4356	31 (0.71%)	22337	473 (2.11%)	18246	372 (2.03%)	12317	213 (1.72%)	**57256**	**1089 (1.90%)**

In the present study, the seroprevalence was found to be 1.90%, which comes under low endemicity. In accordance with our study, Bulle *et al.,* (2016) and Naqshbandi *et al.,* (2016), also reported seroprevalence of HBsAg of 1.57% and 1.2% respectively. Another study conducted by Tripathi *et al.,* (2015), showed seroprevalence of HBsAg at tertiary care centre in Telangana was 1.69%. A review of hepatitis B prevalence in India by Lodha *et al.,* (2001) has conducted that it is in between 1-2%. A hospital based study conducted by Patil *et al.,* (2016), found 2.99% seropositivity in Karad district while Trupti *et al.,* (2018), found 0.56% seroprevalence in Karnataka. Chowdhary (2004), reported that 3-4% of the Indian population are HBV infected with the highest prevalence among the aborigines of Andaman as well as from Arunachal Pradesh.

There is a wide variation in HBsAg prevalence in different geographical regions in India. The difference may be because of the type of population studied, genetic factors, health factors and socioeconomic status. In general, it is lowest in countries or areas with high standard of living like effective vaccination, improved sanitation and safe transfusion measures (e.g. Austrelia, North America, North Europe) and highest in countries or areas with low socioeconomic levels (e.g. China, South East Asia, South America) (Vazhavandal *et al.*, 2014).

In our study, there was an increase in the seroprevalence rate among the male population (2.86%) as compared to that in female (1.34%), as shown in Table 1. In accordance with our study, many studies shows male preponderance compared to females. Tripti *et al.,* (2018), reported HbsAg prevalence in males 0.98% and 0.36% in females. Gokhale *et al.,* (2017), reported seroprevalence in males72% and 28% in females. Bulle *et al.,* (2016), also showed male preponderance (2.2%) than females (1.33%).Higher infection rate in men could be due to their frequent exposure to risk factors such as injecting drug abuse, having multiple sexual partners or other risk behaviours. It is also hypothesized that females clear HBV more efficiently compared to male.

The seropositivity was highest (2.11%) among 21-40 years followed by 41-60 years (2.03%) and lowest (0.71%) among 0-20 years, as shown in Table 2. Like our study, most of the studies (Gokale *et al.*,2017; Bulle *et al.,* 2016) observed seropositivity maximum in second to fourth decade of life. While study of Tripathi *et al.,* (2015), showed highest prevalence in 31-40 years followed by 21-30 years, so it can be concluded that highest prevalence in 21-40 years. The higher prevalence among 21-40 years age group could be due to higher exposure to occupational risk factors as well as high risky behaviour. Further, lowest rate of seropositivity in younger age groups could be due to prevention of perinatal transmission of HBV by immunization in this locality.

In conclusion, the seroprevalence of HbsAg is low in our area, although India lies in intermediate to high endemic category. This might be due to effective immunization programme which reduces the burden of infection in our area. The present study also highlights seroprevalence rate of HbsAg higher in economically productive age groups thereby providing reference for future community based studies on epidemiology of HBV infection and also to formulate strategies to further reduce the seroprevalence rate of HbsAg.

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