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Seroprevalence of Hepatitis B Surface Antigen (HBsAg) among Patients Attending a Tertiary Care Hospital at Chamarajanagar, Karnataka, India

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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 study on its prevalence helps in estimating the magnitude of the problem in a community and identifies potential high risk groups. A hospital based study on seroprevalence of Hepatitis B surface antigen (HBsAg) gives an indirect estimate of disease burden in the community besides being useful in proper allocation of available resources at the hospital. To estimate seroprevalence of Hepatitis B surface antigen among patients at the study setting. A hospital based cross sectional study was conducted at a tertiary care hospital in Chamarajanagar, Karnataka. Secondary data maintained in the microbiology laboratory registers of patients tested for HBsAg by one step rapid immunochromatographic method from January 2016 to August 2017were included for analysis. Statistical analysis was done using Microsoft office excel 2010. A total of 6905 patients tested over a period of one year and eight months from January 2016 to August 2017. Seroprevalence rate in the present study was 39 (0.56%). Majority of them were males i.e. 22 (56.41%) and were in the age group of 21-40 years. i.e. 24 (61.53%).The present study demonstrates predominance of HBV infection in economically productive groups, highlighting the need 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. HBV infection is the cause of 5th most common cancer and 10th leading cause of death worldwide (Quadri *et al.*, 2013; Sood *et al.*, 2013). As per recent estimates, 10 million new cases occur and nearly 350-400 millions of people become chronic carriers annually all over the world (Bulle *et al.*, 2016). It is the cause of 30% cases of cirrhosis and 60 -80% of all primary cancers in the liver. At any point in time, nearly 30 % of the world's population shows serological evidence of current or past infection with HBV (Naqshbandi *et al.*, 2016).

Prevalence of HBV infection varies greatly in different parts of the world. The World Health Organization (WHO) has classified HBV prevalence into high (>8%), intermediate (2-7%) and low endemic (<2%) areas and India

falls in the intermediate range with an estimated 1,00,000 deaths per year. The primary routes of transmission are parenteral transmission 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).

Diagnosis of HBV infection using serological markers varies depending on whether the infection is acute or chronic. Hepatitis B surface antigen (HBsAg) appears 1-7 weeks before biochemical markers of liver disease or jaundice become evident and remains in almost half of them even after 3 weeks after the onset of disease.

After initial infection, a proportion of patients fail to clear infectious material from the blood stream and become chronic carriers (Patil *et al.,* 2011) and in them, the HBsAg persists for longer periods, sometimes for life. Further, a large proportion of patients suffering from Hepatitis B may remain asymptomatic and can transmit the infection to healthy population (Quadri *et al.,* 2013).

Detection of HBsAg is the most commonly used test for diagnosing acute HBV infections as well as for detecting carriers (Naqshbandi *et al.,* 2016) Immunochromatoragphy 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, 1996). The speed, sensitivity and simplicity of the ICA method makes it more attractive, particularly for large-scale surveillance studies (Torlesse, 1997; Kaur, 200) With this background, the present study was undertaken to estimate seroprevalence of with the following objective.

To estimate seroprevalence of Hepatitis B surface antigen among patients at the study setting.

Materials and Methods

A cross sectional study was conducted at Chamarajanagar Institute of Medical Sciences, Chamarajanagar by collecting secondary data from laboratory registers of patients tested for HBsAg from January 2016 to August 2017. Prior permission for the study was obtained from concerned authorities. Demographic characteristics like age, gender, clinical details and HBsAg test results of the patients were collected.

Detection of HBsAg

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 after centrifugation.

The serum was then subjected to one step rapid immunochromatographic assay (ICA) Alere Trueline TM (Alere Medical Pvt. Ltd) kitfor detection of HBsAg following manufacturer instructions.

Statistical analysis

Statistical analysis was done using Microsoft Office Excel 2010.

Results and Discussion

Table 1 demonstrates age and gender wise distribution of patients tested for HBsAg. Out of the total 6905 patients tested for HBsAg, majority i.e. 4679 (67.76%) were females and majority i.e. 4427 (64.11%) were in the age group of 21-40 years as seen in the table.

Figure 1 shows seroprevalence of HBsAg among patients and out of the total 6905 patients tested for HBsAg, 39 (0.56%) were positive.

Table 2 shows gender wise distribution of seropositive patients. Out of 39 seropositive cases, majority i.e. 22 (56.41%) were males. Also the rate of seropositivity was higher among males (0.98%) compared to females (0.36%)

Table 3 shows age and sex wise distribution of seropositive patients. Out of 39 seropositive cases, majority i.e. 24 (61.53%) were in the age group of 21 – 40 years followed 11 (28.2%) cases in the 41 – 60 years age group. Further analysis of the data revealed that the rate of seropositivity was directly proportional to the age groups as seen in the table. The present hospital based study analysed data of 6,905 samples processed over a period of one year and eight months from January 2016-August 2017 at a tertiary care hospital in Chamarajanagar, Karnataka. The proportion of samples tested positive for HBsAg was 0.56 %. Various studies done over the past 10 years in different places of the country showed prevalence ranging from 0.87 % to 5.1% as depicted in Table 4. A prevalence rate of 0.87% was reported by Sood *et al.*, (2013) in Jaipur similar to the findings of the present study. In a recent systemic review and meta-analysis of the prevalence of hepatitis B in India, the state of Andhra Pradesh, showed a prevalence of 3.25 % in nontribal areas and 5.00 % in tribal areas (Batham *et al.*, 2009; Sood, 2013). Chowdhury (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.

Table.1 Age & Sex wise distribution of patients tested for HBsAg

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
1-20	280	12.57	434	9.27	714	10.34
21-40	1064	47.70	3363	71.87	4427	64.11
41-60	700	31.44	658	14.06	1358	19.66
61-80	182	8.17	224	4.78	406	5.87
Total	2226	100	4679	100	6905	100

Table.2 Gender wise distribution of seropositive patients

Gender	All cases	Seropositive cases	Rate of seropositivity (%)
Male	2226	22 (56.41%)	0.98
Female	4679	17 (43.59%)	0.36
Total	6905	39 (100%)	0.56

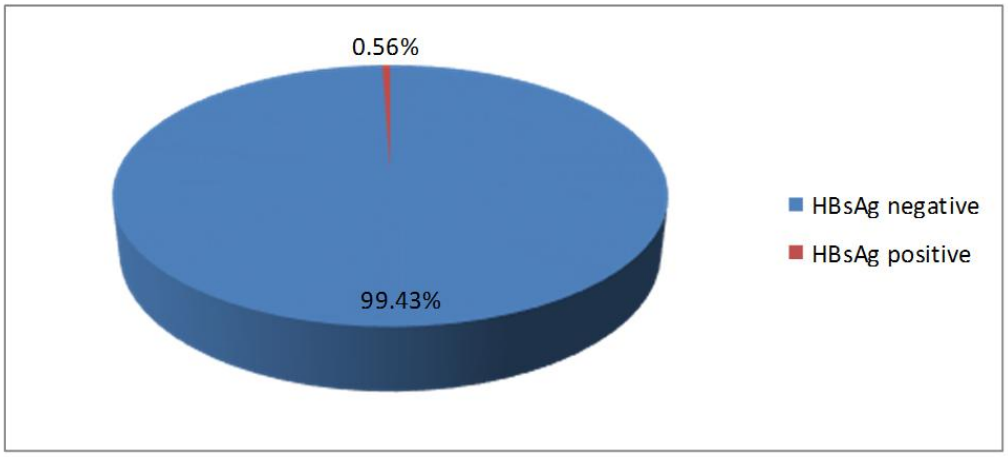
Table.3 Age and sex wise distribution of HBsAg positive patients

Age in years	Male		Female		Total		Rate of seropositivity
	No.	%	No.	%	No.	%	%
1-20	0	0	0	0	0	0	0
21-40	14	63.63	10	58.82	24	61.53	0.54
41-60	6	27.27	5	29.41	11	28.2	0.81
61-80	2	9.09	2	11.76	4	10.25	0.98
Total	22	100	17	100	39	100	0.56

Table.4 Comparison of seroprevalence of HBsAg with various studies in India

Author	Place of study	Year of study	No. of samples tested	No. of samples positive	Prevalence %
Gokale *et al.,*	Bagalkot	2016-2017	3604	96	2.66
Quadri *et al.,*	Bijapur	2010	4283	70	1.63
Mindolli and Salmani	Bijapur	2014	8300	146	1.76
Patil *et al.,*	Solapur	2010	767	23	2.99
Bulle *et al.,*	Yavatmal	2015	4649	73	1.57
Naqshbandi *et al.,*	Srinagar	2011-2013	1300	15	1.2
Bula *et al.,*	Andhra Pradesh	2015-2016	24,028	733	3.05
Patil *et al.,*	Karad	2010-2011	7373	166	2.25
Bhaumik *et al.,*	Tripura	2011-2013	6202	222	3.6
Narayanswamy *et al.,*	Chennai	-	3182	105	3.3
Vazhagavandal *et al.,*	Tiruchirapalli	2010-2013	19513	315	1.61
Kanodia *et al.,*	Jaipur	2012-2013	74787	3092	4.13
Khatoon *et al.,*	Lucknow	2015-2016	1537	61	3.9
Ghosh	Agartala	2001-2005	21121	1044	4.94
Dinesh *et al.,*	Irula	-	372	19	5.10
Sood	Jaipur	2007-2008	3196	28	0.87
Present study	Chamarajanagar	206-2017	6905	39	0.56

Fig.1 Seroprevalence of HBsAg among hospital based population



Hospital based studies conducted in Bijapur district of Karnataka in the year 2010 by Quadri *et al.,* (2014) and by Mindolli and Salmani (2015) found seropositivity rates of 1.63% and 1.76% respectively and a rate of 2.66% in Bagalkot district (Gokale *et al.,* 2017). Several other studies reported a seroprevalence rate of < 2% (Bulle, 2016; Naqshbandi, 2016; Vazhavandal, 2014). This difference in seropositivity could be due to differences in the study settings, differences in data collection methods, differences in the diagnostic tools used, differences in the profile of patients etc.

Seroprevalence rate in the present study was significantly higher in males (0.98%) in concurrence with many other studies (Gokale *et al.,* 2017; Quadri *et al.,* 2010; Mindolli and Salmani, 2015; Patil, 2011; Bulle, 2016; Bula *et al.,* 2017).

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 behaviors. It is also hypothesized that females clear HBV more efficiently compared to males.

In our study, the seropositivity was directly proportional to age groups and there were no positive cases in below 20 years. Like our study, most of the studies observed seropositivity maximum after second decade of life because of their greater exposure and interaction in society as compared to children (Gokale *et al.,* 2017; Mindolli and Salmani, 2015; Bulle, 2016; Bula *et al.,* 2017). Further, absence of disease in younger age groups could be due to prevention of perinatal transmission of HBV by immunization in this locality. The findings in the present study likely reflect the patient population served by our hospital and indirectly estimates the disease burden in the community providing a good reference for future studies.

The present study highlights HBV infection rate in this part of state and its predominance 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.

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