Original Research Article

A Retrospective Study on Seroprevalence of Hepatitis B Surface Antigen among Patients in a Tertiary Care Hospital, South India

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ABSTRACT

Hepatitis B is a parentrally transmitted virus and is a major public health problem worldwide. A diagnosis of HBV infection usually made by detection of Hepatitis B Surface antigen (HBsAg) in the serum. This retrospective study was conducted to determine the prevalence of Hepatitis B surface antigen among patients in a Tertiary care hospital, Tumkur, South India during a period from March 2015 – February 2016. A4135 serum samples were screened for testing of HBsAg in the serology section of Department of Microbiology during the study period. Samples were tested for HBsAg by Rapid ICT using commercially available kits. Seroprevalence of HBsAg was found to be 0.58%. This study showed higher prevalence in males (0.74%) compared to females (0.44%). It was also observed that prevalence is highest in (0.97%) age group 41-50 years. In our study prevalence was highest in the month of October and January (1%). In compare to other parts of India, the present study shows low prevalence of hepatitis B infection in Tumkur, Karnataka, South India. Immunisation with Hepatitis B vaccine helps in reducing the hepatitis B infection.

Keywords

Hepatitis B, HBsAg, Seroprevalence, Immunisation.

Introduction

Hepatitis B virus (HBV) causes a spectrum of disease from self limited hepatitis to acute fulminant & chronic hepatitis which may result in sequele like liver cirrhosis & hepatocellular carcinoma (Quadri et al., 2013). Hepatitis B virus infection (HBV) is a major health problem in many countries of the world especially those in Asia, the Middle East & Africa (El Beltagy et al., 2008). About 2 billion people worldwide have been infected with the virus & about 350 million live with chronic infection (Huda et al., 2013). In the South East region, the estimated burden of chronic HBV infection is 100 million. HBV is the second most common cause of acute viral hepatitis after HEV in India. Every year, one million Indians are at risk for HBV & about one 100000 die from HBV infection (NCDC Newsletter, 2014).

Transmission of the virus occurs in community in 3 ways. First wave occurs during perinatal period when the virus is transmitted from infected mothers to infants during delivery and up to first year of life.
Second wave of transmission occurs during childhood by horizontal spread through close contact with infected siblings, father, relatives and friends. And the third wave of spread occurs during adult life through sexual contact, intravenous drug abuse, blood transfusion etc (Shrestha et al., 2012). Modes of transmission of HBV vary, since the virus is present in blood, saliva, semen, vaginal secretions, menstrual blood, & in smaller quantities in perspiration, breast milk, tears and urine of the infected individuals (Onwuakor et al., 2014). Unscreened donate blood, unsafe therapeutic practices, including the use of inadequately sterilized needles and medical instruments, are the major routes of HBV transmission apart from sexual exposure in South East Asia regions (Negero et al., 2011).

Countries are classified on the basis of endemicity of Hepatitis B Virus (HBV) infection into high (8% or more), intermediate (2-7 %) or low (<2%) incidence countries. The prevalence of chronic HBV infection in India ranges from 2-10% as shown by the different studies. India therefore comes under the intermediate and high endemicity category (Singh et al., 2009). The present study was undertaken to determine the prevalence of Hepatitis B surface antigen in a tertiary care hospital, Tumkur, Karnataka, South India and to compare the prevalence rates in different parts of the world.

**Materials and Methods**

This retrospective study was conducted at Department of Microbiology of Shridevi Institute of Medical Sciences and Research Hospital, Tumkuru, Karnataka, South India from March 2015 to February 2016. A 5 ml of venous blood samples was collected by venepuncture from all patients who come with laboratory requisition for the testing of HBsAg. Samples were allowed to clot at RT for about 30 min to 45 min. Serum was separated by centrifugation at a speed of 3000 rpm for 10 minutes. All the serum samples were screened for HBsAg by Rapid Immunochromatic Technique (ICT using the commercially available kit (Diagnostic enterprises) with reported sensitivity of 100% and specificity of 100%. ICT is a rapid and sensitive method for the detection of HBsAg. All serum samples were tested as per the manufacturer’s instructions.

Data were analysed with Microsoft excel.

**Results and Discussion**

A total of 4135 serum samples were received for detection of HBsAg during the period from March 2015 to Feb 2016. Of these, 24 serum samples reactive to HBsAg giving a seroprevalence rate of 0.58% in the study population (Table 1).

Regarding age, seroprevalence of HBsAg was highest 6 (0.97%) in the age group 41-50 years, followed by 4 (0.82%) in the age group of 51-60 years compared to younger age group 11-20 (0.26%) (Table 2).

The prevalence of HBsAg 14 (0.74%) in males and 10 (0.44%) in females (Table3).

Prevalence was almost between 0.2-0.7% throughout the year but in the month of October and January the prevalence rate of HBsAg of 1% was observed (Table4).

Hepatitis B is a parenterally transmitted virus that has adapted for its existence to the basic human activities like close association, sex and child birth (Shrestha et al., 2012). Diagnosis of HBV infection is usually through serological and virological 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 (Onwuakor et al., 2014).

Prevalence of Hepatitis B varies from country to country and depends upon a complex interplay of behavioral, environmental and host factors. In general, it is lowest in countries or area with high standards of living (eg: Australia, North America, North Europe) and highest in countries or areas were social economic level is lower (eg: China, South East Asia, South America). The reported prevalence of carrier in different population varies widely from 0.1% in the advanced countries to 20% in the developing nations. The carrier rate higher in the tropical than in the temperate regions (Behal et al., 2008).

In a retrospective study conducted between 2005 and 2006 in Korea, the prevalence rate was reported to be 12.7%. In an 11 year surveillance study conducted in Pakistan, prevalence of HBsAg positivity was found to be 2.5% in 47043 patients, where as it was found to be 8.1% in 2995 subjects from Dhaka, Bangladesh.

Prevalence of HBV was found to be 11.2% in Andean plateau region of Latin America, which is considered as low risk region (Turanoglu et al., 2013). In a study conducted in a hospital based population at Kathmandu Medical College Hospital, Nepal, the prevalence rate of viral Hepatitis B was found to be 2.5% (Sood et al., 2010). Prevalence of HBV was found to be 11.2% in Andean plateau region of Latin America, which is considered as low risk region (Turanoglu et al., 2013). In a study conducted in a hospital based population at Kathmandu Medical College Hospital, Nepal, the prevalence rate of viral Hepatitis B was found to be 2.5% (Sood et al., 2010).

**Table 1** Prevalence of Hepatitis B surface Antigen (HBsAg) among Patients in a Tertiary Care Hospital

| Test | Total No. of Samples Received | No. of HBsAg Positive Samples | % of Positive Samples |
|------|-------------------------------|-------------------------------|----------------------|
| HBsAg | 4135                           | 24                            | 0.58                 |

**Table 2** Drug sensitivity profile of E.coli isolates against commonly used antibiotics Prevalence of Hepatitis B surface Antigen (HBsAg) in Different Age Group in a Tertiary Care Hospital

| Age Group (in Years) | Total No. of Samples Received | No. of HBsAg Positive Samples | % of Positive Samples |
|----------------------|-------------------------------|-------------------------------|----------------------|
| 1-10                 | 163                           | 0                             | 0                    |
| 11-20                | 383                           | 1                             | 0.26                 |
| 21-30                | 1243                          | 5                             | 0.40                 |
| 31-40                | 704                           | 4                             | 0.56                 |
| 41-50                | 616                           | 6                             | 0.97                 |
| 51-60                | 486                           | 4                             | 0.82                 |
| >60                  | 540                           | 4                             | 0.74                 |
| Total                | 4135                          | 24                            |                      |
Table.3 Prevalence of Hepatitis B Surface Antigen (HBsAg) in Relation to Gender of Patients in a Tertiary Care Hospital

| Gender | Total No. of Samples Received | No. of HBsAg Positive Samples | % of Positive Samples |
|--------|--------------------------------|--------------------------------|-----------------------|
| Male   | 1873                           | 14                             | 0.74                  |
| Female | 2262                           | 10                             | 0.44                  |
| Total  | 4135                           | 24                             |                       |

Table.4 Prevalence of Hepatitis B Surface Antigen (HBsAg) in Relation to Month wise Among Patients in a Tertiary Care Hospital

| Month                  | Total No. of Samples Received | No. of HBsAg Positive Samples | % of Positive Samples |
|------------------------|--------------------------------|--------------------------------|-----------------------|
| March 2015             | 276                           | 02                             | 0.72                  |
| April 2015             | 359                           | 01                             | 0.27                  |
| May 2015               | 335                           | 02                             | 0.59                  |
| June 2015              | 377                           | 02                             | 0.53                  |
| July 2015              | 387                           | 03                             | 0.77                  |
| August 2015            | 383                           | 00                             | 0.00                  |
| September 2015         | 413                           | 02                             | 0.48                  |
| October 2015           | 369                           | 04                             | 1.08                  |
| November 2015          | 369                           | 02                             | 0.54                  |
| December 2015          | 259                           | 02                             | 0.77                  |
| January 2016           | 245                           | 03                             | 1.22                  |
| February 2016          | 363                           | 01                             | 0.27                  |
| Total                  | 4135                          | 24                             |                       |

Present study revealed increasing trend of seroprevalence with advancing age. HBsAg positivity was significant in the age group 41-50 yrs and > 50 years compared to younger age group (<20yrs). The significant association of HBV markers with older ages could be due to the greater number of years of potential exposure, a lack of adult HB vaccination programs, and the lack of awareness of HBV infection in earlier decade (El Beltagy et al., 2008).

Many studies reported that seroprevalence of HBV infection higher in male patients than in females. In our study the seroprevalence of HBV infection was more in male patients (0.7%) than in female patients (0.4%). No plausible explanation has been given for the higher prevalence in male in the general population but probably females clear the HBV more efficiently as compared to males (Chakraborty et al., 2014).

A study conducted by Qadiri et al., reported that higher prevalence in June-July (Qadri et al., 2013). Higher prevalence was observed in the month of October and January in the present study.

Still further studies are needed to evaluate prevalence of HBsAg in relation to different season.

According to the WHO classification, this part of Karnataka qualifies as a low
prevalence area (< 2%) of hepatitis B infection. An ideal way to reduce the Hepatitis B infection is to implementation of immunization programs along with health education. This is not a community based study. Further, community based studies are required to better estimate the magnitude of hepatitis B infection.

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