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Seroprevalence of Hepatitis B infection at a tertiary care hospital in North Karnataka over a period of 10 years

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Abstract

Background: *The Hepatitis B virus is a hepatotropic virus, known to cause Hepatitis B infection. Although a cost-effective vaccine is available , it still poses a significant public health problem in the world. The 10% of hepatitis B infection is shared by India alone. Every year around 0.1 million deaths occur due to hepatitis B and its related illness in the country.* ***Methods:*** *This was a prospective cross-sectional study conducted at a tertiary care hospital, from 2010 to 2019. For this routine screening of HBV, Hepatitis B Surface Antigen (HBsAg) was used as a marker of infection. All the serum samples were divided into 0.5 milliliter (ml) aliquots and stored at -20 c. All the sera were tested for the presence of Hepatitis B surface antigens (SD Bioline manufactured by Alere Medical Pvt ltd, Gurgaon, Haryana, India) Positive and negative controls were used.* ***Results:*** *A total of 2, 41,845 serum samples were processed for HBsAg detection by latex agglutination over a period of ten years. Of the 2, 41,845 samples tested 5,773 were found positive for HBsAg. Thus, prevalence of hepatitis B infection in our hospital was found to be 2.38%.* ***Conclusion:*** *Thus, this study concludes that HBV infection is still a public health problem which should be among the prioritized health problem in our country.*

Key words*: Hepatitis B, Prevalence, Hepatitis B Vaccine, Chronic hepatitis*

INTRODUCTION

Hepatitis B infection is a significant global liver illness impacting individuals globally. (1) Dr. Baruch Blumberg received the Nobel Prize in 1965 for discovering the hepatitis B virus. The virus was initially

referred to as the "Australian antigen" following the detection of an antibody in the serum of an American hemophiliac from an Australian aborigine's blood sample. While collaborating with Dr. Baruch Blumberg, scientist Irving Millman created the blood test that can identify this virus. (2).

The hepatitis B virus is found all over the world. With 66% of the population residing in these high-risk locations, hepatitis B is quite prevalent. Two billion individuals exhibit evidence of a prior or current hepatitis B infection, with around 350 million being chronic carriers. (3)

Asymptomatic Hepatitis B virus infections can lead to chronic liver disorders such as cirrhosis and hepatocellular cancer. Over a million fatalities worldwide are attributed to the aftereffects of chronic Hepatitis B infection, which include cirrhosis, hepatocellular carcinoma, and chronic hepatitis.Thus, with an estimated 6,20,000 fatalities, it is a major source of morbidity and mortality.(4)

Hepatitis B infection is one of the three main causes of cancer death in East and South East Asia, the Pacific Basin, and Sub-Saharan Africa, accounting for 60 to 80 percent of all primary liver malignancies. Chronic HBV infection prevalence varies by region and can be high (>8%), moderate (2–7%), or low (<2%). In terms of hepatitis B prevalence, India falls inside the WHO's intermediate zone (2–7%). (5)

A 25% decrease in the prevalence of transfusion-associated hepatitis B was achieved in 1971 when blood banks started screening donors for Hepatitis B surface antigen (HBsAg). Dr. Blumberg and Dr. Millman developed the first hepatitis B vaccine four years after the virus was identified. In 1981, the FDA authorized the use of the plasma-derived hepatitis B vaccination in humans. In 1986, DNA recombinant vaccines, the second generation of genetically modified vaccines, were released into the market. (6)

Since the development of the effective vaccine, the global epidemiology of HBV infection has undergone tremendous shift. In 1991, according to WHO recommendation the hepatitis B vaccine was included in each nation's national immunization schedule. By May 2002, a total of 154 countries were regularly receiving the hepatitis B immunization. Following the inclusion of the hepatitis B vaccine in the vaccination schedule, the incidence of hepatitis B infection in India has declined from 9.8% in 1984 to less than 2% in recent years. (7)

Hepatitis B is comparatively common in India. It is associated with unhygienic conditions, poverty, and a large population to service. It becomes difficult to comprehend the true epidemiological variables. Consequently, understanding its epidemiology becomes essential. Periodic disease surveillance should be carried out in order to specify specific health care actions for illness prevention and control. It is difficult to conduct community-based seroprevalence studies because of logical and socioeconomic factors, as well as India's status as a developing country. (8) More than half of ambulatory care and two-thirds of outpatient treatment in India are provided by a large private health care system. As a result, a private healthcare environment has access to a wealth of clinical data. Thus, a private hospital that serves a big population serves as a significant hub for serological surveys. (9)

To the best of our knowledge, no recent research has been conducted in North Karnataka, however there are a few studies that describe the pattern of hepatitis viruses from this region. There is little information available about the distribution and seroprevalence of this blood-borne infection in Dharwad. The present study was therefore undertaken to determine the prevalence of hepatitis B in both sexes and in different age groups of hospital based general population.

MATERIALS AND METHODS

Study design and patients:

The study was conducted in the Department of Microbiology, SDMCMSH, Dharwad. The blood samples received in the laboratory for HBsAg tests from 2010 to 2019 were included in the study. A total of 2, 41,845 patients visiting various out-patient and in-patient departments of SDMCMSH were included in the study. SDMCMSH is using software to record and maintain patient related data since the year 2006.

Specimen collection: The blood samples were drawn from both in patients and OPD patients were received at the Microbiology laboratory and serum was separated immediately. All the serum samples were divided into 0.5 milliliter (ml) aliquots and stored at -20^0 C. All the sera were tested for the presence of Hepatitis B surface antigens (SD Bioline manufactured by Alere Medical Pvt ltd, Gurgaon, Haryana, India). Positive and negative controls were used weekly.

RESULTS

A total of 2, 41,845 serum samples were processed for HBsAg detection by latex agglutination over a period of ten years. Of the 2, 41,845 samples tested 5,773 were found positive for HBsAg. Thus, prevalence of hepatitis B infection in our hospital was found to be 2.38% . Table No 1 shows the prevalence of hepatitis B infection over a decade from 2010-2019. Table No 2 shows the year wise distribution of hepatitis B seropositivity. Table No 3 shows the male to female ratio of hepatitis B infection.
The seroprevalence for HBsAg among males and females was 66% and 34% respectively. Statistical analysis of male and female prevalence was done using the chi square test.

Test	Total number of samples	Positive	%
HBsAg	2,41,845	5,773	2.38

Table No 1: Prevalence of Hepatitis-B infection (2010 -2019)

Table No 2: Year wise distribution of Hepatitis-B infection (2010-2019)

Year	Total number of samples	Positive (n)
2010	12,549	347
2011	15,108	406
2012	18,440	479
2013	19,622	477
2014	23,204	589
2015	26,591	697
2016	27,882	589
2017	28,489	714
2018	32,349	664
2019	37,611	811
Total	**2,41,845**	**5,773**

Table No 3: Sex-wise distribution of Hepatitis-B infection (2010-2019

Year	Positive (n)	Male	Female
2010	347	203	144
2011	406	267	139
2012	479	312	167
2013	477	306	171
2014	589	393	196
2015	697	470	227
2016	589	407	182

2017	714	477	237
2018	664	467	197
2019	811	532	279
Total	**5,773**	**3,834**	**1,939**

DISCUSSION

This virus is more or less prevalent in various parts of our country. The prevalence of hepatitis B varies by country as well. Numerous factors, including as host, environmental, and behavioral factors, influence it. According to reports, 2.28% of patients in Rawalpindi, Pakistan, who visit a surgical outpatient department have hepatitis B. (10) Arunachal Pradesh and the Andaman Islands have the highest reported frequency of hepatitis B. (11) The prevalence rate of viral hepatitis B in a hospital-based population was 2.5% at Kathmandu Medical College Hospital in Nepal. Vanuatu has the highest, while Malaysia has the lowest. (12) Our study indicated that the seroprevalence of hepatitis B was 34% among males and 66% among females. According to the majority of research, hepatitis B infection is more common in men than in women. However, given our study is hospital-based, it is likely that the prevalence is higher among females. It is impossible to explain why males in the general population have a larger prevalence of hepatitis B, but females are better at clearing the HBV than males. (13)India's knowledge of HBV infection is comparatively low because the majority of patients do not show any symptoms until the disease is advanced. Poor drug adherence raises the risk of infection transmission and lowers the cure rate. (14-19) Education is necessary to stop the spread of HBV infection. Published guidelines recommend that patients receive lifestyle advice (e.g., avoiding high-risk sexual activities, unhealthy eating, alcohol, and other risk factors like tattoos and unsafe injection practices), appropriate counseling on how to prevent transmission, and the importance of consistent adherence to long-term treatment plans. For high-risk individuals (e.g., sexual partners, close contact with patients or carriers, medical personnel, dialysis patients, intravenous drug users, individuals who receive multiple blood transfusions, do acupuncture, or are on immunosuppressives, biologics, or cancer chemotherapy, etc.) routine screening and immunization are recommended.

CONCLUSION

To conclude, the overall prevalence of the positivity for markers of Hepatitis B was similar to that which was reported by other studies from India, except for the sex ratio.

Even though hepatitis B is a major public health concern in India, the country's population are pathetically ignorant about the disease, which is a critical factor in lowering the disease burden. With current drugs, a full cure is not possible; instead, the goal is long-term suppression of the virus through protracted therapy, which can result in poor treatment adherence and prohibitive therapy costs.

Conflict Of Interest

The authors declare that there is no conflict of interest.

Authors' Contribution

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Data Availability

All datasets generated or analyzed during this study are included in the manuscript.

Ethics Statement

This study was approved by Institutional Ethics Committee, SDM College of Medical Sciences and Hospital, SDM University, Dharwad, Karnataka, India.

INFORMED CONSENT: Not applicable

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