

Serosurveillance of HBsAg Positive Patients in Voluntary Blood Donors

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ABSTRACT: Blood transfusion is the process of transferring blood or blood products from one person to another. Blood transfusion can lead to the transfer of many infectious agents which can lead to Transfusion Transmitted Diseases. HBsAg is one of such infectious diseases, which leads to Hepatitis B Infection. The hepatitis B virus (HBV) is a DNA virus and a member of the hepadna family of viruses, and is a very common virus with an estimated 300 million carriers worldwide. Only 1 - 1.5 million of these are in the United States. Hepatitis B is much more prevalent in other areas of the world such as parts of Asia including Southeast Asia, sub-Saharan Africa, and some of the Mediterranean countries. Hepatitis B is a major health problem worldwide and is associated with life-threatening complications. Blood Donors are needed to be screened, or else that might make the donation unsafe for the recipient.

In the present study among 8299 blood donors screened, the overall seroprevalence of HBsAg is observed to be 0.69%. 56 are male patients and remaining two is females. The seroprevalence rate in males and females is found to be 0.72% and 0.381% respectively. 58 donors had repeatedly reactive serologic test for HBsAg. It was found that 12.02% (7/58) patients were hospital staffs.

KEYWORDS: HBsAg, HBeAg, Acute hepatitis, chronic hepatitis, RIA, EIA

I. INTRODUCTION

Blood transfusion is the process of transferring blood or blood products from one person to another. Blood transfusion can lead to the transfer of many infectious agents which can lead to Transfusion Transmitted Diseases. HBsAg is one of such infectious diseases, which leads to Hepatitis B Infection. Hepatitis B is a major health problem worldwide and is associated with life-threatening complications. Hepatitis B virus, abbreviated HBV, is a species of the genus *Orthohepadnavirus*, which is likewise a part of the *Hepadnaviridae* family of viruses. This virus is characterized by the causing the disease Hepatitis B, however it can also lead to cirrhosis and hepatocellular carcinoma. The hepatitis B virus (HBV) is a very common virus with an estimated 300 million carriers worldwide. It is very important for a blood transfusion service to ensure a safe blood supply to the patients. All the efforts should be undertaken to make blood transfusion as safe as possible.

The ongoing and systematic collection, analysis, and interpretation of data about a disease or health condition, and disseminating conclusions of the analyses to relevant organizations is referred as surveillance. Collecting blood samples for the purpose of surveillance is called serosurveillance. Epidemiological surveillance is the discipline of continuously gathering, analyzing, and interpreting data about diseases. It is a key element in epidemiology.

It is very important for a blood transfusion service to ensure a safe blood supply to the patients. All the efforts should be undertaken to make blood transfusion as safe as possible. Safe donors are the first line of defence for transfusion safety. Voluntary, non paid, regular blood donors are the cornerstone for a safe blood supply. Appropriate and rational use of blood, Donor selection, screening of blood units for markers of infections are the lines of defence to achieve transfusion safety. Donor recruiters can also help in encouraging the healthy family members to become regular blood donors.

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II. OBJECTIVES OF THE STUDY

- To reveal serosurveillance of HBV among different category of blood donors in relation to their Sex, Age, Education level and Geographical location.
- To find out the seroprevalence rate of HBsAg positive patients in voluntary blood donors.

III. REVIEW OF LITERATURE

S Chandrasekaran et al (2000)^[28] conducted a study for finding the relative prevalence of hepatitis B viral markers and hepatitis C virus antibodies (anti HCV) in Madurai, south India. In the study, a total of 3574 blood donors were screened for anti HCV marker. Of these, only 1819 were tested for HBsAg. HBsAg was found in 4 (75/1819) blood donors whereas anti HCV was detected in only 0.75% (27/3594) of blood donors.

B N Tandon et al (1996)^[8] conducted a study on "Epidemiology of hepatitis B virus infection in India". It was found that the average estimated carrier rate of hepatitis B virus (HBV) in India is 4%, with a total pool of approximately 36 million carriers. Professional blood donors constitute the major high risk group for HBV infection in India, with a hepatitis B surface antigen positivity rate of 14%.

Vaishali Chaudhuri et al (2003)^[31] reported that Transfusion associated-HBV (TAHBV) is estimated at approximately 1.5 percent in post surgical recipients and 50 percent or more in multiple-transfusion recipients in India.

The sensitivity of methods for the detection of HBsAg and its anti-HBs was compared in serial 1200 sera samples from 30 patients with VHB-HBsAg-positive by Novi Sad et al (1978)^[23]. HBsAg was tested by gel-diffusion (GD), counter-immunoelectrophoresis (CIE), reversed haemagglutination (rHA), radioimmunoassay (RIA), and enzyme immunoassay (EIA).

Guroi Emekdas et al (2006)^[14] performed a study for finding the trends in hepatitis B and hepatitis C among blood donors. The serologic test results of whole blood (n = 6,240,130) donors at 22 Red Crescent Centers between 1989 and 2004 were evaluated retrospectively. The overall prevalence was 4.19% for HBsAg and 0.38% for HCV antibody during the study period.

In a serological survey of Hepatitis B Virus (HBV) markers in patients done by Osamu Nakagom et al (1984)^[25], a total of 13,596 patients and 1,876 blood donors in a university hospital examined. It was found that 550 (4.1%) patients and 31 (1.7%) donors possessed hepatitis B surface antigen (HBsAg) in their blood.

In order to assess the potential risk of anti-HBc-positive blood donors for post-transfusional hepatitis and to investigate whether other HBV serological markers are capable of identifying the presence of the virus, LC. Arraes et al (2003) conducted a survey analysis. For that, 1000 first-time blood donors were enrolled between June and July 1997. The 120 (12%) found to be anti-HBc-positive underwent further tests: HBe, anti-HBe, anti-HBs and HBV-DNA by PCR.

Seroprevalence of HBsAg, anti-HCV and anti-HIV was studied by Bhattacharya P (2007)^[6], among 113051 and 106695 voluntary blood donors screened in 2004 and 2005, respectively. A statistically significant increase in the prevalence of HBV (1448 vs. 1768, $P < 0.001$), HCV (314 vs. 372, $P = 0.003$) infections was noted among blood donors of Kolkata West Bengal in 2005 as compared to 2004.

With the use of PCR, Fernando Lopes Gonçales Jr et al (2003)^[10] searched for hepatitis B virus (HBV) DNA in serum samples from 415 HBsAg-negative, anti-HBc-positive patients from the city of Campinas in South eastern Brazil. All the patients were negative for HBsAg and positive for anti-HBc and were tested for anti-HBs, anti-HCV, and anti-HIV. It was found that 150 blood donors negative for anti-HCV and anti-HIV.

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IV. METHODOLOGY

A total of 8299 blood samples were screened from donors using Enzyme- linked immunosorbent assay kit and Antigen coated cards. 'Microscreen' HBsAg Elisa Kit was used for the screening tests. Data on Age, Sex, Education level, Geographical locations of each positive patient were also collected and entered in registers. These registers were also used as sampling frame for the present study.

The procedure followed for the screening process is given below.

- **SAMPLE COLLECTION**

The blood samples are collected from voluntary blood donors. A small part of the blood sample is separated into pilot tubes for the screening of HBsAg.

- **PROCESSING OF BLOOD**

The samples collected in the pilot tubes are subjected to centrifugation to separate serum and blood cells. The tubes are spinned at 3000 rpm for 3 minutes for separation. The separated serum is collected for further screening analysis.

V. EXPERIMENTAL RESULTS

Out of 8299 blood samples screened, 58 blood samples showed HBsAg positivity and the overall seroprevalence of HBsAg is observed to be 0.69%. 56 are male patients and remaining two is females. The seroprevalence rate in males and females is found to be 0.72% and 0.381% respectively. 58 donors had repeatedly reactive serologic test for HBsAg.

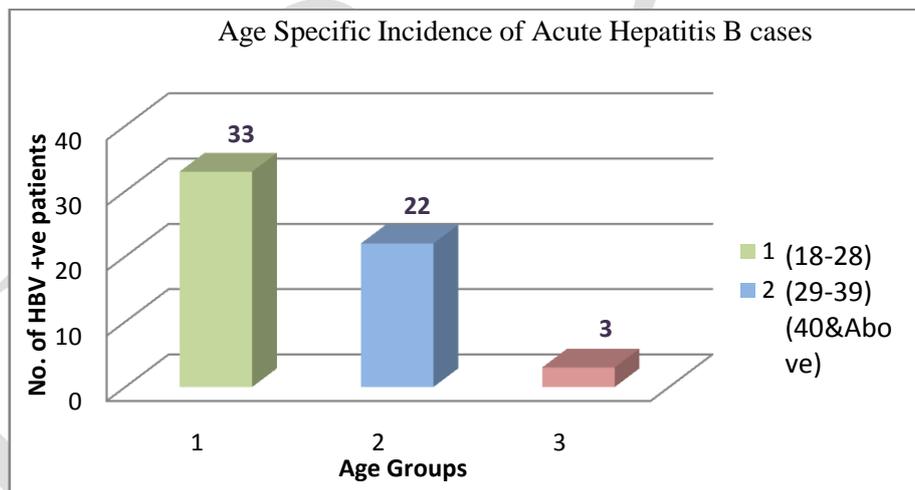


Fig 1. Graph shows the age specific incidence of acute hepatitis B cases.

[A graph is plotted between no.of HBV +ve patients and their age groups. It was found that among the total 58 positive patients,33 patients belong to code1(Age18-28).22 patients belong to code2(Age29-39).And 3 patients belong to code3(Age 40 and above)]

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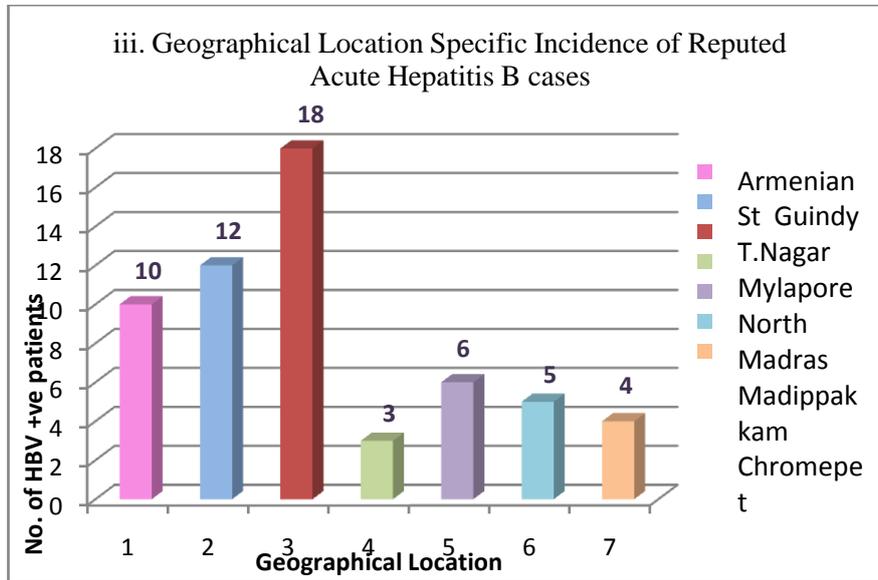


Fig.2: Geographical location of specific incidence of reputed acute hepatitis B cases

[Graph is plotted between no.of HBV +ve patients and their corresponding geographical location . It was found that among the total 58 positive patients,10 patients belong to code1(Armenian St).12 patients belong to code2(Guindy).18 patients belong to code3(T.Nagar).3 patients belong to code4(Mylapore).6 patients belong to code5(North Madras).In code 6(Madippakkam), 5 positive patients are there.And the remaining 4 positive patients belong to code 7(Chromepet)]

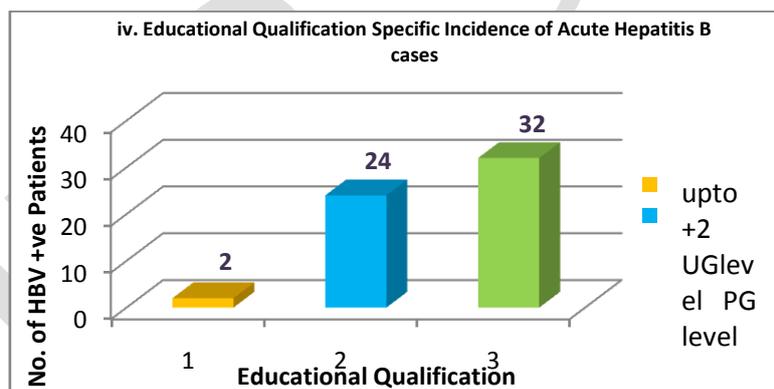


Fig. 3: Educational Qualification specific incidence of acute hepatitis B cases.

[Graph is plotted between no.of HBV +ve patients and their corresponding Educational Qualification. It was found that among the total 58 positive patients,only 2 patients belong to code1(Up to +2). 24 patients belong to code2(UG level).32 patients belong to code3(PG level).]

VI. DISCUSSION AND CONCLUSION

Hepatitis B is a major health problem worldwide and is associated with life-threatening complications. In the present study among 8299 blood donors screened, the overall seroprevalence of HBsAg is observed to be 0.69%. 56 are male patients and remaining two is females. The seroprevalence rate in males and females is found to be 0.72% and 0.381% respectively. 58 donors had repeatedly reactive serologic test for HBsAg. It was found that 12.02% (7/58) patients were hospital staffs. And it was found that 33.03% are corresponding to code 3 (T.Nagar) geographical regions.

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The lowest positivity 5.1% of donors was found to be corresponding to code 4 (Mylapore) geographical regions. All the HBsAg positive patients are advised go for further tests. Proper disposal of infected materials, use of disposable syringes, screening of blood and blood products, sterilization of surgical and dental instruments should be carried out. Infection control measures in health-care settings including safe injection practices and proper sterilization techniques of medical instruments and education of barbers about the significance of sterilization of their instruments may reduce the burden of HBV infections.

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