

A Study To Assess Trend In Seroprevalence Of Hepatitis B Virus Infection Among Blood Donors Of Southern Haryana, India

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Citation

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Abstract

Background: Hepatitis B is one of the transfusion transmissible infections. The prevalence of this infection varies across the different geographical regions. Noting the trend in seroprevalence of hepatitis B is useful to assist the preventive strategies. The aim of this study was to determine the trend of seroprevalence of hepatitis B in southern Haryana over a five -year period. **Methodology:** The study was conducted at the blood bank of a tertiary care hospital serving predominantly the rural population of Southern Haryana. A retrospective analysis of blood donors over a period of five years was done to assess the seroprevalence and the trend of hepatitis B infection. ELISA was used to detect the hepatitis B surface antigen in the donors as a marker of infection. **Results:** A total of 11,340 blood donors were studied. 150 (1.32%) were positive, which comes under the "low prevalence (<2%) zone," per World Health Organization (WHO) guidelines. The increasing trend in seroprevalence of hepatitis B was observed after 2009. Replacement donors and male blood donors showed higher seropositivity compared to voluntary donors and female donors. A Chi-square test was used to calculate the significance of difference between the groups. **Conclusion:** Southern Haryana has a low prevalence of hepatitis B in blood donors with an increasing trend in seroprevalence of hepatitis B over the last two years (i.e. 2009-11). This is an alarming situation, which needs effective preventive measures as well as improved health care delivery system.

INTRODUCTION

Hepatitis B is a major public health problem worldwide. Assessment of the quality of donor selection and safety of the blood supply can be estimated by monitoring the prevalence of the serologic markers of infectious disease in screening tests. Approximately 30% of the world's population or about 2 billion persons have serological evidence of either current or past infection with hepatitis B virus¹. Countries are classified based on endemicity of hepatitis B virus (HBV) infection into high (8% or more), intermediate (2-7%) or low (less than 2%) incidence countries. The prevalence of chronic HBV infection in India ranges from 2% to 10%, as shown by different studies¹. India therefore comes under the intermediate to high endemicity category. Hepatitis B infection is one of the transfusion transmissible infections; hence, it is mandatory to test all blood donors for HBsAg. Sero-surveys are one of the primary methods to determine the prevalence of HBsAg. Evaluation of data on the prevalence of HBV, among blood

donors permits an assessment of the occurrence of infection in the blood donor population and consequently, the assessment helps in determining the safety of the blood products. In the present retrospective study, we evaluated the seroprevalence of HBV among blood donors in rural population of southern Haryana. The study also aimed to determine the trend in hepatitis B infection and to compare the prevalence with that of other areas in India. The results of these prevalence studies should help in the creation of long-term strategies to improve public health and to prevent spreading of the disease in the local population.

MATERIAL AND METHODS

The study was conducted at the blood bank of a rural tertiary care hospital, Maharaja Agrasen Medical College, serving a predominantly rural population of southern Haryana. In this retrospective study, we reviewed 11340 healthy blood donors over a period of three years from January 2007 to December 2011. Trained personnel carefully selected the donors for donation after a complete physical examination

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and satisfactorily answering the donor's questionnaire. The family members, friends or relatives of the patients were categorized as replacement donors. People who donate blood without expecting any favor in return or in voluntary blood donation camps were classified as voluntary blood donors. At the end of the blood collection, donor samples were obtained for serological testing. HbsAg screening was done using the commercially available third generation ELISA kit (Transasia Bio-Medicals Ltd, Daman) with reported sensitivity of 100% and specificity of 99.9% per the manufacturer's manual.

RESULTS

Out of the total 11,340 blood donors, 10,925 (96.34%) were males and 415 (3.66%) were females with a male to female ratio of 26.32:1. A higher seroprevalence rate was observed among male donors than in female blood donors (1.35% versus 0.48% respectively); however, this difference was statistically insignificant ($p = 0.183$). The screening test (ELISA) revealed that 150 (1.32%) donors were HBsAg reactive. Five thousand and seventy-nine (44.78%) donors were replacement donors, the rest of them were voluntary donors. The observed seroprevalence of HBV was higher in replacement donors than in voluntary donors (1.69% vs. 1.02%, respectively, Table 2) and the difference is statistically significant (p value: 0.002). The trend in seroprevalence over five years is shown in figure 1. The increasing trend in seroprevalence of hepatitis B was observed after 2009 over the period of last two-year period (figure 1).

Figure 1

Table No. 1: Sex wise distribution and seropositivity of blood donors

| Years | Donors | | Total donors | Positive | | |
|-------|--------|--------|--------------|----------|---|-------|
| | Male | female | | M | F | total |
| 2007 | 2324 | 36 | 2360 | 22 | 1 | 23 |
| 2008 | 2149 | 57 | 2206 | 23 | - | 23 |
| 2009 | 1902 | 77 | 1979 | 17 | - | 17 |
| 2010 | 2204 | 66 | 2270 | 38 | - | 38 |
| 2011 | 2346 | 179 | 2525 | 48 | 1 | 49 |

Figure 2

Table No. 2: Comparison between different blood donor categories

| Donors | Positive | Prevalence | p-value |
|-------------|----------|------------|---------|
| Male | 48 | 1.35% | 0.183 |
| Female | 2 | 0.48% | |
| Replacement | 86 | 1.69% | 0.002 |
| Voluntary | 64 | 1.02% | |

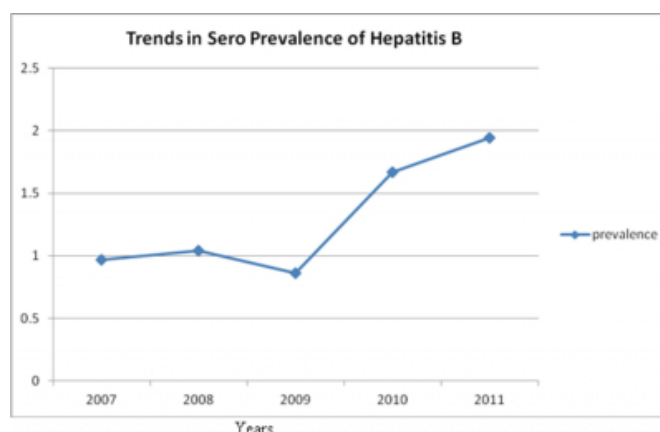
Figure 3

Table 3. Comparison of HBsAg prevalence rate in different parts of India

| PLACE | PREVALENCE | REFERENCES |
|------------------|---------------------|---------------|
| New Delhi | <2.5%, 2.23%, 2.76% | 9,10,11 |
| Kanpur | 2.25% | 3 |
| Dehradun | 0.99% | 4 |
| Kolkatta | 1.66% | 2 |
| Rural India | | |
| Ambajogai | 2.78% | 12 |
| Voluntary | 4.84% | |
| Replacement | 2.15% | 1 |
| Maharashtra | 3.1% | 8 |
| Kerala | | |
| Tamilnadu | 1.37% | 13 |
| Voluntary | 2.96% | |
| Replacement | 7% | 5 |
| Madurai | 1.86% | 14 |
| Bangalore | 0.62% | |
| Costal Karnataka | 1.32% | Present study |

Figure 4

Figure 1: Trend in seroprevalence of HBsAg over a period of five years



DISCUSSION

According to India's Drugs and Cosmetics Act (1945), each blood unit has to be tested for hepatitis B virus infection [2]. In our study, among the 11,340 blood donors screened, the overall seroprevalence of HBsAg was observed to be 1.32%. According to the WHO classification, this southern part of Haryana qualifies as a low prevalence area (less than 2%). The data providing a picture of hepatitis B infection burden in India has come from HBsAg seroprevalence studies (Table 3). In comparison with the other parts of India, the present study shows low seroprevalence of hepatitis B infection in southern Haryana. Seroprevalence was significantly high in male donors as compared to female donors. It is to be noted that the majority of our study population were males. However, this difference was statistically insignificant ($p = 0.183$). A significantly higher HBsAg seroprevalence in males than in females is also reported in other studies^[5,7]. The present study also revealed

that seroprevalence of HBV was significantly ($p=0.002$) higher in replacement blood donors than voluntary donors as noted in the study of Sonwane et al. and Singhvi et al.^[12,13]. The prevalence of hepatitis B in this study comes out to be 1.29%. That is quite low, as WHO placed India under the intermediate to high-risk category. The main concern is increasing trend in seroprevalence was noticed over the last two years (i.e. 2009-11). This is an alarming situation, which needs effective preventive measures as well as improved health care delivery system. Rural population with lower literacy rate and lack of awareness about the disease and its mode of prevention may be the reasons for showing increasing trend.

CONCLUSION AND RECOMMENDATIONS

Certain steps should be taken to stop the increasing trend of Hepatitis B like monitoring disease incidence and determine the sources of infection and modes of transmission by epidemiological investigation. Certain control measures should be taken like immunization; the most effective and cost saving means of prevention, along with education, of high risk groups and health care personnel to reduce the risk of contracting the virus and to reduce the chances for transmission to other. Ensuring the safety of patients by reducing the residual risk of transfusion-transmitted hepatitis is the concern of every transfusion center. Pre-donation counselling, donor self-exclusion and ensuring 100% voluntary blood donation will be effective in decreasing the hepatitis B infection rate. This study provides a helpful guide in reducing the residual risk of transfusion-transmitted hepatitis not only in India, but also in the other developing countries of the world.

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