



ORIGINAL RESEARCH PAPER

Pathology

RETROSPECTIVE STUDY FOR CO-INFECTION OF HIV, HBV AND HCV IN THE BLOOD DONORS IN THE BLOOD BANK

KEY WORDS: HIV, HBV, HCV, SEROPREVALENCE

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ABSTRACT

AIM: To find out the seroprevalence of HBV, HCV and HIV in blood donors and assess the co-infection in different age group.

METHOD: Tests are routinely done on every blood unit to exclude transfusion transmitted infection. Donors were selected by the standard criteria for donor fitness. The screening for HIV, HBsAg and HCV was done by ELISA using kits.

RESULT: Seroprevalence of HBV, HIV and HCV are 1.97 %, 0.185 % and 0.032 % respectively. Age group 26- 35 year are show higher Seroprevalence (1.023 %) for all types of transfusion transmitted disease.

CONCLUSION: This high prevalence of transfusion transmitted disease in youth suggests a potential public health problem. Introducing nucleic acid testing (NAT) for HIV, HBsAg and HCV is recommended to detect the infection during window period. Screening and better selection of donors are necessary to improve blood safety in the regional blood transfusion centers.

INTRODUCTION

Transmission of infectious diseases through donated blood is of concern in order to provide safe blood for transfusion which forms an integral part of medical and surgical therapy. Blood transfusion carries the risk of transfusion induced transmissible infections including HIV, hepatitis, syphilis, malaria and less frequently toxoplasmosis, brucellosis and some viral infections like Epstein-Barr virus, cytomegalovirus and herpes (1). People at high risk for Human Immunodeficiency Virus infection are also likely to be at increased risk for other pathogens like the Hepatitis B Virus and the Hepatitis C Virus, which share the route of transmission with HIV. There is a high degree of epidemiological similarity between these viruses in terms of routes of transmission, associated risk factors and the presence of these viruses in various body fluids (2). The aim of the present study was to know the seroprevalence of transfusion-transmitted diseases in donors in this area as the incidence of transfusion-transmitted HIV and hepatitis is increasing in India (3).

MATERIAL AND METHOD

The present study is being undertaken in the Department of Pathology MGM Medical College Indore. This is a retrospective study that will be conducted, during the period 2008–2010. Tests are routinely done on every blood unit to exclude HIV, HBV and HCV. Donors were selected by the standard criteria for donor fitness. The screening for HIV, HBV and HCV was done by ELISA using kits.

ABO and Rhesus (Rh) blood groups were determined using blood grouping antisera: anti-A, anti-B, anti-AB, and anti-D. Selection of cases for the study included the donors of MYH Blood Bank.

RESULTS

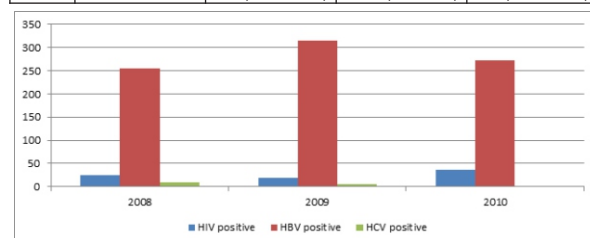
In the present study, 42582 blood donors are observed in the year 2008-10 in the M. Y. Blood Bank. The data collected from donor register record book, donors form, master record book, HIV positive beg numbers records.

Results and observations are summarized as follows

1. Seroprevalence of HBV, HIV and HCV are 1.97 %, 0.185 % and 0.032 % respectively.
2. Seroprevalence of HBV is higher than HIV and HCV.
3. Seroprevalence is higher in the age group 26-35 year for HBV- 0.904 %, HIV-0.105 % and HCV-0.014 %
4. Age group 26- 35 year are show higher Seroprevalence (1.023 %) for all types of transfusion transmitted disease.
5. Over all Seroprevalence of transfusion transmitted disease in all donations in the year 2008-10 is 2.19 %
6. Seroprevalence of co-infection is 0.04 % and it is higher for HBV with HIV infection.

Table 1: Result of Seropositive donor blood samples for HBV, HCV and HIV

| Year | Total units | HIV positive | HBV positive | HCV positive |
|-------|-------------|--------------|--------------|--------------|
| 2008 | 13052 | 24 (0.184%) | 255 (1.95%) | 09 (0.07%) |
| 2009 | 14226 | 19 (0.113%) | 315 (2.21%) | 05 (0.035%) |
| 2010 | 15304 | 36 (0.235%) | 273 (1.78%) | 00 (00%) |
| Total | 42582 | 79 (0.185%) | 843 (1.97%) | 14 (0.032%) |

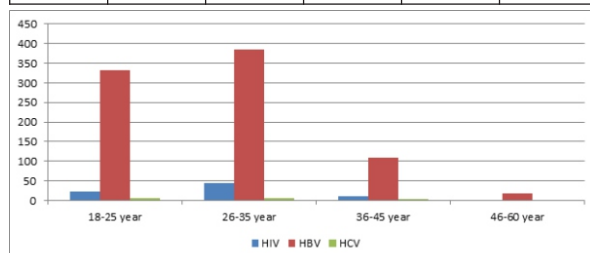


Graph 1 : Seropositive donors for HIV, HBV and HCV in 2008-10

Seroprevalence of HBV, HIV and HCV are 1.97 %, 0.185 % and 0.032 % respectively.

Table 2: Overall age distribution of seroprevalence of HBV, HCV and HIV in 2008-10

| Infections | Age group (in years) | | | | Total |
|------------|----------------------|-----------------|-----------------|----------------|----------------|
| | 18-25 | 26-35 | 36-45 | 46-60 | |
| HIV | 22 (0.051%) | 45 (0.105%) | 10 (0.023%) | 02 (0.004%) | 79 (0.185%) |
| HBV | 332 (0.779%) | 385 (0.904%) | 109 (0.255%) | 17 (0.040%) | 843 (1.97%) |
| HCV | 05 (0.011%) | 06 (0.014%) | 03 (0.007%) | 00 (00%) | 14 (0.032%) |
| Total | 359 (0.843%) | 436 (1.023%) | 122 (0.286%) | 19 (0.044%) | 936 (2.19%) |

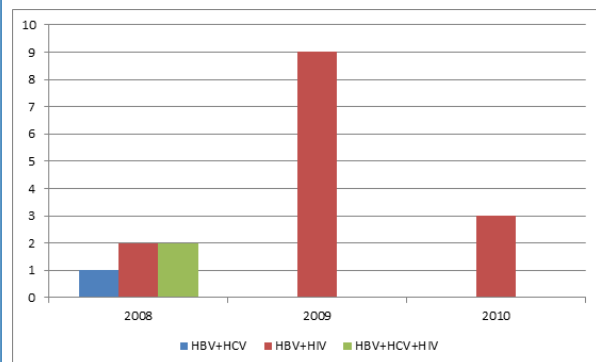


Graph 2: Overall age distribution of seroprevalence of HBV, HIV and HCV in 2008-2010.

Age group 26- 35 year are show higher Seroprevalence (1.023 %) for all types of transfusion transmitted disease.

Table 3: Seroprevalence of co infection with HBV, HCV and HIV.

| Year | HBV+HCV Seropositive | HBV+HIV Seropositive | HBV+HCV+HIV Seropositive | Total |
|-------|----------------------|----------------------|--------------------------|-------------|
| 2008 | 01 | 02 | 02 | 05 |
| 2009 | 00 | 09 | 00 | 09 |
| 2010 | 00 | 03 | 00 | 03 |
| Total | 01 | 14 | 02 | 17 (0.040%) |



Graph 3: Seroprevalence in co-infection of transfusion transmitted disease.

Seroprevalence of co-infection is 0.04 % and it is higher for HBV with HIV infection.

DISCUSSION

Seroprevalence of Co-infection

In our study, overall Seroprevalence of co-infection is 0.04 % and it is higher for HBV and HIV infection than multiple infections with HCV. Out of all blood donations, the seroprevalence of transfusion transmitted disease are 936 (2.19%), which are affected at least one pathogen and seroprevalence 17 (0.04%) with multiple infections. Seroprevalence is lower in co-infection than single infection. Similarly, out of all blood donors in 2009, 1348 (29.82%) were infected with at least one pathogen and 149 (3.30%) had serological evidence of multiple infections by Marius Bolni Nagalo and Mahamoudou Sanou et al conducted in Koudougou(4). Of all donated blood during the study period, 607 (9.5%) had serological evidence of infection with at least one pathogen and 50 (0.8%) had multiple infections and among those with multiple infections, the most common combinations were HIV - HBV 17 (34%) by Belay Tessema and Gizachew Yismaw et al conducted in University of Gondar, Ethiopia(5). Similarly in another study, the rate of co infection with HIV and HBsAg was 0.06% (12 cases), HIV with HBsAg and HCV was 0.03% (6 cases) by Nagarekha Kulkarni in Karnataka(1). The 1.39% prevalence of HBV-HCV co-infection found among the blood donors and the HIV-HBV co-infection rate of 0.38% prevalence observed among blood donors by Marius Bolni Nagalo and Mahamoudou Sanou et al conducted in Koudougou(4). The 0.031prevalence of HBV-HCV co-infection and 0.27% prevalence observed among blood donors with HIV-HBV co-infection rate reported by Tessema et al in Northwest Ethiopia(5). The prevalence of HBV as assessed on the basis of the presence of HBsAg in patients infected with HIV was 9.9% (117/1178), the prevalence of HCV with HIV was 6.3% (74/1178) and the prevalence of HIV with both HBV and HCV was ~ 1% (12/1178) by Manisha Jain and Anita Chakravarti et al conducted in New Delhi(2).

Age wise distribution

In our study, Seroprevalence is higher in the age group 26-35 year for HBV-0.904 %, HIV-0.105 % and HCV-0.014 %. Age group 26- 35 year are show higher Seroprevalence (1.023 %) for all types of transfusion transmitted disease. In another study, the highest seroprevalence of anti-HCV was found in males above the age of

61 years. The highest seroprevalence for anti-HIV was found in the age group 31-40 years by [Smita Sood](#) and [Shirish Malvankar](#) et al conducted in Rajasthan(6). In another study, 3 positive cases belonged to 21-40 years age group by S Mishra and N Chayani et al conducted in Orissa(7). The seroprevalence of HBV was significantly higher donors in the group aged 20-29 years old than in the group 30-40 years old by Marius Bolni Nagalo and Mahamoudou Sanou et al conducted in Koudougou(4). The seroprevalence of HCV was higher among the youngest age group (less than 20 years old; $P<0.001$) and in subjects >40 years ($P=0.005$) compared to the prevalence in subjects in the age group 30-40 years old by Marius Bolni Nagalo and Mahamoudou Sanou et al conducted in Koudougou(4). The seroprevalence of HIV was significantly lower among blood donors aged between 30 and 40 years old (1.18%) compared to that in subjects over 40 years old (3.70%) by Marius Bolni Nagalo and Mahamoudou Sanou et al conducted in Koudougou(4). Similarly, the seropositivity of HBV was significantly increased among donors with the age groups of 26 - 35 and 36 - 45 years compared to the age group greater than 45 years by Belay Tessema and Gizachew Yismaw et al conducted in University of Gondar, Ethiopia(5). The seroprevalence of HIV, HBsAg, HCV and syphilis was 0.25%, 1.42%, 1.10%, 0.62% respectively in total donors by Rajvir Singh and Prakriti Vohra et al conducted in Sonapat, North India (8). Seropositivity of transfusion transmitted disease in replacement donors was 1.96% in hepatitis B surface antigen, 0.85% in hepatitis C virus, 0.23% in HIV. Voluntary donors had an almost negligible infectivity rate by Tulika Chandra and Ashutosh Kumar et al (9). Introduction of nucleic acid amplification testing (NAT) for HCV, HIV, anti-hepatitis B core antigen (HBcAg) and IgM for hepatitis B infection is recommended to detect the infections during window period (10).

CONCLUSION

The present study is conducted in the Department of Pathology MGM Medical College Indore and M. Y. Hospital blood bank. This is a retrospective study that was conducted, during the period 2008 –2010. In the present study, 42582 blood donors are observed in the year 2008-10 in the M. Y. Blood Bank. All work is carried out under the professional guidance of Department of Pathology, M.Y. Hospital. In our study, 3 year period from 2008 to2010 total 42582 units of blood was collected. Majority of donors are voluntary donors (73.85%) and male donors (97.66%). Seroprevalence of HBV, HIV and HCV are 1.97 %, 0.185 % and 0.032 % respectively. Age group 26- 35 year are show higher Seroprevalence (1.023 %) for all types of transfusion transmitted disease. Seroprevalence of co-infection is 0.04 % and it is higher for HBV with HIV infection.

This high prevalence of transfusion transmitted disease in youth suggests a potential public health problem. HBV and HIV are the most prevalent transfusion-transmissible diseases among blood donors in Indore. Screening and better selection of donors are necessary to improve blood safety in the regional blood transfusion centre of M. Y. Hospital.

Therefore, it is concluded that voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases. The time and cost involved in screening donated blood can be reduced by an effective donor education and selection program that promotes self-exclusion by donors at risk of transfusion-transmissible infections. Introducing nucleic acid testing (NAT) for HIV, HBsAg and HCV is recommended to detect the infection during window period.

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