

Original Research Article

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Seroprevalence of Hepatitis B and C Virus in Blood Donors at a Tertiary Care Hospital, Dhanbad, Jharkhand, India

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ABSTRACT

Blood transfusion serves a significant role in the supportive care of healthcare system. Infectious diseases remain a major topic of interest for those involved in blood safety. The purpose of this study was to estimate the prevalence of HBV and HCV among the blood collected from the donors at a hospital based blood bank in Dhanbad, Jharkhand. A total of 7721 blood samples from donors were collected. Blood samples (3ml each) were collected aseptically in to sterile dry tube. It was allowed to stand at room temperature for clotting and retraction and then centrifuge to extract serum. Detection of Hepatitis B and C virus was done using commercially available SENSEA Hep-B HBsAg kit and Flaviscreen HCV kit for screening and confirmation by respective ELISA kit. The overall prevalence of HBV and HCV was 0.28% and 0.06% respectively. The HBV Seroprevalence in male donor was 0.22% and in female donors was 0.06%. HCV seroprevalence in male and female donors was found as 0.05% and 0.01% respectively. The occurrence of hepatitis B and C among the blood donors should be monitored carefully to further reduce the rates to ensure safer and more reliable blood for transfusion.

Keywords

HBV, HCV, Ag, Ab,
Blood transfusion

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Introduction

Donation of blood involved collection, testing, preparation, and storing of blood and blood components. Blood donors are divided into groups. A voluntary blood donor is a person who donates blood voluntarily and does not receive payment, and who donates only for an internal sense of altruism, or community responsibility. A replacement donor, either a friend or family member of the recipient, is someone who donates blood to replace the blood that is used for a transfusion, to ensure a consistent supply. Transfusion plays an

important role in the supportive care of medical and surgical patients. Transfusion-transmitted infectious diseases remain a major topic of interest for those involved in blood safety. Globally, the most notable transfusion-related risks are human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) due to their high prevalence rates (Marcucci *et al.*, 2004).

The risk of transmitting hepatitis through transfusions of blood and blood products has been known since 1950 (Cerny and Chisari, 1999; Mahoney, 1999).

Hepatitis B and C are transmitted parentally mainly as a result of blood to blood contact including injury with contaminated instruments and sharing of needles or by sexual contact and also through prenatal transmission from mother to child (Robbin, 2005; Mahoney, 1999). HBV and HCV are the two established causes of post transfusion hepatitis. Prevalence of transfusion-transmitted diseases is much lower in healthy voluntary blood donors as compared to professional blood donors (Kamal, 2000).

Both infections can lead to an acute or silent course of liver disease progressing from liver impairment to liver failure, cirrhosis of the liver and to hepatocellular carcinoma. Hepatitis B virus (HBV) infection is one of the most common infectious diseases in the world with significant acute and chronic morbidity and thus has become a global public health problem. The presence of HBsAg in serum indicates active HBV infection, either acute or chronic. Usually, HBsAg is the first serologic marker in acute HBV infection and is detected 2–4 weeks before the alanine aminotransferase (ALT) level becomes abnormal and 3–5 weeks before symptoms or jaundice (Mujeeb, 2000).

The World Health Organization (WHO) has estimated that more than 2 billion people in the world have been infected with HBV at some time in their lives and about 350 million people worldwide are HBV carriers with the majority in developing world mainly in Asia and Africa (Horvat *et al.*, 2003). The worldwide carrier rate of HBV is more than 350 million; these carriers provide a huge reservoir for HBV (World Health Organization, 2015).

Hepatitis C virus (HCV) continues to be a major disease burden in the world. In 1997, WHO estimated a worldwide prevalence of about 3% with the virus affecting 170 million people worldwide and 3 to 4 million new

infections each year (Villano *et al.*, 1999). Among the viral hepatitis, HCV is dreadful in the aspect that its morbidity rate is high as it establishes a state of chronic infection in as many as 85% of acutely infected patients, whereas about 15% of acutely infected patients spontaneously clear the infection (Dienstag and Isselbacher, 2001; Alter *et al.*). Considering the grave consequences of these infections and to reduce the transmission, it is extremely important to monitor these viral transfusion transmissible infections. Thus we aimed to estimate the prevalence of HBV and HCV among the blood collected from the donors at a hospital based blood bank in Dhanbad, Jharkhand. This research would help to study and identify the trend of increase or decrease of HBV and HCV.

Materials and Methods

This was a retrospective and cross-sectional study conducted at Patliputra medical college and hospital, Dhanbad District of Jharkhand, India from January 2018 to August 2018. During this period 7,721 donations were done. Three millilitres of venous blood samples were taken from each blood donor into a clean dry tube. Blood samples were allowed to stand at room temperature for clotting and retraction. Thereafter, the samples were centrifuged to give a clear serum.

Detection of HBsAg was done using commercially available SENSEA Hep-B HBsAg kit (Orchid Biomedical system) for the detection of HBsAg in serum. Blood units which were shown to be HBsAg positive or at border line were retested using HBsAg confirmation kit (DIA.PRO Diagnostic, Milano, Italy), a set of reagents for the confirmation of HBsAg positivity in human sera.

Detection HCV-Ab was done using the commercially available Flaviscreen HCV kit

(Qualpro diagnostic Goa, India), an enzyme immunoassay for the detection of antibodies to hepatitis C virus in human serum. Positive and borderline HCV-Ab units were confirmed using the commercially available HCV confirmation kit (DIA.PRO), an enzyme immunoassay for the confirmation of HCV Ab positivity in human sera. Data was analyzed using a Statistical Package for Social Sciences (SPSS version 16). Ethical clearance for this study was obtained from the Institutional Ethical Committee of Patliputra Medical College and Hospital.

Results and Discussion

A total of 7,721 donors were screened and among these 97.48% (7527) were males and 2.51% (194) were females. Among them, 22 donors were found seropositive for HBV giving the seroprevalence of 0.28%. The HBV Seroprevalence in male donor was 0.22% (17) and in female donors was 0.06% (5). 5 donors were found seropositive for HCV giving a seroprevalence of 0.06%. HCV seroprevalence in male and female donors was 0.05% and 0.01% respectively. The overall prevalence of

HBV and HCV was 0.28% and 0.06% respectively (Table 1).

The present study shows that the prevalence of HBV infection among native of Jharkhand in the Dhanbad district is 0.28%. The HBsAg seropositivity results observed in this study are considerably lower than those reported by Ayoola *et al.*, who observed a prevalence of 5.4% from Jazan Region in Saudi (Villano *et al.*, 1999). This study presumed that the most important factor that is responsible for the decline in HBV infection was the introduction of the HBV vaccination under national immunisation schedule by government of India in recent time. This decline in HBV infection could also be due to the greater awareness of HBV among blood donors. The distribution of HBV worldwide shows variations depending on geographical location. In China, 1.4% of blood donors were reported to be positive for HBV (Ayoola *et al.*, 2003). In Europe, the prevalence of HBV in blood donors ranged from 0% to 5.2%, and in the United States the prevalence ranged from 0.4% to 1.0% among blood donors (Yong-lin Yang *et al.*, 2012; Van Der Poel *et al.*, 2005).

Table.1 HBV and HCV Prevalence in Dhanbad Jharkhand, India (Jan 2018- August 2018)

Sex	N (%)	HBV Positive N (%)	HCV Positive (%)
Male	7527 (97.48)	17(0.22)	4 (0.05)
Female	194 (2.51)	5 (0.06)	1(0.01)
Total	7721	22	5

In this study, the HCV seropositivity rate among the tested blood units was 0.06%. Considering the worldwide prevalence of HCV seropositivity in blood donors from the Americas was 0.07% (Van Der Poel *et al.*, 2005), and in Europe it ranged from 0.02% to 3.03% (Yong-lin Yang *et al.*, 2012).

HBV and/or HCV infection(s) among blood donors in the study area is/are reducing. The

occurrence of these infections among the blood donors should still be monitored carefully to further reduce the rates to ensure safer and more reliable blood for transfusion.

Measures such as more sensitive techniques, education, sensitization and vaccination must be carried out to ensure that people are well enlightened and protected from these infections.

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