



HBV prevalence in the volunteer blood donors in Peshawar, Khyber Pakhtunkhwa Pakistan

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Abstract

Hepatitis B is a fatal liver disease caused by the hepatitis B virus. In Pakistan, there are estimated 7-9 million carriers of hepatitis B virus (HBV) with a carrier rate of 3-5%. An estimated two billion people have been infected with hepatitis B virus (HBV) which is the 10th leading cause of death in the world. The World Health Organization (WHO) estimates that there are 350 million people with chronic HBV infection. This study was designed to determine anti-HBV prevalence based on ELISA (Enzyme Linked Immune Sorbent Assay), among blood donors in Khyber Teaching Hospital (KTH), a tertiary care hospital in Peshawar Khyber-Pakhtunkhwa province of Pakistan. A total of 8634 blood samples were collected during June 2017 to November 2017 in the blood bank of KTH, Peshawar. All samples were tested for anti-HBV antibodies using ELISA Technique. Analysis of all 8634 blood donors indicated that 127 individuals (1.47%) had anti-HBV antibodies in their sera. According to our study the prevalence of HBV infection is even lower (1.47%) than the common HBV prevalence recorded in the case of all previous studies in our subject areas. The decreasing movement of HBV infection indicates the development in health care facilities and awareness among the common population over the past few years.

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Introduction

Hepatitis cause liver inflammation, and can lead to liver failure, liver cirrhosis and may finally lead to last phase of liver illness (Basit *et al.*, 2014). The World Health Organization (WHO) estimates that there are 350 million people with chronic HBV infection (Previsani *et al.*, 2002). Viral hepatitis is the most prevalent liver disease worldwide. Among the human diseases that impose major health concerns, hepatitis B infection is a serious threat for human health. An estimated two billion people have been infected with hepatitis B virus (HBV) which is the 10th leading cause of death in the world.

The annual death rate for chronic HBV infection is 500000-700000 deaths, 75% of which are among Asians (Lee, 1997). The consequences of HBV infection depend on the age of its acquisition. There is an over 90% risk of a new born to get infected and become a long-term carrier of HBV. This risk drops from about 90% in the first six months of life, to about 25% by the age of five years, and to 10% by the age of 15 years. It is unusual (2%- 5%) for adults who are infected later in life to become chronic carriers (WHO 2000). HBV infection may lead to a variety of clinical pictures, ranging from asymptomatic carrier state to acute hepatitis, fulminant hepatitis, chronic hepatitis, liver cirrhosis (LC) and hepatocellular carcinoma (HCC). Progression of chronic hepatitis B (CHB) disease to severe liver diseases, such as LC and HCC, is determined by the genetic characteristics of the host, as well as by viral and environmental factors (Biswas *et al.*, 2013).

Hepatitis B virus is belonging to hepadnaviral family, having small circular DNA virus containing a nucleocapsid and an envelope. HBV nucleocapsid contains a relatively small and incompletely double stranded 3.2 Kb DNA genome, viral polymerase and core protein (Mason *et al.*, 1991). HBV have been identified in to ten genotypes, from A to J, based on a genetic diversity of at least 8% in the viral genome (Lin *et al.*, 2015). Genotype A predominates in Northern Europe and North America, genotypes B and C in central Asia, genotype D in Mediterranean

countries, genotype E in sub-Saharan Africa and in Madagascar, genotype F in South and Central America, genotypes G and H in Mexico and some countries in Central America and genotypes I and J in Eastern Asia (Kao *et al.*, 2007, Roman *et al.*, 2013). HBV is transmitted by percutaneous and mucous membrane exposures to infectious body fluids, such as serum, semen, and saliva. Among adults, high-risk sexual activity is one of the most frequent routes of transmission for HBV (Alter MJ 2003).

The prevalence of chronic HBV infection is >8% among people in sub-Saharan Africa, Asia, and the Amazon Basin; 2%–8% in the Middle East, Eastern Europe, and the Indian subcontinent; and <2% in Western Europe, Australia, and most of the Americas (Franco *et al.*, 2012). Pakistan is an extremely endemic area for HBV with an estimated 9 million people infected with HBV (Ali *et al.*, 2008). Prevalence of Hepatitis B was 2.55% in Sindh, 2.4% in Punjab, 1.31% in Khyber Pakhtunkhwa and 4.3% in Baluchistan (Siddique *et al.*, 2010).

The Purpose of the study was to find out anti-HBV prevalence in the blood donors, coming to the blood bank of KTH. While earlier studies survive that have revealed HBV prevalence in different time frame (Ali *et al.*, 2013), but as prevalence differs in respect to time, that's why to report the current HBV prevalence in Peshawar Area of KPK, we have conducted this study.

Materials and methods

The Objective of this study was to investigate the prevalence of the HBsAg antibody among the blood donors of KPK from June to November 2017. ELISA technique was used to screen the prevalence of HbsAg antibody in the blood samples.

Blood donors selection

Blood samples were taken from the controlled blood donors and screened in the blood bank of Khyber Teaching Hospital Peshawar (KTH) Peshawar.

Assay method

The blood samples were tested for HbsAg by sandwich ELISA using the (Monolisa HBs Ag ULTRA) kit.

Assay procedure

Following steps were followed for testing the samples for the detection of Anti HbsAg.

1. After careful establishment of sample distribution and identification plan, we prepared 1:20 dilution of the washing solution and reconstituted the conjugate solution.
2. Unpacked the microplate and distributed 100 µl of negative control to wells A1, B1 and C1
3. 100 µl of positive control to well D1
4. 100 µl of patient sample to wells E1, F1 onwards.
5. Dispensed 50 µl of well mixed conjugate solution and homogenized the reaction mixture.
6. Covered the microplate with adhesive film and incubated for 1 hour and 30 minutes at 37°C in a dark chamber.
7. Removed the adhesive film, decant the wells and washed 5 times with the washing solution.
8. After that quickly dispensed 100 µl of freshly prepared development solution (substrate) into each well and kept in a dark for 30 minutes at room temperature
9. After development 100 µl of stop solution was added to each well and waited for 4 minutes
10. Read the optical density of the wells at 450 nm using a plate reader.

Results*HBV Prevalence among the blood donors in KPK Peshawar*

Out of total of 8634 volunteer blood donors screened for HBsAg antibody by ELISA, 1.47% were positive for HBsAg antibodies as shown in figure 1.

Discussion

Hepatitis B virus (HBV) infection is a main worldwide health problem especially in Asia, Africa, southern Europe and Latin America, About 2 billion people are infected with HBV worldwide and 400 million among them are suffering from chronic HBV infection,

Pakistan is highly endemic with HBV with nine million people infected with HBV and its infection rate is on a steady rise due to the lack of accurate health facilities, poor economic status and less public awareness about the spread of major infectious diseases including HBV, HCV and HIV.

Most patients with acute hepatitis B do not have demonstrable signs or symptoms at the start of infection (M.ali *et al.*, 2012). Hepatitis B virus infection is responsible for 1-2 million deaths worldwide every year and around 300 million are carrier for HBV out of which around 80 % reside in Asia (J, ahmad *et al.*, 2003). According to one study the prevalence of HBV infection among the healthy blood donors of KPK is 1.83% (J. Iqbal *et al.*, 2006).

Studies conducted in different cities of Pakistan reported different results based on health care facilities and awareness of peoples. For example, the prevalence rate of HBV infection in Islamabad is 2.56% (N. Khokhar *et al.*, 2004), in Rawalpindi 2.45% (I. Ahmad *et al.*, 2007) in Multan 3.37% (M. arif *et al.*, 2007), and in Bahawalpur 1.1% (Yusuf *et al.*, 1998).

In the current study we have investigated 8634 volunteer blood donors for Anti HbsAg antibodies coming from different regions of Peshawar to the blood bank of KTH Peshawar.

The donors were screened for Anti HbsAg by 3rd generation ELISA which showed an overall prevalence rate of 1.47%. In KPK screening is usually performed by ICT method which has a higher false positive rate as compared to ELISA, and this may be a reason that some earlier studies reported HBV prevalence of 1.83%. We recommend that screening of blood and blood products should be done by ELISA to minimize the chances of false positives and protect the recipients from the risk of getting infected with HBV infection.

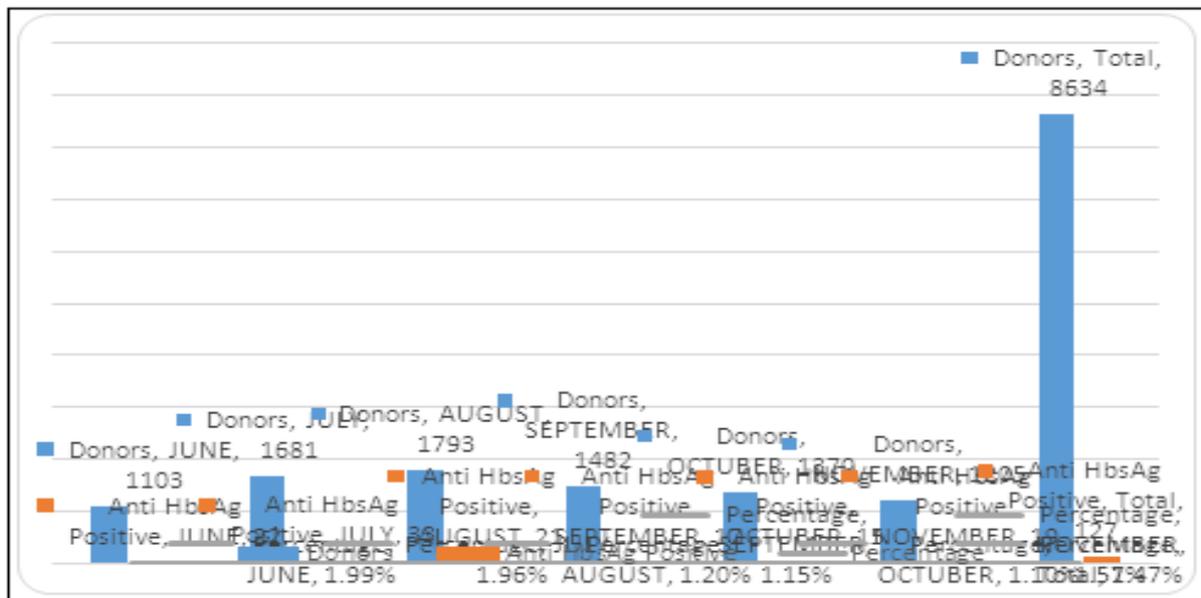


Fig. 1. Chart showing month wise and total prevalence of Anti HbsAg among donors.

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Conclusion

In conclusion our study indicated HBV prevalence of 1.47% in the volunteer donors of KPK, Peshawar. We recommend ELISA as a method of choice for screening of viral diseases because of its higher sensitivity and specificity.

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