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Prevalence of Hepatitis B virus, Hepatitis C virus and HIV in blood donors of different areas of Khyber Pukhtoonkhwa, Pakistan

Tariq Ahmed¹, Rahool², Noor Nasir Khattak³, Faizullah Khan⁴, Shahabuddin¹, Muhammad Saleem Khan^{*5}

¹Department of Microbiology, Quaid e Azam University Islamabad, Pakistan

²Department of Endocrinology, Ichan School of Medicine, Queens Hospital Center, New York, USA

³Department of Obsteristics and Gynecology, KIMS, KMU Peshawar, Pakistan

⁴Department of Pharmacy, Quaid e Azam University, Islamabad, Pakistan

⁵Department of Zoology, Wildlife and Fisheries, Government College University, Faisalabad, Pakistan

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Abstract

It is common to donate blood to save lives of critical patients the carefully transfusion of blood and screening of blood donors is essential to test the blood for the purpose to stop the spreading of the infectious agents trough blood components. Hepatitis is one of the major cause of all the deaths throughout the world as in present, record of past and feature the diseases has alarming signals. The retrospective study period of one year was conducted to show the prevalence of HBV and HCV along with HIV in the blood donors of KPK, Pakistan the information will be helpful for general population which had been remained aware less and unwarned. In current study 8439 blood donors' data were examined from well-known blood bank of KPK. The 98.9% donors were HBV negative and 1.1% positive. The 99.3% donors were HCV negative and 0.5% positiv e. Overall prevalence of the hepatitis virus (both B and C) was low in the blood donors. The prevalence of HIV is negligible with only one sample found positive. It is concluded that, HBV, HCV and HIV transmission and occurrence low comparative to other province due to awareness, preventive measures and vaccines availability in the KPK.

*Corresponding Author: Muhammad Saleem Khan ✉ samiikhan@yahoo.com

Introduction

In Pakistan Nearly 1.5 million transfusions took place every year (Sultan *et al.*, 2007). Main cause and source of blood borne diseases is the blood components in transfusion which is essential part in transmission of diseases. The screening of blood donors and collection of data from screening remain a good source of information and the prevalence of causative agents in general population (Sultan *et al.*, 2007).

The rate of infection of hepatitis B virus, hepatitis C virus and HIV in Pakistan is high as up to 12 million people are suspected to have these infections. (Brown and Ashman, 1996). Hepatitis (*hêpar*-liver and *it is*-inflammation) as an inflammation of liver irrespective of its cause liver is an important role in metabolism and detoxification in the human body and due to toxicity of the drugs, immune diseases and mostly by the viruses effect the liver in result hepatitis developed due to these risk factors (Bernal and Wendon, 2013). At presently, six different types of hepatitis virus have been identified and named as hepatitis A, B, C, D, E and G viruses (WHO, 2015). Certainly acute hepatitis may converted to chronic which in result of fibrosis, cirrhosis and hepatocellular carcinoma which can be fatal and life threatening (Bernal and Wendon, 2013).

Hepatitis B virus is also the causative agent of liver inflammation as like HAV and HCV. About 350 million people reported globally are being infected with HBV and one of the top 10 causes of death and 1 million deaths occur due to HBV infection per annum particularly in economically less-developed or developing countries (Wright, 2006 Khan *et al.*, 2013). Studies reported 7-9 million carriers of HBV infection with carrier rate of 3-5% in Pakistan (Ali *et al.*, 2011). Untreated condition may lead to complications such as acute and chronic hepatitis, hepatocellular carcinoma (HCC), hepatocirrhosis (Li *et al.*, 2015).

In Pakistan, there are various risk factors for HBV infection to occur. In children, the main risk factors include cutting of umbilical cord with unsterilized instruments at home, cuts by local barbers, injections, and surgical and dental procedures.

For health care workers main risk factors include dental and surgical procedures and needle prick (Ganem and Schneider, 2001). In pregnant women, the risk factors are HBV infected husband, ear and nose pricking, history of jaundice, tooth extraction, and history of injections and blood transfusion (Yousfani *et al.*, 2006; Batool *et al.*, 2008). More than 2 years history of dialysis is a risk factor for dialysis patients repeated blood transfusion is the risk factor for thalassemia children. The symptoms of hepatitis B usually appear after 1-4 months of infection. Most patients do not possess any symptoms in acute infection. The symptoms may include, the patient suffer from abdominal pain, have dark urine, goat (joint pain) and fever. It may also suffer from weakness, nausea, vomiting and loss of appetite. The color of skin and whites of eyes also turn yellow (WHO, 2015).

HCV mostly cause acute and chronic liver cirrhosis and hepatocellular carcinoma (Nathans *et al.*, 2009). Chronic infection resulted from acute one with almost 80% of total infected individuals (Sun *et al.*, 1999). More than 70% people get persistent carrying HCV infection and one-fourth of a million deaths occur annually possessing chronic HCV infection (Zein, 2000; Khan *et al.*, 2013). About 170 million people have chronic hepatitis C infection and almost entered into epidemic level because more than 1 million people get HCV infection annually and confirmed as most prevalent as HBV (Re and Kostman, 2005). WHO reported that Hepatitis C in acute form has 20% of recovery chances and 80% chances in chronic infection (Sharma, 2010). The main modes of transmission studied in Pakistan include sharing of needles/syringes (61.45%), minor/major dental surgery procedures (10.62%), blood transfusion (4.26%), razors sharing by barbers (3.90%), and less than 1% due to piercing, tooth brushes and sexual transmission (Muzaffar *et al.*, 2008). However, it has been confirmed that injection drug use is one most vital mode of transmission (Rehman *et al.*, 2011).

Pakistan is second most Muslims largest population in the world and has low prevalence of HIV/AIDS. People are less aware regarding HIV/AIDS which is alarming conditions the people of the Pakistan has strong relationship with India and neighboring gulf countries (Shah *et al.*, 2004). Alone in India, WHO reported 1750,000 cases till 1994. Many communities in Pakistan like Sikh, Punjabi and Hindu have relations with Indian people and visit to their countries time to time. Due to same culture the diseases may spread with sexual contact between the people. The first case was reported in 1987 and the cause was the blood transfusion from a person living abroad (Khanani *et al.*, 1988). In 2004 there was first outbreak of HIV in the remote area of Larkana due to uses of drug injections by addicted people (Shah *et al.*, 2004). The other reason in the country is transgender sex workers (Rai *et al.*, 2007). Though large studies are not conducted overall data available in the country is seroprevalence 0.008 which is low as previously reported screening suggested the rate in blood donated by donor are few in number (Khattak *et al.*, 2002; Khan *et al.*, 2013).

Materials and methods

The retrospective study was conduct to investigate the prevalence of HBV and HCV positive samples in the blood donors from different districts of Khyber Pukhtoonkhwa along with HIV. All the serum samples were received along with specifically designed Performa contained information regarding age, sex and geographical region from the blood donors at Fatimid Foundation Peshawar Center, from 1st July 2014 to 30th June 2015. The data were analyzed by a statistical package, SPSS version 17.0 for Windows. The results for all variables were given in the form of rates (%). Chi-Square ANOVA and correlation tests were used for categorical variables that measured association among categorical variables.

Results

In the current study, out of the total 8439 samples, 8343 (98.9%) were HBs Ag negative while 94 (1.1%) were found positive. HCV positive samples were 38 (0.5%) while 8382 (99.3%) were anti HCV negative. HIV was found positive only in one sample. MP and VDRL were not detected any sample. The overall prevalence of the hepatitis virus (both B and C) is low in the blood donors which show that awareness in general population is increasing. The prevalence of HIV is negligible with only one sample found positive for it which is positive indication.

Blood group distribution among blood donors

Eight Blood groups were found in total 8439 blood donors, in which about ~90 % blood donors have Rh+ positive blood group. Blood group A- Negative was found in 194 (2.3%) donors, A+ Positive was found in 2164 (25.6%), AB- in 74 (0.9%) donors, AB+ in 874 (10.4%) donors, B- Negative in 206 (2.4%), B+ in 2515 (29.8%), O- negative in 171 (2%), O+ Positive in 2241 (26.6) donors (Table 1).

Table 1. Blood group distribution among blood donors.

Blood Groups	Frequency	Percent	Valid Percent	Cumulative Percent
A Neg	194	2.3	2.3	2.3
A Pos	2164	25.6	25.6	27.9
AB Neg	74	0.9	0.9	28.8
AB Pos	874	10.4	10.4	39.2
B Neg	206	2.4	2.4	41.6
B Pos	2515	29.8	29.8	71.4
O Neg	171	2.0	2.0	73.4
O Pos	2241	26.6	26.6	100.00
Total	8439	100.00	100.00	

Prevalence of HbsAg in blood donors

In total 8439 blood donors HbsAg was tested using kit. 8343 (98.9%) were found Non-reactive, 94 (1.1 %) were found reactive, 1 of the result was not cleared it was undetermined and 1 was recommended (Table 2).

Table 2. Prevalence of HbsAg among Blood donors.

HbsA	Frequency	Percent	Valid Percent	Cumulative Percent
Undetermined	1	0.00	0.00	0.00
Non-Reactive	834	98.00	98.00	98.00
Reactive	9	1.00	1.00	100.00
Recommended	1	0.00	0.00	100.00
Total	8439	100.00	100.00	

Prevalence of HCV in blood donors

In total 8439 blood donors' anti-HCV was tested. 8382 (99.3%) were found Non-reactive, 38 (0.5 %) were found reactive, 2 of the result were undetermined and 17 were recommended (Table 3).

Table 3. Prevalence of HCV among Blood donors.

Anti-HCV	Frequency	Percent	Valid Percent	Cumulative Percent
Undetermined	2	0.20	0.20	0.00
Non-Reactive	8382	99.30	99.30	99.30
Reactive	38	0.50	0.50	99.80
Recommended	17	0.20	0.20	100.00
Total	8439	100.00	100.00	

Prevalence of HIV in blood donors

HIV was checked in blood donors and was found positive only in one sample and all other were found negative for HIV (Table 4).

Table 4. Prevalence of HIV among Blood donors.

HIV	Frequency	Percent	Valid Percent	Cumulative Percent
Negative	8438	100.00	100.00	100.00
Positive	1	0.01	0.01	100.00
Total	8439	100.00	100.00	

Discussion

In this study, we attempt to show prevalence of HBV, HCV and HIV among the blood donors because of most common problem in Pakistan. All of these are considered serious health problems and Very less population is aware about the prevalence of HBV, HCV and HIV in Pakistan. This is mainly due to very rare routine checkup and unawareness of public about symptoms and transmission risk factors of these transmissible diseases.

As previous published studies data reported, Pakistan has highly endemic for HBV with nine million infected people. In case of HCV infected people were upto 17 million (Malik *et al.*, 1996; Yousaf *et al.*, 1996). However, in the case of blood donors of KPK (Khyber Pukhtoonkhwa) province lucky the prevalence is low. According to different studies in different areas of Pakistan, like study conducted at Rawalpindi shows the occurrence percentage of HBV infection 2.11% and HCV infection 11.26% (Choudhary and Khan, 2005). A study reported by Malik *et al.* (1996) which shows carrier rate of HBsAg is 10% and occurrence rate of HCV antibodies varies from 4% to 7%. Another study conducted by Hussain *et al.* (2015) at NMCH Multan found HBV 2.32% and HCV 3.44% among blood donors. One of other study done by Masood *et al.* (2005) showed the prevalence of HBV infection 6.5% and HCV infection 11.3% by her study. A survey conducted by Pakistan medical research council from July 2007 to May 2008 reveals that occurrence rate of HBV is 2.5% and HCV is 5% respectively in general population of Pakistan (Khan *et al.*, 2008; Ilyas *et al.*, 2011). According to another small survey conducted among general population of Pakistan the prevalence of hepatitis B is up to 10% and hepatitis c is 4-10% respectively (Malik *et al.*, 1988; Yousaf *et al.*, 1996). No other large study reported for Prevalence of Hepatitis B virus, Hepatitis C virus and HIV in blood donors in Pakistan. As table 1 shows Blood group distribution among blood donors while in table 2 and 3 prevalence of HbsAg among Blood donors different areas of KPK HBsAg positive samples found were 1.1% and HCV positive samples were 0.5% and table 4 the only case of HIV in both males and females of general population out of 8439 samples was found positive for both HBsAg and HCV antibodies. After the sample collection, its blood grouping process and then screened by Elisa for presence of DNA and RNA of HBV and HCV. In our study the causative factors of both Hepatitis B and Hepatitis C are mainly lack of proper health facilities, poor economic status and less public awareness about the transmission of major communicable diseases including HBV, HCV and HIV sharing of needles/syringes, blood transfusion,

razors sharing by barbers, and sexual transmission. Further studies are needed to characterize HBV, HCV and HIV prevalent in KPK Pakistan at molecular level. Moreover, both host and viral factors associated with molecular and cellular mechanism of HBV and HCV infection in KPK population needs to be explored blood donors should be recognize the place an facilities whenever to donate the blood.

Conclusion

The prevalence of the HBV, HCV and HIV are increasing in the Pakistan due to less awareness, less safety and preventive measures. Though blood donors must take care while donating the blood to any blood bank of hospital or to charity organization laboratory, because lacking of facilities may lead to risk and become prone to these diseases. Further, blood receiving laboratory must screen donors for infectious diseases. It should be the prime responsibility of the technician of blood bank to screen the blood before any further process an report the suspects. The major risk factors that were identified are unawareness of the general population about signs and symptoms, risk factors, control measures and access to possible treatment and vaccination HBV, HCV and HIV and their availability also a main problem in the remote areas.

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