

Prevalence of Hepatitis B and C Among Different Cohorts of Lahore, Pakistan

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Abstract:

Viral Hepatitis like hepatitis B and hepatitis C are the serious cause of mortality in Pakistan, as reported in 2012 the prevalence of hepatitis B was 3-4 % and hepatitis C was 6-8% in Pakistan. Hepatitis virus are the blood borne pathogens transmitted primarily through blood, body secretions and by piercing through skin (percutaneous), veins and mucosal surfaces.

Methods:

A cross sectional study was designed in which five hundred blood samples of individuals from different cohort including, general population, students and minorities were collected. People from all age groups and from both genders were included in this study with no prior history of hepatitis or liver abnormality. HbsAg, Anti-HBc and Anti-HCV tests were done on blood samples to check the presence of viral hepatitis B and C respectively.

Results:

Of 200 participants from general population 28% were hepatitis positive (4% HbsAg positive and 24% hepatitis C virus (HCV) positive cases). Of 200 university students, 9% were hepatitis positive (8% HbsAg positive and 0.5% HCV positive cases) while out of 100 minority participants 24% were hepatitis positive (1% HbsAg positive and 23% HCV positive cases). Gender was not significantly associated with viral hepatitis while age was significantly associated with hepatitis ($p < 0.001$, OR: 3.75 and 95% CI 3.05-8.15).

Conclusions:

High prevalence of hepatitis C was observed among general population and minorities. However, incidence of hepatitis is less frequent in university students. Awareness about hepatitis is required in less educated people in order to control the frequency of hepatitis.

Keywords:

Hepatitis C Virus (HCV), Hepatitis B Virus (HBV), Epidemiology

Introduction:

Viral hepatitis is a major public health concern due to its high morbidity and mortality rate. Virus that can cause Hepatitis are further classified into six different types including Hepatitis A, B, C, D, E and G virus¹. It has been reported that annually more than 1 million people died across the globe due to hepatitis B virus infection². In chronic conditions, hepatitis B virus can cause liver cirrhosis, hepatocellular carcinoma (HCC) and liver failure³. In a report of World Health Organization (WHO) it's been stated that hepatitis B virus has infected more than 2 billion people⁴. In mild infections patients fully recover from hepatitis B but in chronic situations hepatitis B leads to liver cirrhosis and hepatocellular carcinoma⁵. Hepatitis C, caused by hepatitis C virus is another significant cause of death in the world⁶. Globally, 0.35 million people per annum died due to hepatitis C. Hepatitis C infected 3 to 4 million people and almost 0.17 billion chronically infected patients develop liver cirrhosis hepatocellular carcinoma or liver failure⁷. In comparison to other countries rate of hepatitis C infection is high in Pakistan, estimated to be 4.8%. It is reported that ten million people are infected with hepatitis C infection in Pakistan⁸. According to the report of Prevention and Control of Hepatitis Program (Pakistan Health Department) 2012 the prevalence of hepatitis B was 3-4 % and hepatitis C was 6-8% in Pakistan⁹. For the detection or diagnosis, HBV and HCV different markers are used, the most common is Hepatitis B surface antigen (HBsAg). HBsAg is the only primary marker which is detected within 4-12 weeks the incubation period of the virus. Anti-HCV is the primary marker used for the diagnosis and screening of hepatitis C virus in the blood¹⁰. For the detection of HCV RNA,

PCR technique is used. In few cases virus eliminates from the blood of the patients but in some cases, it's become chronic and detected NAT HCV RNA test^{11, 12}. HBV and HCV can be transmitted from one person to another via body fluids (blood and other secretions). In developed countries, virus usually transmits through sexual contact, blood transfusions, tattoo piercing, IV drug abuse and needle prick injuries. Unsterilized medical equipment and reuse of syringes are the commonest ways in developing countries. It has also reported that almost eight to sixteen million HBV infections and two to five million HCV infection occur due to reuse of unsterilized injections needles or blades¹⁵.¹⁶. The prevalence of hepatitis B was 1.3% and 13% in general population of Ukraine and Uzbekistan respectively while prevalence of hepatitis C was 0.5% and 13% in general population of Ukraine and Uzbekistan respectively. The prevalence of both infections was high in drug abuse individuals¹⁷. Prevalence of hepatitis B and C were 1.71% and 2.06% respectively in Blood donors in India (18). Prevalence of HCV in blood donor in Saudi Arabia was 0.4-1.1%¹⁹. In Pakistan prevalence of HBsAg was 5.07% and HCV was 1.1% in blood donors²⁰.

The aim of this study was to determine the frequency of Hepatitis B and C in different groups of population including General Population, University Students, and Minorities.

Methods:

In this cross-sectional study five hundred blood samples of individuals from different groups, general population (200), university students (200) and minorities (100) were collected. People from all age groups and from both genders were included in this study with prior no history of hepatitis or liver abnormality. The study was approved from the ethical committee of UIMT department, university of Lahore. From all participants, 5cc of blood sample was aseptically drawn from the medial cubital vein and transferred to serum clotted vial. Samples were stored at 2-8°C and transported carefully to a laboratory for processing. For the qualitative analysis of viral hepatitis antigens and antibody different tests were performed; ARCHITECT HBsAg QUALITATIVE (U.S.A) were used for the detection of HBsAg based on Chemiflex (enhance chemiluminescent) assay. For Hepatitis B core antibody, Anti-HBc present in the blood

of patients with chronic hepatitis B infection was detected by using the kits of ARCHITECT Anti-HBc (U.S.A) based on Chemiflex (enhance chemiluminescent) assay. Anti-Hepatitis C antibody (Anti-HCV); HCV in the blood of participants was screened by ARCHITECT Anti HCV (U.S.A) based on Chemiflex (enhance chemiluminescent). Results of the laboratory tests were stored in Microsoft EXCEL and analyzed using the Statistical Package for Social Sciences (SPSS 21.0. version). Regression analysis was done to identify if age and gender is a risk factor for the incidence of hepatitis, odd ratio and 95% CI were calculated and p values less than 0.05 were considered as significant.

Results:

In this cross-sectional study, blood samples from 500 participants were collected, of which 40% were from the general population, 40% were University students and only 20% were from the minority group. Of these 500 participants, 265 (53%) were males and 235 (47%) were females. In age-wise distribution, 64% (n=322) participants were under 30 years of age while 36% (n=178) participants were ≥ 30 years of age.

Of total 500 participants 97 (19%) were hepatitis positive of which 5% were hepatitis B positive while 14% were Hepatitis C positive. Table 1 shows the frequency distribution of hepatitis among different cohort groups; 56 (28%) of 200 participants from General Population were hepatitis positive of which 8 were hepatitis B positive and 48 were hepatitis C positive. Of 17 positive hepatitis cases in University students, majority were hepatitis B positive while only 1 was positive for hepatitis C. Among the Minority group, 1 out of 24 positive hepatitis cases were hepatitis B positive while 23 were hepatitis C positive.

Cohort	Hepatitis +ve	Hepatitis B +ve	Hepatitis C +ve
General Population (n=200)	56 (28%)	8 (4%)	48 (24%)
Students (n=200)	17 (9%)	16 (8%)	1 (0.5%)
Minority (n=100)	24 (24%)	1 (1%)	23 (23%)
Total (n=500)	97 (19%)	25 (5%)	72 (14%)

Table 1: Frequency distribution of hepatitis among different cohort groups

Gender-wise distribution of hepatitis shows that out of 265 male participants, 59 (22%) were hepatitis positive cases. Out of these 59 hepatitis positive cases 19 were hepatitis B while 40 were hepatitis C positive. Of 235 female participants, 38 (16%) were hepatitis positive, 6 were positive for hepatitis B and 32 female participants were positive for hepatitis C. Statistical analysis show that gender is not significantly associated with hepatitis, as p value 0.08 (OR: 1.48 and 95% CI: 0.94-2.33) (Table 2).

In the age-wise distribution it has been observed that out

of 500 individuals 322 were less than 30 years of age. Out of 322 individuals, 39 (12%) were hepatitis positive; moreover 17 were positive for hepatitis B and 22 for hepatitis C. In this study, 178 individuals were ≥ 30 years of age and 33% of them were positive for hepatitis. Out of 58 positive cases 8 were hepatitis B positive and 50 were hepatitis C positive. Statistical analysis shows that age is significantly associated with the incidence of hepatitis (p value <0.001 , OR: 3.75 and 95% CI 3.05-8.15) (Table 3).

Gender	Hepatitis +ve	Hepatitis B +ve	Hepatitis C +ve	P value	OR(95% CI)
Male (n=265)	59 (22%)	19	40	0.08	1.48 (0.94-2.33)
Female (n=235)	38 (16%)	6	32		

Table 2: Gender wise distribution of hepatitis patients

Age (years)	Hepatitis +ve	Hepatitis B +ve	Hepatitis C +ve	P value	OR(95% CI)
0-30 (n=322)	39 (12%)	17	22	<0.001	3.75(3.05-8.15)
≥ 30 (n=178)	58 (33%)	8	50		

Table 3: Age-wise distribution of hepatitis patients

Discussion:

This study was conducted to evaluate the prevalence of hepatitis (B and C) in different populations of Lahore. Results of this study indicate that 19% of our total participants were hepatitis positive while the majority (14%) was hepatitis C positive and 5% were hepatitis B positive. The highest prevalence of Hepatitis C may be due to the lack of vaccination against Hepatitis C virus. Another reason of the high frequency of hepatitis C is occurrence of its genotypic variation. Qureshi *et al* in 2010 reported the prevalence of HCV and HBV in general population was 4.8% and 2.5% respectively²¹). The finding of this study also reveals that the frequency of Hepatitis was higher in general population and minority group and low in university students as compared to other cohorts. General Population consists of people from different groups based on their religion, occupation, ethnicity and socio-economic background. High frequency of hepatitis in general population may be due to people from different groups while the reason for minorities may be low socio-economic background, less medical knowledge, no vaccinations, unscreened blood

transfusions and reuse of surgical blades or needles, tattoo piercing and drug abuse. University students are more educated and aware so a less prevalence rate was observed among this group. Results indicate that gender is not significantly associated with hepatitis although hepatitis was much common in male participants of our study. Results were in accordance with the previous studies^{22, 23}. Similar results were also reported by Butterfield *et al* in 2003²⁴. However, Niu *et al* in 2016 reported a high prevalence of hepatitis C in female²³. Male are at high risk of acquiring communicable infections as they involve in drug-related activities, needle use, tattoo piercing and outdoor activities while the female are involved in indoor activities they have less dealing with the community. Current findings suggest that hepatitis (B or C) is more common in individual's ≥ 30 years of age. Statistical analysis also showed a significant relationship of hepatitis with age in accordance with the previous studies^{22, 25}. Many researchers have already established a relationship of hepatitis with age^{26, 27}. Elder Adults are the fast growing

people with distinct epidemiological, pathological, and therapeutic characteristics of multiple disease processes, including viral hepatitis. These people have a high risk of complications of acute and chronic liver disease as well as higher risk of mortality because of high prevalence of co-morbid conditions²⁸. A number of diseases, drug abuse, sexual contact and multiple blood transfusions in elder people are the reasons for the high prevalence in people ≥ 30 years of age. In this study an advanced technique Chemiflex Immuno-assay for the detection of HBsAg, Anti-HBc, and Anti-HCV was used which is more specific and sensitive method than Immuno-Chromatography (ICT) Kits. Most of the studies used ICT kits for the evaluation of the prevalence of hepatitis in this population while this study has an advantage that prevalence of hepatitis viruses had been detected by using advanced methodology. More studies with a large cohort are required to identify prevalence rate of hepatitis.

Conclusions:

As the rate of hepatitis is alarming among minorities and in general population so more attention should be given to less educated people to prevent the cases of hepatitis.

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