

Frequency of Hepatitis C and Hepatitis B infection in a Tertiary Care Hospital

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Abstract

Objective: To determine the frequency of HCV and HBV in patients referred for screening at Zulfiqar Ali Bhutto Medical University, PIMS, Islamabad.

Material and Methods: This retrospective study was conducted at the Pathology Department of Shaheed Zulfiqar Ali Bhutto Medical University, PIMS, Islamabad over duration of 3 months (from 1st January, 2014 to 31st December 2014). The data was analyzed with, Microsoft Excel 2010.

Results: Total of 28319 (17040 + 11279) serum samples were tested by ELISA for HCV antibody and HBV antigen respectively. Among the positive samples, 3427 (12.1%) samples were found positive for HCV antibodies, while 843 (7.5%) were positive for HBV antigen. However, the number of samples testing positive for both HBV and HCV out of the total sample size of 28319 were 143 (0.5%).

Conclusion: HCV has a higher seropositivity, being more prevalent in females, effecting mostly patients between the ages of 36 years to 46 years compared to HBV that has a lower seropositivity, effecting mostly females with highest number of samples recorded between the ages of 25 years to 35 years. However, it should be kept in mind that these are patients and not healthy donors/ or population.

Key words: Co- infection, Enzyme-Linked Immunosorbent Assay, Hepatitis B, Hepatitis C, Liver damage.

Introduction

World Health Organization (WHO) estimates that there are 350 million people with chronic hepatitis B (HBV) infection and 170 million people with chronic hepatitis C (HCV)

infection worldwide.¹ Hepatitis B is estimated to result in 563 000 deaths and hepatitis C in 366000 deaths annually. Pakistan is amongst the worst afflicted nations. Pakistan carries one of the world's highest burden of chronic hepatitis and mortality due to liver failure and hepatocellular carcinomas.² In a recent note WHO has rated Pakistan as a 2nd country having high rate of chronic hepatic infection in the world. According to a national survey conducted in Pakistan on the general population by Pakistan Medical Research Council in 2007-2008, the seroprevalence of anti HCV and HbsAg was 4.8% and 2.5%, respectively suggesting a total chronic carrier population of hepatitis B and C of about 13 million.^{1,3}

HBV and HCV are blood borne hepatotropic viruses leading to significant morbidity and mortality worldwide. HBV is a member of Hepadnaviridae family, harboring a DNA genome, while HCV is RNA virus that belongs to Flaviviridae family. HCV infection results in number of complications including cirrhosis and hepatocellular carcinoma. HCV-related end stage liver disease is one of the leading reasons for liver transplantation today.² Hepatitis C virus (HCV) is the major cause of parenterally transmitted non-A non-B hepatitis. About 15% of patients recover or have a benign outcome while the rest develop a chronic infectious state, out of these 20% patients will develop liver cirrhosis over a period of 10-20 years and will succumb their life to it in the absence of liver transplantation. One to five percent develop hepatocellular carcinoma. Even in the asymptomatic carrier, a compromise in the quality of life has been reported.⁴

Hepatitis B is also potentially life-threatening liver infection. Both, the whole, intact virion as well as the incomplete virus particles, consist entirely of HbsAg and are produced during replication of HBV as the infected hepatocytes reproduce. It can cause chronic liver disease and chronic infection and puts the people at high risk of death from cirrhosis of the liver and liver cancer. About 90-95% of the patients contracting hepatitis B virus recover on their own due to

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their strong immune system, in 0.5% cases hepatitis ensues to a fulminant form and death of the patient occurs while the remaining patients tend to have a persistent infection, or become asymptomatic carriers, developing chronic persistent hepatitis, out of these 1-2% patients clear the virus while the remaining eventually develop chronic, active hepatitis leading to cirrhosis and hepatocellular carcinoma.⁴ Intra-familial spread, horizontal transmission of hepatitis B is quite high. Hepatitis B is an important occupational hazard for health workers.⁴

HCV infection is diagnosed through detection of HCV antibodies (anti HCV) that is produced when a person is infected with HCV. Anti-HCV can be detected with a less sensitive method i.e. Immuno chromatography (ICT) and a more sensitive and specific test Enzyme Linked Immunosorbant Assay (ELISA). ELISA is used as the most reliable screening test. Viral genome is detected in blood through PCR. During window period of one and half months Anti-HCV test may be negative.

Due to the presence of HCV and HBV associated liver diseases and the development of effective treatments, the diagnosis of the two infections is a growing medical need.⁵ Purpose of this study is to estimate the frequency of HCV and HBV at Shaheed Zulfiqar Ali Bhutto Medical University, PIMS Islamabad. PIMS being a tertiary care hospital receives multiple referred cases from areas adjacent to Islamabad. These figures and findings will be helpful for health policy makers, blood banks and national prevention and surveillance program for further research and investigations.

Materials and Methods

This cross sectional study was conducted at the Pathology department of Shaheed Zulfiqar Ali Bhutto Medical University, Pakistan Institute of Medical Sciences (PIMS), Islamabad over a period one year (from 1st January, 2014 to 31st December, 2014). All the samples received in Microbiology lab for screening of Hepatitis B and c were included in the study. These samples were collected under standard procedures. The samples were collected in gel tubes and HBsAg and anti-HCV were detected by 3rd Generation and 4th Generation kits respectively (Bio kit, Spain) on semi-automated ELISA system BEST 2000. (Bio. kit, Spain) Data variables included age, gender, and co infection of HCV and HBV. Duplicate and follow-up samples were excluded. The data was analyzed with, Microsoft Excel 2010.

Results

A total of 28,319 (17040 + 11279) serum samples were tested by ELISA for HCV antibody and HBV antigens, respectively. Among the positive samples, 3427 (12.1%) samples were found positive for HCV antibodies, while 843 (7.5%) were positive for HBV antigen. The number of samples positive for both HBV and HCV were 143 (0.5%).

Out of the total HCV positive samples, 1742 (50.8%) were of females while 1685 (49.0%) were of males, male to female ratio being 0.9:1.0. And out of the total HBV positive samples, 424 (51%) samples were of females while 419 (49%) were of males, male to female ratio being 0.9:1.0. However, out of the total number of samples that showed co infection, 58 samples were of females while 87 samples were of male. Male to female ratio being 1.5:1. Age group yielding the highest number of positive HBV Ag results ranged from 25 years to 35 years while the lowest positive age group was below 14 years of age. (Table 2, and Figure 1).

Table 1: Gender distribution of patients testing positive for HCV (n=3247), HBV (n=843), and co infection (n=143)

Gender	Males (n%)	Females (n%)
HCV positive	1685 (49.0%)	1742 (51.0%)
HBV Ag positive	419 (49%)	424 (51%)
Co infection	87 (60%)	58 (40%)

Table 2: Age distribution of positive cases (n=4270)

Age Group (in years)	HCV positive (n=3427)	HBV positive (843)
< 14	44 (1.3%)	14(1.7%)
14 to 24	266(7.7%)	192(22.8%)
25 - 35	880(25.6%)	245(29.1%)
36 - 46	978(28.5%)	189(22.4%)
47 - 57	687(20.0%)	119(14.1%)
58 - 68	403(11.8%)	78(9.3%)
≥ 69 and above	155(4.5%)	24(2.8%)

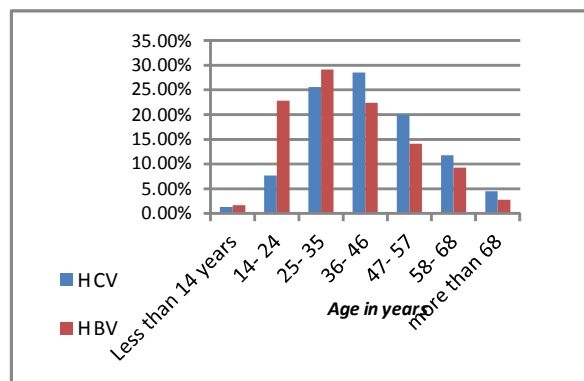


Figure 1: Age distribution of patients tested for HCV (n=3247) and HBV infections (n=843).

Author's name	Place	Population	Percentage
Nafees et al ⁸	Faislabad	Visiting Hospital	17.77%
Tareen et al ⁹	Quetta	Blood Donors	20.8%
Ali et al ¹⁰	Mansehra	General	10.3%
Ali et al ¹⁰	Shamdhra	General	11%
Khattak et al ¹¹	D.I.Khan	Visiting OPD	6.54%

Discussion

Hepatitis B and C are a worldwide health hazard. Multiple studies have been conducted for estimation of seroprevalence of HBsAg and HCV antibodies targeting different populations of Pakistan. Results of the present study show the high rates of seroprevalence of HCV & HBV amongst the hospital based population of Islamabad. According to this study, the percentage of HCV antibodies is much higher than the HBsAg. Abdul Basit et al 2014 reported results consistent with our study, with lower prevalence of HBsAg than HCV antibodies.⁶ Out of the total serum samples tested 12.1% were positive for HCV antibody, 7.5% were positive for HBV antigen while 0.50% patients tested positive for both, HBV and HCV.

Atif G. et al in 2009 reported 10.4% prevalence of HCV antibodies and Basit A. et al in 2014 reported 0.7% co infection amongst the patients visiting PIMS, Islamabad.^{6,7} These results are similar to the present study. According to different studies conducted throughout Pakistan, on different population groups the prevalence of anti HCV is between 6.54% to 17.7% as evident from the table 3 below.

Unlike our study where samples were either from in patient or out-patient departments of PIMS, having a relatively higher number of patients with deranged liver profile tests, transplant patients, patients on hemodialysis, HIV patients or higher number of drug abusers, hence, showing a relatively higher prevalence percentage compared to the subjects employed from the general population that participated in most of the studies mentioned in table above. There has been a lot of variation in the seroprevalence of anti HCV worldwide ranging 0.47% in Nepal¹² to 13.9% in Egypt¹³ amongst general population.

The prevalence of HCV as recorded in this study was higher in females, 51.0% compared to males, 49.0%. High rate of HCV seropositivity in our study is due to type of samples (i.e. from patients and not the general population) and is thought to be chiefly due to exposure during major and /or minor surgical procedures due to usage of improperly sterilized surgical equipment.¹⁴

The highest HCV seropositivity recorded amongst the patients between the ages 36 - 46yrs. (28.5%) and the lowest being amongst patients below the age of 14 years (1.3%).

Unsafe injecting practices, intravenous drug abuse, high number of dental procedures, endoscopy, major and minor operation and unsafe sexual practices, all have a contributory effect on the overall seroprevalence of HCV especially in ages between 36 years to 46 years.

The global prevalence of HBV infection varies widely; and its endemicity ranges from high ($\geq 8\%$) to intermediate (2-7%) and low ($< 2\%$).¹⁵ According to different studies, the seroprevalence HbsAg (by ELISA) of patients visiting different health facilities within Islamabad is between 3.9% to 15%^{6,16}. This is compliant with the result of this study.

According to a research conducted in Liaquat University Eye Hospital Sindh, Pakistan on patients admitted for ocular treatment, 4.6% of the total tested samples were positive for HBV Ag. However, patients above 30 years of age were employed for the study, unlike this study, and the HBV Ag was done by the chromatographic method which is less sensitive than ELISA.¹⁷

In another study 5.7% prevalence of hepatitis B virus was recorded amongst the Hospital care seeking population in Eithopia, Africa.¹⁵ The highest HBV seropositivity recorded was amongst the patients between the ages of 25 yrs.-35 yrs. while the lowest being observed in patients below 14 years of age. A study conducted in China associates HBV infection with the different gender, however, the reason for this difference in result is unclear. It is speculated to have been due to differences in the immune response to the HBV infection.¹⁸ The incidence of HBV infection is also related to different occupations, risky social activities, personal history of vaccination, and age in adults.¹⁸ WHO also estimates that in developing countries due to the use of non-sterile, reused syringes or needles cause 12-18 million HBV infections annually.¹⁵ It is also stated that the rate of positivity decreases with age due to the spontaneous seroconversion to the antibody against HBeAg.¹⁸

HBV and HCV may appear as co infections due to the same mode of transmission.¹⁹ Several studies have been documented that HCV and HBV co infection accelerates liver damage and may progresses to hepatocellular carcinoma. Co-infection also alters the interferon dosage required for treatment.¹⁹ HBV/HCV co infection is most commonly found amongst certain high risk personnel i.e. IV drug abusers, patients on hemodialysis, patients in immunocompromised states e.g. after organ transplantation and/ or HIV positive, and patients requiring frequent blood transfusions e.g. Beta thalassemia patients.²⁰ However, due to lack of large scale population based studies conducted over different geographical areas and presence of silent HBV infection amongst many patients, the worldwide prevalence of HBV/HCV coinfection is not known.²⁰ A study conducted on adult, females in Karachi estimated the co infection rate by both these viruses to be 1.4%.²¹ However, according to another study conducted in 2011 in Karachi the frequency of co infection by HCV and HBV was 1.1%.²² Whereas, the prevalence of co infection in

national survey was 0.1%.²³ Co-infection indicates more severe and difficult to treat disease with higher morbidity and mortality.

Conclusion

High number of samples were tested positive for HCV and HBV at PIMS. There is thus great need for improved health policies and to increase awareness against HCV and HBV amongst the general population and high risk population to prevent people from contracting the virus and/or early detection of the disease.

Conflict of Interest

This study has no conflict of interest as declared by any author.

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Authorship Contribution:

Author 1 & 4: Active participation in Research

Author 2 & 3: Conception, planning, critical review of article and final approval

Author 5 & 6: Interpretation and analysis of results