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Prevalence of Hepatitis C and Hepatitis B co-infections in District Hyderabad, Pakistan

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Abstratct: Hepatitis is an inflammation of the liver that may lead to cirrhosis. Viral hepatitis is an important global public health problem, particularly in Asian countries. Because of shared routes of transmission of Hepatitis B virus (HBV) and Hepatitis C virus (HCV), co-infection is not uncommon in areas with high rate of hepatitis infection such as Pakistan. It is estimated that in Pakistan at least nine million people harbor HBV and over fourteen million are chronically infected with HCV. The overarching goals of the present study were to evaluate the prevalence rate of HBV, and HCV mono-infections and co-infections in Hyderabad, Sindh. A total 2214 individuals were enrolled in the present study. All samples were analyzed by using third generation ELISA using Bioelisa kits as per manufacturer's guidelines. The data obtained in the current study demonstrated that 26.38% samples were positive for HCV, with 11.11% males and 15.27% females whereas 12.42% individuals were found positive for HBV, of which 7.72% were males and 4.70% were females. The prevalence of HBV-HCV co-infection was 4.52% (males 2.17 % and females 2.35%). In Summary, the current study shows a high prevalence rate of HCV, and HBV mono infections. HCV seemed to be more common in females than in males, while HBV was more common in males than in females. HBV-HCV co-infection prevalence was found to be slightly high in females than in males.

Keywords: Prevalence, Hepatitis B virus; Hepatitis C virus; HBV-HCV co-infection;

1. INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infection are major public health problems worldwide particularly in Asian countries (Lu *et al.* 2003). Because of the similar route of transmission of HCV, and HBV i.e. blood and blood products, patients can suffer from dual/co-infections by these viruses (Sheen *et al.* 1994; Lu *et al.* 2003; Liu & Hou 2006; Fattovich *et al.* 1991; Rizzetto & Verme 1985; Alberti *et al.* 1994). Several lines of evidence suggest that HBV- HCV co-infection are heterogeneous in terms of the profiles of immunity against each virus and as well as their varying states of replication. Hepatitis occurs by a number of causatives such as alcohol and autoimmunity but majority of incidences of hepatitis have been reported by viruses (Naeem *et al.* 2012). The burden of HBV infection has been reported to be continuously increasing in the developing countries (Lee 1997). HBV infection leads to a range of liver diseases, including acute and chronic HBV infection. The risk factors include hospitalization, tattooing, facial shaving by barbers, and use of glass syringes. In spite of an effective HBV vaccine, according to reports of World Health Organization (WHO), HBV infects around 400 million people worldwide (Parkin 2004; El-Serag and Rudolph 2007).

HCV is a major cause of chronic liver disease, mostly asymptomatic in nature. HCV infection remains a major virus associated liver diseases across various parts of the world. According to WHO reports 170 million people suffer from HCV worldwide and 3-4 million new cases are reported annually (Madhava *et al.* 2002). Pakistan has been reported among the high risk areas of Hepatitis C with approximately 10 million people suffering from Hepatitis C in Pakistan (Umar & Bilal 2012). The rapid global spread of HCV has been shown to occur through parenteral exposures with contaminated equipment and blood transfusion (Prati 2006). The aims of present study were to determine the current trends of prevalence of HBV and HCV mono infections and to study the frequency of HBV-HCV co-infection at local level in Hyderabad, Pakistan.

2. MATERIALS AND METHODS

The present retrospective and descriptive study was carried out for eight months from January 2013 to August 2013 at the institute of Microbiology and Pathology laboratory of Liaquat University of Medical and Health Sciences (LUMHS) Hyderabad, Pakistan. This study was conducted with the approval of the authorities of the source hospital. All individuals suspected of Hepatitis who visited the laboratory for screening of hepatitis B and C were included in this study.

2.1 Detection of Hepatitis B and Hepatitis C using ELISA

Detection of Hepatitis B surface antigen (HBsAg) and antibodies against HCV was carried out using Bioelisa HBsAg 3.0 and Bioelisa HCV 4.0 kits, respectively, as per manufacturer's guideline Bbiokit,

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Spain). Hepatitis B was detected using the sandwich type ELISA. Briefly, the microplate was coated with guinea pig anti-HBs antibodies that acted as capture antibodies and goat anti-HBs antibodies conjugated with peroxidase were used as secondary antibodies. The sample was loaded into microplate wells pre-coated with the antibodies. Following incubation, the microplate was washed thrice to remove unbound material. The anti-goat HBs antibodies conjugated to peroxidase were added to the microplate well. After incubation, plate was washed was washed three times. Finally, chromogenic enzyme substrate was added to the well. Development of a blue color was recorded as positive reaction. For detection of Hepatitis C, the same protocol was applied except instead of antibodies, the microplate was coated with recombinant antigens including NS3, HCV Core, NS5 and NS4. Briefly, the serum samples from patients were loaded on to the microplate wells. The wells were washed to remove excess sample and a rabbit anti-human IgG conjugated with peroxidase was added to the wells. Following incubation, the plate was washed thrice and added a solution of chromogenic enzyme substrate. Development of a blue color was an indication of positive reaction where as negative samples yielded colorless reaction.

3. RESULTS AND DISCUSSIONS

Viral hepatitis appears to be spreading rapidly among the general population of Pakistan. The burden of HCV infection is increasing worldwide. To find out HBV-HCV co-infection, 2214 cases were examined during eight months period from January, 2013 to August, 2013. Of them, 1166 were males and 1048 were females. The total prevalence of HBV-HCV co-infection was 4.52% (n=100). The prevalence of HBV-HCV co-infection in males was 2.17 % (48) and in females was 2.35% (n=52). Out of 2214 patients, 26.38% (n=584) were infected with HCV, including 11.11% (n=246) males and 15.27% (n=338) females whereas prevalence of HBV was found to be 12.42% (n=275), with 7.72% (171) males and 4.70% (n=104) females **(Table 1).** The data of present study demonstrated that the prevalence of HBV in Hyderabad was 12.42% with males showing very high ratio (7.72%) as compared to females (4.7%) **(Fig.1 and 2).** One of the possibilities of contracting higher infections in male could be due to the fact that males have a higher environmental exposure and social freedom as compared to females especially of rural areas. Moreover, males may be at higher risk due to shaving by barbers. Our results are in agreement with the findings of previous studies from Pakistan (Naeem *et al.* 2012; Khan and Siddiqui 2007) .

Table 1. Prevalence of HBV and HCV mono and co-infections

Gender	Prevalence	Male	Female
	%(n)	%(n)	%(n)
HCV	26.38 (584)	11.11 (246)	15.27 (338)
HBV	12.42 (275)	7.72 (171)	4.70 (104)
HCV-HBV co-infection	4.52 (100)	2.17 (48)	2.35 (52)

Our results showed high prevalence of HCV (26.38% of the patients tested) in Hyderabad (Fig. 2). The high prevalence may be associated to poor health conditions, use of razor by barber, and lack of education. According to our results, HCV is more common in females (15.27%) than in males (11.11%). Similar findings have been reported in some studies where females showed higher prevalence than males (Farooqi & Farooqi 2000). However some studies have contradicted the results with higher positivity of HCV in males than in females (Naeem *et al.* 2012; Khan & Siddiqui 2007).

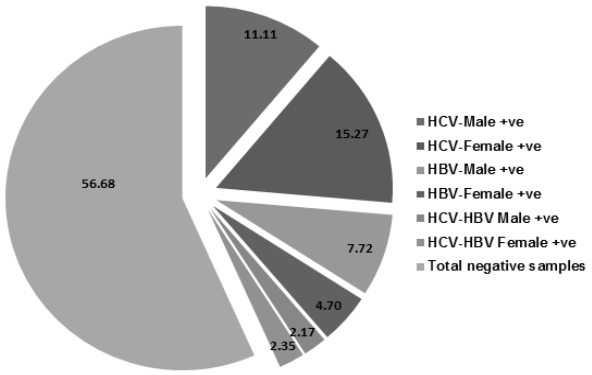

Fig. 1 Graph showing prevalence of HCV, HBV, and HBV-HCV co-infection in males and females

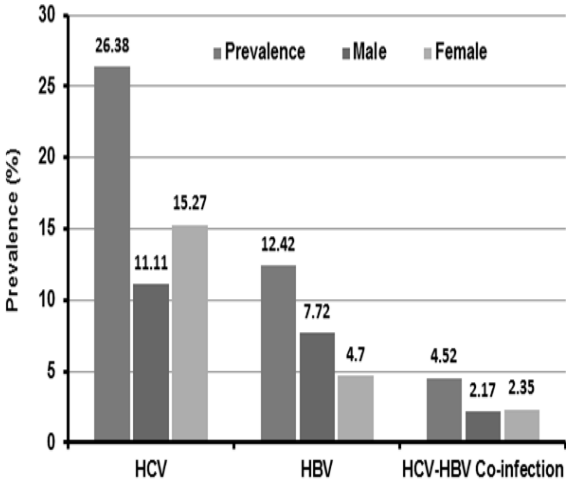

Fig 2. Sex-wise frequency of overall HCV, HBV and HBV-HCV co-infection.

The importance of co-infection with HBV and HCV has not been well documented. The present study demonstrates 4.52% total prevalence of co-infection of HCV-HBV , which is considerably lower as compared with the findings of previous studies by Syed Saad Naeem *et al.,* (12.99 %) (Naeem *et al.* 2012) and Ahmed *et al.,* 5.75% (Ahmad *et al.* 2004). The prevalence of HBV-HCV co-infection in males (2.17 %) was a little lower than in females (2.35%).

4. CONCLUSION

Owing to the lack of large-scale population based studies, the prevalence of co-infections with HBV and HCV is not well-known especially in our region. In order to determine the disease severity, appropriate treatment strategy, and detrimental effects, it is of high importance to identify the clinical relevance of HBV-HCV coinfection. Moreover, the information concerning many aspects of co-infection infection in lacking, therefore, patients with acute hepatitis should be evaluated for possibility of viral causes such as HCV and HBV. In summary, the present study reports comparatively low prevalence of co-infection of HBV-HCV as compared with the results of similar studies from different regions of Pakistan.

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