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Occurrence and Risk Factors of Hepatitis B and Hepatitis C: A Multicenter Screening Campaign in Pakistan

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ABSTRACT

Objective: To determine the occurrence and risk factors of Hepatitis B and C virus infection in two tertiary-level facilities in Pakistan.

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: A screening campaign was conducted at a tertiary care hospital in Lahore, Pakistan, focusing generally on the entire facility and specifically on the Department of Ear, Nose and Throat (ENT), additionally, the campaign was carried out at the Department of Gastroenterology at a tertiary care hospital in Malir, Pakistan, from June 2020 to January 2021.

Methodology: A total of 2,085 individuals were included in the study. Of these, 1,085 were enrolled through the screening campaign in Lahore, of which, 600 individuals were recruited from the ENT outpatient department (OPD) and 400 were included from the Gastroenterology OPD of the tertiary care hospital in Malir, Pakistan. Specimens were collected and transported under controlled temperature conditions to the Department of Pathology, at a tertiary care hospital in Rawalpindi, Pakistan.

Results: Out of the total 2, 085 participants, 1330(63.78%) were males and 755(36.21%) were females while mean age of study participants was 36.15± 10.9 years. Of the total sample, 40(1.91%) were infected with viral Hepatitis B (Positive HBsAg) and 141(6.76%) were infected with viral Hepatitis C (Positive Anti-HCV).

Conclusion: The study has shown that there is high HCV antibody seroprevalence (6.76%) and relatively low HBV infection (1.91%) in Pakistan.

Keywords: Hepatitis B virus infection, Hepatitis C virus infection, Screening, Viral hepatitis

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INTRODUCTION

Hepatitis B and C viruses are endemic all over the world with about 350 million individuals infected with chronic HBV infection and 58 million infected with chronic HCV.[1] Cirrhosis leading to Hepato-cellular Carcinoma (HCC) is a long-term complication of these infectious diseases.[2] Hepatitis B Surface Antigen (HBsAg) was discovered in 1965 with HBV vaccine made subsequently, making it a major breakthrough as the first anti-cancer vaccine.[3,4] however, the cost of HBV vaccine has limited its use in underdeveloped countries.[5] After many clinical trials, effective curative treatment for HCV was introduced in 2013 but the relapse rate of patients treated for HBV infection is significant and treatment efficacy remains elusive.[6] Chronic HBV and HCV infections burden is increasing with a need to conduct epidemiological surveys at the national level to document accurate prevalence in the country.[7] More emphasis has been given on the importance of screening for viral hepatitis, however, awareness of vaccination and better screening and diagnostic tools is limited.[8] Individuals at risk need to be identified as they risk increasing transmission and prevalence of the disease.[9] World Health Assembly issued a strategy in 2016 of putting an end to HBV and HCV by 2030, by reducing the incidence of viral hepatitis by vaccination as most new chronic HBV infections are infants infected by vertical and perinatal transmission from HBV infected mothers. [10] In our study, we have presented the results of a screening campaign to highlight urgent need to initiate preventive and curative measures to control the disease burden and spread of this infectious disease.

METHODOLOGY

This study was conducted at two tertiary care hospitals: one, in Lahore, and second, in Malir,

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Pakistan, from 1st June 2020 till 30th Jan 2021, after gaining permission from Ethics Review Committee (IRB-12-20) on 15th May 2020. Sample size of 2085 was determined using World Health Organization (WHO) sample size calculator, with 95% confidence interval and population proportion of 8.6 for chronic viral infections.11 All patients and attendants who reported to the hospitals were offered screening. Informed consent was taken from all of them and parental consent was taken from those who participated but were younger than 18 years of age.

Inclusion Criteria: Patients of either gender, of any age, who reported in free screening campaign held at Department of ENT OPD, Pakistan Air Force (PAF) Hospital, Lahore and Department of Gastroenterology OPD, Combined Military Hospital (CMH), Malir, were included.

Exclusion Criteria: Patients diagnosed with autoimmune disease or with past history of positive laboratory results of HBV and HCV infection were excluded from the study.

Demographic information sheet was completed for all participants, samples were collected and transported to PAF Laboratory, Lahore, or transported to Armed Forces Institute of Pathology (AFIP), Rawalpindi. Venous blood samples were subjected to centrifugation, and serum was tested for HBsAg and anti-HCV. Double antibody sandwich Enzyme-Linked Immunosorbent Assay (ELISA) by Labway Diagnostics S.A. (Spain) was used for the screening of HBsAg in serum samples of subjects. Similarly, serum samples of all the participants were tested for anti-HCV antibodies by indirect ELISA method, a third generation HCV ELISA by Labway Diagnostics S.A. (Spain). A medical doctor was appointed to the task of making a telephonic call to all those individuals who were diagnosed with either HBV or HCV infection and informing them of their diagnosis, where they were educated in detail about the disease, its routes of transmission, treatment and possible complications, with risk to their family members also shared to bring them for screening as well. All infected individuals were offered medical treatment and follow-up testing. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23.00. Mean and standard deviation were calculated for age, while frequencies and percentages were used for categorical variables such as gender, marital status, education, and drug abuse. Chi-square test was applied to assess associations between categorical variables and Hepatitis B and C status where a p-value of <0.05 was considered as statistically significant.

RESULT

Among total of 2085 study participants, 1330(63.78%) were males and 755(36.21%) were females. Out of total 2085, 40 participants (1.91%) were positive for HBsAg and 141(6.76%) were positive for anti-HCV. HCV occurrence was divided into three age groups as shown in Figure 1. The age group most commonly found to be positive for anti-HCV was between 31 to 60 years of age while 95 (67.40%) participants in age group 31 to 60 years of age were infected with Hepatitis C virus. No study participant was infected with both HBV and HCV. HBV occurrence was divided into three age groups as shown in Figure 2. The age group most commonly found to be positive for HBsAg was between 31 to 60 years of age while 21(52.50%) participants were in age group 31 to 60 years of age. The frequency of Hepatitis B was significantly higher among individuals with no formal education (p<0.001) and those with a history of drug abuse (p < 0.01) Hepatitis C was also significantly associated with drug abuse (p=0.002). No significant associations were found between gender, marital status, and infection status for either virus as shown in Table-I.

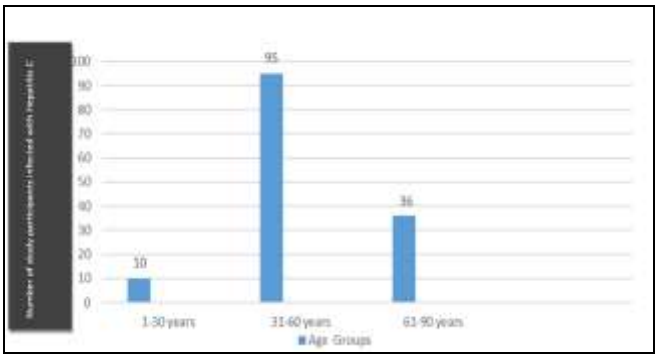

Figure-1: Frequency of Study Participants Infected with Hepatitis C According to Age Groups (n=141)

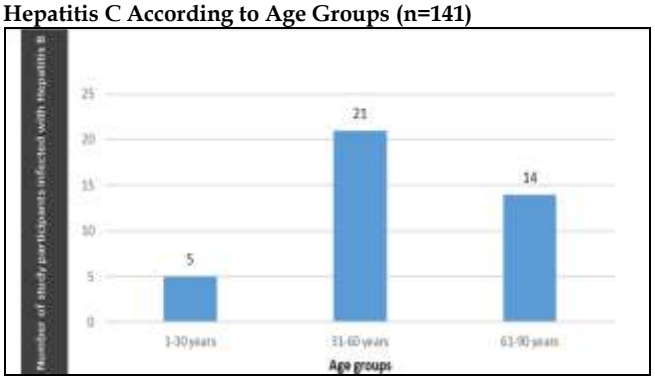

Figure-2: Prevalence of Study Participants Infected With Hepatitis B According to Age Groups (n=40)

Table-I: Sociodemographic Characteristics and Frequency of Hepatitis B and Hepatitis C (n=2085)

Socio-demographic Characteristics	HBsAg Positive (n = 40)	HBsAg Negative (n = 988)	p-value		HCV Positive (n = 141)	HCV Negative (n = 828)	*p*-value
Gender							
Female	15(1.50%)	405(41.00%)	0.10		51(5.30%)	305(36.80%)	0.40
Male	25(2.40%)	583(59.00%)			90(9.30%)	523(63.10%)	
Marital status							
Married	27(2.60%)	390(39.50%)	0.70		101(10.40%)	503(60.00%)	0.20
Unmarried	13(1.30%)	598(60.00%)			40(4.00%)	323(39.00%)	
Education							
No	30(3.00%)	635(64.00%)	< 0.001		31(3.20%)	590(71.00%)	0.30
Yes	10(1.00%)	353(36.00%)			110(11.80%)	238(24.00%)	
Drug abuse							
Yes	9(1.00%)	400(40.00%)	< 0.01		39(4.00%)	386(46.00%)	0.002
No	31(3.00%)	588(59.00%)			102(10.70%)	442(53.00%)	

**HbsAg: Hepatitis B Surface Antigen, HCV: Hepatitis C Virus*

DISCUSSION

Chronic viral hepatitis is an important cause of morbidity and mortality in Pakistan especially as general awareness and knowledge among people are very low.[12] In this study, 6.76% individuals were found infected with HCV, while 1.91% were infected with HBV with HCV infection being more common in the age of 31 to 60 years (67.40%), followed by age of 61 to 90 year (25.50%). In Pakistan, the first ever survey to estimate the burden of HBV and HCV was conducted in 2007-2008 on national level 13 where a total of 47, 043 individuals were tested for HBV and HCV infection, with males being more affected than females, overall 2.40% HBV prevalence and 4.80% HCV prevalence, where highest occurrence of HBV was reported from the Baluchistan province (4.30%) followed by 2.5% in Sindh, while Punjab reported the highest prevalence of HCV (6.70%) followed by Sindh (5.00%) and main factors highlighted for increased frequency of cases were repeated unscreened blood transfusions, past history of surgeries, intravenous drug use and shaving by barbers in the community.[14,15] The frequency of HBV was less in our study as compared to national levels while that of HCV has increased in comparison. Another study found that the occurrence of HBV and HCV was 6.7% and 14.3%, respectively, among 523 participants in Pakistan16, which was higher than the findings of our study. In one study, HBV and HCV positivity were 1.98% and 7.44%, respectively, which is comparable to our findings.[17] In Mexico, a low-resource country, the positivity of HBsAg and anti-HCV was 1% and 3%, which is much lower than Pakistan.[18] One study noted that HBV and HCV were 1.08% and 2.78%, respectively, in Pakistan, which is less than our data.[19] Screening for Hepatitis B and C should be done in all individuals with chronically elevated liver enzyme levels, multiple sex partners, those receiving regular blood transfusions, patients on dialysis and close contacts with Hepatitis B and C patients.[20,21] The Centers for Disease Control and Prevention (CDC) recommends that all individuals born in intermediate or high prevalence zones of Hepatitis B and C should get themselves screened at least once in their lifetime.[22,23] However, the number of individuals who get themselves screened every year for HBV and HCV is very low, as noted in our study, due to low level of knowledge among the primary care physicians,[24] where it was found that 42.00% were unaware of the correct interpretation of HCV serology, 20.00% lacked the knowledge about the true interpretation of HBV serology, while 22.00% and 18.00% did not recognize hepatocellular carcinoma as a long-term complication and sequelae of chronic HBV and HCV, respectively.

LIMITATIONS OF STUDY

This study's descriptive cross-sectional design conducted across only two tertiary care facilities (Lahore and Malir) limits generalizability to other regions or community settings in Pakistan, where hepatitis prevalence may vary. The screening campaign approach and heterogeneous sampling from specific departments (ENT, Gastroenterology) introduce potential selection bias and lack of adjustment for confounders like age and gender further

constrains interpretation of the reported seroprevalence. Anti-HBc (Hepatitis B core antibody) and anti-HBs should have been done as part of screening to rule out naturally recovered Hepatitis B virus infected cases. Multicenter studies with standardized risk factor evaluation are needed.

CONCLUSION

This study highlights the significance of early diagnosis and timely management of HBV and HCV infected cases as HBV and HCV can cause CLD, cirrhosis, and HCC making early diagnosis and treatment critical in preventing these serious complications. Due to lack of awareness, very few people participated in the screening campaign, highlighting the need for effective awareness strategies in this regard.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SM & MKAK: Data acquisition, data analysis, critical review, approval of the final version to be published.

FA & EG: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

RSAK & FM: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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