Frequency of Hepatitis B and C Infection In The General Population of Lahore: A Study To Highlight The Magnitude Of The Problem

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Abstract:
In the recent times, viral hepatic infection (HBV and HCV) has become the common and most important cause of liver disease and posing great health problem especially in the developing world. The importance of hepatitis B and hepatitis C is illustrated by the fact that these infections are imposing a heavy burden on national economy and individual families due to considerable morbidity and mortality from both acute infection and chronic sequelae including chronic active hepatitis, cirrhosis and hepatocellular carcinoma. The present study was carried out to determine the frequency of HBV and HCV infection in the general population of Lahore to highlight the magnitude of the problem.

A descriptive /cross sectional study was conducted during the ‘Free Hepatitis Camp’ held at Services hospital, Lahore, Pakistan for a period of one week from May 18, 2007 to May 25, 2007.

Blood specimens were collected and tested for HBsAg and Anti-HCV by using 3rd generation ELISA system.

This study was conducted in the general population of Lahore and a total of 992 subjects were screened for both hepatitis B and C. The carrier state of hepatitis was detected in 30.94% of the subjects. The prevalence of HCV among the total cases studied was 21.7%, hepatitis B, 8.06% and hepatitis B and C (dual infection) 1.31%. A higher percentage of male subjects showed positive results for HBsAg as compared to females whereas hepatitis C shows female predominance. Exposure to HBV and HCV infection increased with increasing age.

According to this study, about 1/3rd population of Lahore is suffering from chronic viral hepatitis and majority of them is unaware of their illness. This study further concludes that the frequency of HCV infection is much more common than that of HBV. The relatively high frequency of viral hepatic infection merits mandatory screening of the general population and high-risk individuals. This should be supplemented with health education along with vaccination against HBV of the masses to minimize further spread.

Key words: Viral Hepatitis, HBV, HCV, Anti-HCV, HBsAg, Vaccination, General Population, Lahore

Introduction
Hepatitis can be caused by numerous viruses, drugs and toxic agents, the clinical manifestations of which are quite similar. Only recently, viral hepatitis has emerged as a big health problem globally and has been differentiated into 5 major types with the development of serologic tests for specific markers. Hepatitis B was identified during World War II whereas HCV was distinguished in 1989. [1] The World Health Organization (WHO) estimates that more than 2 billion people show evidence of past or current HBV infection and over 350 million people are chronic carrier’s and about 170 million individuals are infected with hepatitis C virus (HCV) globally.

Viral hepatitis has become a disease of major significance and concern- in terms of morbidity and mortality. Regardless of the cause, all types of viral hepatitis affect liver cells. This accounts for the fact that many signs and symptoms for the various types are similar and not specific to the causative agent. The clinical picture of viral hepatitis is extremely variable, ranging from asymptomatic infection without jaundice to a fulminating disease and
death in a few days.\cite{2-5} Diagnosing the specific agent responsible for viral hepatitis is not possible clinically and a definite diagnosis of viral hepatitis is only achievable by the use of viral-specific hepatitis markers.\cite{3,5} HBV is usually transmitted by parenteral route through infected blood or blood products or by sexual contact and is present in saliva, semen and vaginal secretions. HBsAg positive mothers may transmit HBV to their neonates at the time of delivery; the risk of chronic infection in the infant is as high as 90%. HBV is highly prevalent in homosexuals and I/V drug users, but at present most cases reported in the USA, result from heterosexual transmission.\cite{4,8} Whereas HCV is predominantly transmitted through parenteral and percutaneous routes but many patients report no recognizable source of infection.

Viral hepatitis is also common in Pakistan and chronic hepatitis B and C are a serious clinical health problem. Accurate epidemiological information for chronic HBV and HCV infections is quite limited from Pakistan. Community based seroprevalence studies are difficult to conduct in a developing country because of socioeconomic hurdles and other difficulties. A tertiary care hospital catering to the needs of a large population represents an important center for serological surveys. The present study was carried out at Services Hospital, Lahore, a tertiary care center and a teaching hospital attached with the Services Institute of Medical Sciences, Lahore, Pakistan.

The objectives of this study were to determine the carrier state of HBV and HCV infection in the general population of Lahore to highlight the magnitude of the problem and to assess any age and gender differentiation in the prevalence of both infections in the studied population.

**Material and Methods**

This descriptive/cross sectional study involved detection of HBsAg and Anti-HCV in blood samples collected from individuals who participated in the ‘Free Hepatitis Camp’ held at Services Hospital, Lahore, for one week from May 18, 2007 to May 25, 2007.

**Blood Specimens:** Sterile disposable syringes were used to collect blood specimens from the participants. Markedly hemolytic specimens that may offer false positive or negative results were not included in the study. Subjects with incomplete or duplicate data were also excluded from the study.

**Subject’s data:** All subjects were self motivated and beyond recording age and gender, no attempt was practicable to obtain any history of contact or likely mode of infection associated with those whose blood tested were HBsAg or Anti-HCV reactive.

Participants were divided into seven different age groups: Group 1 (< 10 years), Group 2 (10-19 years), Group 3 (20-29 years), Group 4 (30-39 years), Group 5 (40-49 years), Group 6 (50-59 years) and Group 7 (≥ 60 years). [Table I]

The screening was performed in the clinical laboratory of Services hospital, Lahore. Almost all sera were screened on the same day of collection or refrigerated overnight. HBsAg and Anti-HCV 3rd generation ELISA kits were used to screen all blood specimens. Following instrumental and kits were used. Multiskan –EX (Thermo Electron Corporation, Finland), Ortho HCV 3.0-ELISA Test System Enhanced SAVE (sample addition verification) and MONOLISA HBs Ag Ultra (Bio-Rad, France).

SPSS version 12.0 was used for statistical analysis. The $X^2$ (Chi-square) test was used for qualitative variables- to check the relationship of HBV and HCV infection with age and sex. Percentages were calculated directly for HBV and HCV. Statistical significance level was accepted $P < 0.05$ as significant and $P > 0.05$ as insignificant.

**Results**

During this study, blood specimens of 992 subjects were screened for both hepatitis B and C. The carrier state of hepatitis was detected in 30.94 % of the subjects. The frequency of HCV among the total cases studied was 21.57 %, hepatitis B, 8.06 % and hepatitis B and C (dual infection) 1.31 % [Table I]. The proportion of hepatitis C amongst the total cases of hepatitis was 69.70 %, hepatitis B 26.05 % and for dual infection (HBV and HCV) 4.23 % and statistically, the difference was significant ($P < 0.05$). [Figure-1]. The youngest baby participated in this study was two (2) years old.

Out of total of 992 subjects screened, 214 (21.57 %) including 103 females (48.13 %) and 111 males (51.86 %) were sero-positive for Anti-HCV. [Table I & II] This table also shows that 17.99 % males and 27.46 % females were sero-positive for HCV and statistically, there was significant difference in the infection rate of both genders.
(P< 0.05). The geriatric age Group 7 (≥ 60 years) also showed a high percentage of Anti-HCV reactive cases. [Table I & III]

Eighty subjects (8.06 %) including 64 males (80.00 %) and 16 females (20.00 %) were reactive for HBsAg. A higher percentage of male gender showed positive results for HBsAg as compared to females. [Table I & II] This table also shows that 10.37 % males and 4.26 % females were sero-positive for HBV. The difference was significant (P < 0.05).

The maximum number of HBsAg reactive subjects were detected in the age group 3 (9.79 %) and for Anti-HCV in groups 4 and 7 (29.83 % and 36.84 % respectively) and were lowest in those in group 1 (0.00 % for HBV) and 5.55 % for HCV in the age group 2. [Table I & III] The dual infection was more frequent in the age group 3 and 5. [Table I]

Figure 1: Percentage distribution of viral hepatitis and Proportion of Hepatitis B and C amongst total reported positive cases of Hepatitis

![Percentage distribution of viral hepatitis and Proportion of Hepatitis B and C amongst total reported positive cases of Hepatitis](image)

Total Positive cases: [n=992] 307(30.94%); Percentage distribution, HBsAg+ = 80(8.06%), Anti-HCV+ = 217 (21.57 %), Dual= 13(1.31%), Total Positive cases: 307(30.94%), Total Positive Cases: 307, Total positive cases:307(30.94%)  

Table I: Distribution of Hepatitis B and C reactive cases in different age groups.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Age (Years)</th>
<th>Subjects Screened</th>
<th>Anti-HCV reactive cases</th>
<th>HBs Ag reactive cases</th>
<th>Dual (B&amp;C) reactive cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>&lt;10</td>
<td>15</td>
<td>1 (6.66 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Group 2</td>
<td>10-19</td>
<td>144</td>
<td>8 (5.55 %)</td>
<td>13 (9.02 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Group 3</td>
<td>20-29</td>
<td>286</td>
<td>49 (17.13 %)</td>
<td>28 (9.79 %)</td>
<td>6 (2.09 %)</td>
</tr>
<tr>
<td>Group 4</td>
<td>30- 39</td>
<td>248</td>
<td>74 (29.83 %)</td>
<td>19 (7.66 %)</td>
<td>2 (0.80 %)</td>
</tr>
<tr>
<td>Group 5</td>
<td>40- 49</td>
<td>198</td>
<td>56 (28.28 %)</td>
<td>15 (7.57 %)</td>
<td>5 (2.52 %)</td>
</tr>
<tr>
<td>Group 6</td>
<td>50-59</td>
<td>82</td>
<td>19 (23.17 %)</td>
<td>4 (4.87 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Group 7</td>
<td>≥ 60</td>
<td>13</td>
<td>7 (36.84 %)</td>
<td>1 (5.26 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>992</td>
<td>214 (21.57 %)</td>
<td>80 (8.06 %)</td>
<td>13(1.31 %)</td>
</tr>
</tbody>
</table>
Discussion
This study indicates that the frequency of viral hepatic infection (30.94 %) is quite high in the studied population and HCV infection (21.57 %) is much more prevalent than HBV (8.06 %). Our study represents a totally different population without any gender and age differentiation that may show an actual sero-prevalence in the general population of Lahore, a city of gardens.

According to various studies, the prevalence of HBV and HCV infection varies throughout the world. About three quarters (¾) of the world’s population lives in regions with high levels of HBV infection and is highly endemic in countries of Sub-Saharan Africa, Middle East and South East Asia.\cite{4,8,9} WHO estimates that over 5 million new hepatitis B virus infections occur yearly. In the United States, 1.0 – 1.25 million individuals are chronically infected with HBV. The number of acute HBV infections in the US is estimated to be approximately 140,000 – 320,000 per year\cite{4,5,8} and infection due to HCV accounts for 20 % of all cases of acute hepatitis, an estimated 30,000 new acute infections, and 8000-10,000 deaths each year.\cite{3,10,11} In a study from Egypt, Frank et al reported that Egypt has the highest number of reported HCV infections (22 %), largely attributed to the use of contaminated parenteral antischistosomal therapy.\cite{12} In a recently published study, Qureshi et al reported HBV and HCV prevalence rate of 13.2 % and 35.8 % respectively, among healthy Pakistanis and 38.0 % and 16.8 % respectively among healthy Nigerians working in Makkah region of Saudi Arabia.\cite{13}

Few studies are available about the prevalence of hepatitis B and C in the general population of Pakistan as most of the reported studies revolve around the blood banks and the healthy young blood donors, predominantly male in gender that does not represent general population. In any seroprevalence estimation, the appropriate study subject would probably be a sample from the general population, so the results from blood banks cannot be

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Total No.</th>
<th>Anti-HCV reactive cases</th>
<th>HBsAg reactive cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td>No.</td>
<td>Percentage</td>
</tr>
<tr>
<td>Male</td>
<td>617 (62.19 %)</td>
<td>111</td>
<td>17.99 %</td>
</tr>
<tr>
<td>Female</td>
<td>375 (37.80 %)</td>
<td>103</td>
<td>27.46 %</td>
</tr>
<tr>
<td>Grand total</td>
<td>992</td>
<td>214</td>
<td>21.57 %</td>
</tr>
</tbody>
</table>

Table III: Age and sex wise distribution of Anti-HCV +ve cases

<table>
<thead>
<tr>
<th>Age- Group</th>
<th>Total subjects</th>
<th>Male subjects</th>
<th>C +ve cases</th>
<th>Female subjects</th>
<th>C +ve cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>15.</td>
<td>11</td>
<td>1 (9.09 %)</td>
<td>4</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Group 2</td>
<td>144</td>
<td>92</td>
<td>7 (7.60 %)</td>
<td>52</td>
<td>1 (1.92 %)</td>
</tr>
<tr>
<td>Group 3</td>
<td>286</td>
<td>187</td>
<td>26 (13.90%)</td>
<td>99</td>
<td>23 (23.23%)</td>
</tr>
<tr>
<td>Group 4</td>
<td>248</td>
<td>148</td>
<td>38 (25.67%)</td>
<td>100</td>
<td>36 (36.00%)</td>
</tr>
<tr>
<td>Group 5</td>
<td>198</td>
<td>117</td>
<td>26 (22.22%)</td>
<td>81</td>
<td>30 (37.03%)</td>
</tr>
<tr>
<td>Group 6</td>
<td>82</td>
<td>49</td>
<td>8 (16.32%)</td>
<td>33</td>
<td>11 (33.33%)</td>
</tr>
<tr>
<td>Group 7</td>
<td>19</td>
<td>13</td>
<td>5 (38.46 %)</td>
<td>06</td>
<td>2 (33.33%)</td>
</tr>
<tr>
<td>Total</td>
<td>992</td>
<td>617</td>
<td>111 (17.99 %)</td>
<td>375</td>
<td>103 (27.46%)</td>
</tr>
</tbody>
</table>
applied to general population for the very obvious reason. Various small scale studies show wide variations ranging from 1.8% to 11.3% in case of HCV [14-21] and for HBV varies from 2.0% to 8.4% mainly in healthy blood donors [14-21]. In another study, the sero-prevalence of HCV among hospital based general population was found to be 17.77%. [22] From this and other studies, it can be assumed that hepatitis C is emerging as a major cause of viral hepatitis than hepatitis B in this region.

However, the relatively high seroprevalence of HBV and HCV merits mandatory screening of the general population and high-risk individuals. This should be supplemented with health education of general population to increase awareness about HBV and HCV infection, their modes of transmission and consequences. The large reservoir of viral infection in the community provides an opportunity to investigate risk factors for transmission, the natural history of infection and effectiveness of preventive methodologies. It also raises concern about the prospects of an increasing incidence of chronic liver disease in future.

Conclusion
In summary, the frequency of viral hepatic infection (30.94%) is quite high in the studied population. It is further concluded that HCV infection has become a much more common cause of hepatitis than HBV. While it is a universal truth that “Prevention is better than cure”, we should continue to struggle for creating awareness amongst masses to minimize further spread. National program for prevention and control of viral hepatitis has to be extended to provide free blood-screening facility to all for early detection of different types of viral hepatitis along with vaccination of masses against HBV.

Acknowledgments
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