Incidence of Hepatitis C Genotypes Among the Rural Population of Pakistan

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Abstract

This study was aimed to find out the prevalence of HCV infection and frequency of its genotypes in the population of the Karol war village i.e. situated in Lahore, Punjab, Pakistan. It was a descriptive cross-sectional study model. Tests were performed in the Department of Bacteriology, Institute of Public Health Lahore, Pakistan. Cases positive for Anti-HCV antibodies by chemiluminescence assay were subjected to HCV RNA detection by PCR. Genotyping was done by Geno-Sen’s HCV Genotyping 1/2/3/4 Real Time PCR kit for Rotor Gene. A total of 396 patients were enrolled for this study. The incidence of positive HBSAg and HCV cases were 11.86% and 1.5% respectively. Males were more affected with 61.7% (n=29) while positive cases in females were 38.3% (n=18). Age group of 31-45 years had higher infection rate among other ages (n=20). The frequency of genotypes 3, 1 and 2 was 36, 4 and 3 respectively while the genotype of 4 patients was found to be indeterminate. Genotype 3 is the most prevalent genotype in the studied individuals which corresponds to the local data available so far however 11.86 % positivity figure is quite alarming figure for that area.

Keywords: Hepatitis C virus, Prevalence, Genotypes, Anti-HCV antibodies, Chronic liver disease

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Introduction
Hepatitis C virus is a major cause of chronic liver disease. More than 170 million of the world population is infected with HCV [1] and around four million new cases are being added in this figure annually [2]. In the data inferred by World Health Organization (WHO) a population of 21 million is infected with HCV in Eastern Mediterranean Region [3]. However, at the best of our knowledge, a very few studies has been carried out in Pakistan to find out the prevalence of HCV. In combination with hepatitis B, chronic HCV infection accounts for 75% of all cases of liver disease [4]. The countries are struggling with economy, having chronic hepatitis C as a leading cause of liver cirrhosis, hepatocellular carcinoma and liver transplantation [5]. Historically, transfer of HCV in the developing world has been largely iatrogenic. Today, sporadic transmission is more common (drug addicts, needle sharing, needle-stick injury in medical personnel, tattooing and piercing or razor sharing) [6]. Pakistan has the second highest prevalence rate of hepatitis C ranging from 4.5% to 8% [6] and 7-9 million carriers of hepatitis B virus (HBV) with a carrier rate of 3-5% [7].

Table 1: Age, gender and occupation wise distribution of HCV-Ab positive and negative cases.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Class</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
<th>Prevalence/1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt;15</td>
<td>2</td>
<td>45</td>
<td>47</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>15-30</td>
<td>14</td>
<td>105</td>
<td>119</td>
<td>133.3</td>
</tr>
<tr>
<td></td>
<td>31-45</td>
<td>20</td>
<td>137</td>
<td>157</td>
<td>145.9</td>
</tr>
<tr>
<td></td>
<td>&gt;45</td>
<td>8</td>
<td>65</td>
<td>73</td>
<td>123</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>29</td>
<td>198</td>
<td>227</td>
<td>146.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>18</td>
<td>151</td>
<td>169</td>
<td>119.2</td>
</tr>
<tr>
<td>Occupation</td>
<td>Laborer</td>
<td>17</td>
<td>103</td>
<td>120</td>
<td></td>
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<tr>
<td></td>
<td>Butcher</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td></td>
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<tr>
<td></td>
<td>Employees</td>
<td>11</td>
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<td>Self-Business</td>
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<td></td>
<td>Non-employed</td>
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<td>32</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>House wives</td>
<td>11</td>
<td>85</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>47</td>
<td>349</td>
<td>396</td>
<td></td>
</tr>
</tbody>
</table>

Approximately 10 million people in Pakistan are infected with HCV [9]. Within Pakistan, the HCV prevalence rate varies between the four provinces, prevalence rate reported in Punjab is 6.7%, in Sindh 5%, in Baluchistan 1.5%, and in Khyber Pakhtunkhwa 1.1% [10].

The samples collected from the subjects enrolled in the study were analyzed by ELISA to screen for HCV-Ab. All the enrolled subjects further stratified in groups based on various attributes i.e. gender, age, and occupation. Out of total 396 cases, 47 cases were found positive for hepatitis C virus antibodies where the male and female cases were 29 (61.7%) and 18 (38.3) respectively. The prevalence of HCV among the study population was 11.86%. Most of the infected individuals belonged to age group 31-45 (n=20).

Material and Methods
396 individuals were enrolled in this study; among them number of male and female was 227 and 169 respectively.

Results
The samples collected from the subjects enrolled in the study were analyzed by ELISA to screen for HCV-Ab. All the enrolled subjects further stratified in groups based on various attributes i.e. gender, age, and occupation. Out of total 396 cases, 47 cases were found positive for hepatitis C virus antibodies where the male and female cases were 29 (61.7%) and 18 (38.3) respectively. The prevalence of HCV among the study population was 11.86%. Most of the infected individuals belonged to age group 31-45 (n=20). Among different occupation groups, laborers were the most infected subjects (n=17) while no butcher was reported to be positive for HCV infection (Table 1).

Table 1: Age, gender and occupation wise distribution of HCV-Ab positive and negative cases.
All the HCV positive cases were subjected to PCR testing which confirmed that the findings of all ELISA consistent with PCR test. After confirmation, the samples were further processed for genotype analysis. Among the positive cases, 36 cases were of genotype 3, 4 cases of genotype 2 and 3 cases of genotype 1 were reported while 4 patients remained indeterminate. The genotype results are summarized in figure 1.

![Image](image.png)

Figure 1: HCV Genotype result

**Discussion**

Pakistan is one of the three countries with the highest HCV infection prevalence worldwide \[14\]. According to a nationwide study, seroprevalence of HCV infection is 4.8% \[15\] whereas viraemic rate of 87.4% representing relative viraemic prevalence of 4.2% \[15\]. Our study is the first of its type to determine Hepatitis Prevalence and HCV genotypes in the surrounding village of Lahore Punjab, Pakistan. Sharing toothbrushes, smoking utensils, shaving by wandering hairdressers, unsterilized piercing and unsterilized acupuncture procedures are major risk factors reported in Pakistan \[14\]. In our study, laborer were the most infected group of individuals, as the aforementioned risk factors are likely to be found in this group of people. Studies done by \[16;17\] showed a similar finding that there was a higher proportion of male patients (53.1%) infected with HCV than females (46.9%). Previous studies in Pakistan also show similar higher prevalence in males (65%) as compared to females \[17\]. The most infected people from 26 to 35 years of age. Female population is having more of HCV infection as compared to males \[14\]. However, the age group 31-45 was having maximum of HCV positive cases in the present study (n=20). A study was undertaken in Pakistan \[15\] showed that HCV genotype 3 with distribution frequency of 72.9% and subtype a with distribution frequency of 73.8%. These findings supported the current findings in which cases detected as genotype 3 are 80.8%. Type 3 is the most prevalent HCV genotype in the North of Pakistan followed by type 2. The type 1 genotype is less prevalent in the North as compared to the rest of Pakistan \[18\]. Because of the more prevalence of type 3 & 2, we can safely recommend shorter durations of antiviral therapy with better viral clearance rates.

**Conclusion**

Prevalence of HCV is 11.86 %, HCV genotype 3 is the most prevalent genotype in a subjected population with highest infection found in the age group of 31 –45 years. The male population is having more HCV infection as compare to female.

**References**

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