Epidemiology of hepatitis C viral infection in Faisalabad, Pakistan: a retrospective study (2010-2012)

Muhammad Arif Maan[1], Hussain Fatma[2], Jamil Muhammad[3]

1. Punjab Medical College/Sexually Transmitted Infections (STIs) clinic, District Headquarter (DHQ) hospital, Department of Dermatology
2. University of Agriculture, Department of Chemistry and Biochemistry
3. Clinical Pathology Laboratory, District Headquarter Hospital

Abstract:

Background: Hepatitis viral infections are major health challenge leading to high morbidity and mortality worldwide.

Objectives: Although the magnitude of hepatitis in Pakistan has been well documented, information regarding the prevalence of hepatitis C virus (HCV) infection in Faisalabad, Pakistan is scarce. The present retrospective study was undertaken to determine the epidemiology of HCV in Faisalabad, Pakistan.

Methods: Between May, 2010 and December, 2012, medical records of 39780 subjects visiting sexually transmitted infections (STIs) clinic, district headquarter (DHQ) hospital, Faisalabad, Pakistan were reviewed. Regression analysis was used to determine independent risk factors

Results: HCV prevalence was 21.99%. With mean age of 49.5 ± 2.7 years (range 27-63 years), majority (67.15%) of the individuals were male. Marital status and low literacy rates were associated with HCV ($P<0.05$). Reference to the potential risk factors, the injection drug use was the major mode (72.77%) of infection transmission. Age (OR 1.5, 95% CI 1.2-1.9), male gender (OR 1.2, 95% CI 0.9-1.6) and injection use (OR 1.9, 95% CI 1.0-2.7) were significantly associated with HCV.

Conclusions: Most important finding was higher HCV prevalence in Faisalabad region as compared to the previous assessments that demands an urgent need for preventive intervention strategies.

Keywords: hepatitis C; virus; blood transfusion

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Introduction

Hepatitis C viral infections are major health challenge, with the global prevalence of 180 million patients. In Pakistan, about one million people are inflicted with hepatitis C virus (HCV). It leads to liver cirrhosis or hepatocellular carcinoma and results in high morbidity and mortality. [1-3] Nelson et al.,[4] compiled data on hepatitis prevalence in intravenous drug users (IDU) and it was observed that 60-80% of IDUs had anti-HCV in 25 countries and about 10.0 million IDUs worldwide might be anti-HCV positive. Numerous studies documented prevalence of hepatitis C infection.[5-17]

Diverse HCV prevalence rates worldwide could be explained by the different risk factors involved.[18-20] At national level, HCV prevalence among general population and high risk groups was reported.[21-24] Ahmed et al.,[25] reported 16% HCV prevalence among subjects visiting HCV screening camps and blood donors in Faisalabad. HCV infection inflicts major socioeconomic burdens and effective intervention strategies are mandatory to combat the consequences of hepatitis C at the regional levels.[1,24,25]

Incidence estimates are prerequisite to lessen the disease burden, hence preventive and treatment strategies can be implemented with precise objectives set to be attained. Despite increasing reports of HCV infections, its incidence and risk factors in Faisalabad, Pakistan are still obscure. Present retrospective study was undertaken to determine the epidemiology of viral hepatitis C in the local population.

Corresponding author:
Fatma Hussain,
Department of Chemistry and Biochemistry,
Faculty of Sciences, University of Agriculture,
Faisalabad-38040, Pakistan.
Phone: +92-41-9200161-170, Ext.3309,
E-mail: fatmauaf@yahoo.com

Methods

Study Period and Data Collection

The study covered two and a half year period from May, 2010 to December, 2012 and included 39780 individuals visiting STIs clinic, DHQ hospital, Faisalabad, Pakistan. From Clinical Pathology Laboratory (CPL), District Headquarter hospital, Faisalabad, Pakistan, patients' records were procured. As per reports; routine investigation involved blood sera test for antibodies to HCV (anti-HCV) by enzyme linked immunosorbent assay (Abbot Diagnostics, Germany), in accordance with the manufacturer's instructions. In addition, the following information was also collected: age, gender, marital status, education and high risk behaviours (blood donation, intravenous drugs abuse and sexual behaviours). The study was anonymous. Ethical approval for the protocols was procured from Research Committee, Punjab Medical College, Faisalabad, Pakistan.

All the data were expressed as number (n) or mean (standard error). Potential risk factors were assessed by multivariate analysis of variance (MANOVA). The p value of less than 0.05 was considered to be significant. To estimate the effect of each risk factor on anti-HCV positivity, the odds ratio was calculated by logisticregressionanalysis. Statistical analysis was performed by Statistical Package for the Social Sciences (SPSS Inc. Chicago, IL, USA) software (version 15.0)

Results

The present retrospective study was conducted with the aim to assess the HCV prevalence rate and the risk factors in general population visiting DHQ hospital, Faisalabad, Pakistan. Overall HCV prevalence was 21.99% (8751/39780) of the total sample. Annual incidence rates of HCV as shown in table 1 were almost consistent over the study period.

Comparative analysis of data regarding anti-HCV positive and anti-HCV negative subjects is summarized in table 2. Reference to the baseline characteristics of the HCV positive subjects, the mean age of the positive sample was 49.5 ± 2.73 years, signifying the fact that risk of HCV increased with older age. Majority (67.15%) of the HCV-positive individuals were male and the HCV seroprevalence showed statistically significant differ-

Table 1: Year-wise prevalence of HCV

2010		2011		2012		Overall Prevalence	
Tested	Positive (%)	Tested	Positive (%)	Tested	Positive (%)	Tested	Positive (%)
11290	1887 (16.71)	13354	3360 (25.16)	15136	3504 (23.15)	39780	8751 (21.99)

Data are n (%)

Table 2: Baseline characteristics and risk factors associated with Anti-HCV positivity

Characteristics	HCV positive subjects		HCV negative subjects	
	N	%	N	%
Samples tested	8751	21.99	31029	78
Age, mean (SE), years	49.5 (2.73)	-	47.4 (1.9)	-
≤ 40	2015	23.0	13824	44.5
> 40	6736*	76.97	17205	55.4
Gender				
Male	5876*	67.14	16095	51.87
Female	2875	32.85	14934	48.12
Marital status				
Unmarried	484	5.53	14119	45.5
Married	7289*	83.29	15866	51.13
Divorced/widowed	978	11.17	1044	3.37
Education				
None	835	9.54	1156	3.72
Primary	7525*	85.99	15400	49.63
> Primary	390	4.45	14473	46.64
Risk factors				
Blood donor				
No	6794	77.64	18484	59.57
Yes	1957	22.36	12545	40.42
Injection drug user				
No	2383	27.23	30291	97.62
Yes	6368*	72.76	738	2.37
Sexual behaviours[a]				
Heterosexual	390	4.45	19	0.06
Others (homosexual, bisexual)	36	0.41	12	0.03
None	8325	95.13	30998	99.90

Data are number (N), percentage (%) or mean (standard error). * $P < 0.05$[a] Self-reported extra-marital.

ences (P<0.05) between the two genders. Of potential risk factors, the injection usage was the major mode (72.77%) of infection transmission. Contrary to that, gender disparity was less prominent in HCV- negative individuals. The majority of the case participants (83.29%) were married and about 86% had primary level education. In anti-HCV negative group, only about half of the sample was married and 46.64% had higher education (>primary level). In anti-HCV subjects, about 60% denied any involvement in blood donation activity. Majority of the people in this group contradicted the drugs injection practice and extra-marital sexual activities. Table 3 shows the results of regression model to estimate the effect of each exposure while controlling for all other variables. Multivariate regression was used to estimate independent effects of risk factors on seropositivity. Among those, the following risk factors were significantly associated with seropositivity: over 40 years of age (OR 1.5, 95% CI 1.2-1.9); male gender (OR 1.2, 95% CI 0.9-1.6) and injection use (OR 1.9, 95% CI 1.0-2.7). Age (P 0.03) and male gender (P 0.004) were strongly associated with anti-HCV. Injection use increased the odds of being anti-HCV–positive (P 0.002). In regression model, education and marital status were no longer the significant predictors.

Table 3: Effects of predictors on the odds of anti-HCV positivity in HCV patients

	OR	95% CI	*P*
Age (years)			
≤ 40	1.0	0.7-1.9	0.51
> 40	1.5	1.2-1.9	0.03
Male	1.2	0.9-1.6	0.23
Female	1.0	1.6-1.9	0.15
Married vs. other status	1.0	1.5-2.3	0.11
Education vs. no education	1.0	1.2-1.9	0.15
Blood donation	1.0	0.6-1.8	0.24
Injection use	1.9	1.0-2.7	0.025
Heterosexual vs. others	0.7	0.5-1.4	0.38

CI: Confidence interval, OR: odds ratio (derived by multiple logistic regression analysis. Each variable is adjusted for the confounding effect of all the others listed in the table).

Discussion

The epidemiology of HCV may be diverse among different ethnic groups and within the same ethnic group residing in different geographic area. Present study estimated that the prevalence of HCV in Faisalabad region was 21.99% (table 1) which was a little higher than the earlier reported 16% HCV prevalence[25]. Different rates can be justified by the fact that our retrospective study sample comprised of subjects visiting STIs clinic, DHQ hospital, Faisalabad, Pakistan, whereas, previous report included subjects visiting HCV screening camps and blood donors. Several national studies indicated high prevalence of HCV infection in high risk groups. The prevalence of HCV was significantly higher (17.3%) in Rawalpindi than in Abbottabad (8%) among IDU[23]. Kazi et al.[24] determined 15.2% HCV among Pakistani prisoners. Prevalence rates of numerous sexually transmitted diseases in Faisalabad, Pakistan have already been documented[26], rationalizing the probability of associated infections. With about 50 years of mean patient age in present study, it can be concluded that older age favours HCV infectivity rate. An observation supported by previous studies. Brian et al.,[27] and Gaeta et al.,[28] indicated that the proportion of patients with clinically apparent hepatitis C increased with age. However, the increase in HCV cannot be explained solely by the effect of aging in the general population. Pakistani society reflects health care negligence and delayed physician consultation[26] and this may present an alternate explanation for the older age in present study.

Infected population attending STIs clinics had more men than women, indicative of striking gender difference (2:1). This tendency can be explained by the fact that chances of exposure to risk factors are more in men. Paladino et al.[29] confirmed that the host's genetic background plays a significant role in the outcome of HCV infection. In particular, they demonstrated a gender effect associated with the susceptibility to develop a persistent HCV infection. Nonetheless, other general or specified reasons not mentioned above to explain such effects should not be ignored. Present report documented that marital status and low literacy rates were associated with HCV (P<0.05). Low educational status is one of the major barriers to disease treatment and management in the local population.[26]

Sexual contact, intravenous and percutaneous drug use and occupational, habitual, social behavior have been identified as risk factors for hepatitis transmission in various settings.[18]

Present study identified injection drug use as the major factor imperilling HCV infection. Current outcome about IDU was supported by Nelson et al.[4] They detected 60-80% hepatitis C prevalence in injection drug users (IDU). Similarly, in Russian IDU, HCV prevalence was 54-70%[6] and 61.4% among Chinese IDU[7]. Contrary to that, higher prevalence of HCV (97.3%) in IDU was found in Mauritius[9]. However, IDU was never a significant factor for HCV incidence, as only 0.2% and 6% HCV infectivity was noticed in Congo15 and South- west Nigeria[8]. Our results are not in accordance with some of the earlier data at domestic level, presenting 8-17.3% HCV prevalence in IDU in Abbottabad and Rawalpindi.[23]

It is noteworthy that most of the HCV positive patients claimed to be either IDU or blood donors and very few acknowledged their sexual trends as the causative factor for infectivity. Self- described patient's history can be biased and should be considered with caution.

Conclusion

The Hepatitis C viral infections are highly prevalent among the local population. Given the long term exposure to risk factors, it is likely that injection drug users exhibit the highest proportions of HCV serological markers and indicate the urgent need for preventive strategies on intervention and facilitation of access to healthcare programs. Furthermore, for monitoring contagion trends, a period of two and half year is not sufficiently long. This data needs further observations.

Conflict of interest statement

We declare that we have no conflict of interest.

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