PREVALENCE AND DISTRIBUTION OF HEPATITIS C VIRUS GENOTYPES AMONG HOUSE HOLD AND DIRECT CONTACT PERSONALS OF HCV PATIENTS

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ABSTRACT: *Hepatitis C virus infection is a major public health problem across the globe. The aim of the current study was to determine the prevalence and risk factors of hepatitis C virus among house hold and direct contact personals infected with the disease, furthermore different genotypes of HCV infection were also detected and subsequently most prevalent subtype was predicted. A total of 178 house hold and direct contact personals were enrolled and screened for Anti HCV in the study. All samples were processed for Anti-HCV antibody detection through ELISA by using third generation ELISA Kit. The Anti-HCV positive serum samples were stored for RT-PCR to estimate the genotypes of HCV. House hold and direct contacts selected from in and around Lahore Metropolitan from June 2012 to December 2012 were included. The data analysis was done by using SPSS version 16. A P-value of < 0.05 was considered to be significant. The mean age of reactive and non reactive house hold and direct contact personals was 31.92±12.82 and 34.05±11.62 years, respectively. Road accident history, Gender, disease history of relative, Glass Sharing and Spoon Sharing were significantly associated with HCV status i.e. P-value<0.05. Out of 26 reactive respondents, 02 patients' viral genotype was Type-1, 22 patients' viral genotype was Type-3 and 2 patients' viral genotype was not detected and the most prevalent subtype of HCV genotype was 3a (n=22) followed by 1b (n=2). The study concludes that house hold and direct contact personals had high prevalence of HCV infection and sharing of utensils was a source of infection of HCV.*

Key Words: House Hold Contact, HCV, Genotype

INTRODUCTION

Hepatitis C is a contagious liver disease caused by blood borne viral infection of Hepatitis C virus (HCV) and has emerged as a major public health problem globally. An estimated 3% (170 million) people are persistently infected with HCV around the world [1]. There was a difference of HCV prevalence among the different countries. World Health Organization reported to collect better data in order to improve understanding the epidemiology of HCV infection [2]. Some studies documented the prevalence of HCV infection 17.78% in blood donors [3], almost 14.70% in long route truck drivers [4] and 10.84% in pregnant women [5] by using the method of Elisa.

The contact with general household items was not considered as risk, but sharing of razors and tooth brushes were responsible for the spread of hepatitis. The HCV antibodies had been detected in saliva of these patients. It was also highlighted that unsafe sexual practices, rituals like circumcision, excision, bloodletting, skin breaking activities like nose and ear piercing were the significant risk factors (P<0.05) responsible for the spread of viral infection [6].

Eighty six infants and their mothers were tested for HIV and HCV. It was found that those mothers who were co-infected with HIV and injection drug users more rapidly transmitted HCV to their children. It concluded that injection drug usage and HIV co-infection increased the risk for HCV vertical transmission [7]. Sharing of personal belongings was responsible for the spread of viral diseases. It was observed that 37.5% persons infected with HCV, were sharing each other's personal belongings. The major risk factors which were, barber shaves, dental procedure, sharing of tooth brushes and house hold items [8, 9, 10].

Out of 3115 pregnant women 18% were HCV positive. Among the HCV positive mothers 44.4% were HCV RNA positive. It was observed 25% vertical transmission of HCV among the HCV RNA infected mothers occurred [11] and 10.8% HCV prevalence was observed among pregnant women in Lahore [5].

This study was conducted to estimate the prevalence of Hepatitis C Virus infection among house hold and direct contact personals diagnosed with anti HCV antibody in and around Lahore Metropolitan. It also discussed the various demographic and risk factors associated with HCV infection. The different genotypes of HCV were also detected in this study and prevalent subtype was predicted.

MATERIALS AND METHODS

Present study was carried out to estimate the prevalence of laboratory confirmed Hepatitis-C virus infection in house hold and direct contact personals among the population of Lahore metropolitan. The risk factors of Hepatitis-C virus infection in house hold and direct contact personals in and around Lahore Metropolitan were also assessed. Subsequently distribution of genotypes of Hepatitis-C virus among house holds and direct contact personals through RT-PCR was assessed. Data collection was done through a pretested questionnaire (to study the risk factors associated with HCV infection). Convenient sampling technique was used to take blood samples of house hold and direct contact personals. The process of data collection was completed during the period of one year (June 2012 to December 2012). All samples were processed at Mayo hospital for Anti-HCV antibody detection through ELISA and third generation ELISA Kit (ETI-AB-HCVK-4, Diasorin S.P.A Italy) containing 96 wells was used for Enzyme Linked Immunosorbent Assay [12].

To study the different genotypes of Hepatitis-C virus, the Anti-HCV positive serum samples were stored and processed for RT-PCR (Real-time PCR Cepheid smart cycler was

Table-1: Distribution of reactive (Positive) & non-reactive (Negative) House Hold and direct contact personals

	Anti Hepatitis C Virus		Total
	Reactive (Positive)	Non-Reactive (Negative)	
Number (%)	26 (14.60%)	152 (85.40%)	178(100%)
Mean (Age)	31.92	34.05	33.74
Std. Deviation	12.82	11.62	11.75
(Independent sample t-test) p-value= 0.549 Statistically insignificant at 5%α level			

Table-2: Distribution of Hepatitis C Virus reactive & Non-reactive House hold and direct contact personals according to Demographic characteristics

Demographic Characteristics		Anti-HCV		p-value	ODDS Ratio	Confidence Interval	
		Reactive	Non-Reactive			Lower	Upper
Gender	Male	18	104	0.004	1.96	0.270-3.440	
	Female	8	48				
Geographical Status	Punjab	-	178	-	-	-	
Marital Status	Married	16	104	0.625	1.35	0.401-4.576	
	Unmarried	10	48				
Educational Status	Illiterate	22	118	0.570	1.58	0.31-7.85	
	Educated	4	34				
Occupational Status	Public Job	2	12	0.949	0.93	0.10-8.434	
	Private job	24	134				
Socioeconomic Status	5000-10000	14	88	0.666	-	-	
	11000-30000	12	62				
	>40000	0	2				

applied by using QIAamp Mini column kit and Sacace HCV Genotyping kit). The data collection was done through non-probability convenience sampling technique and was analyzed statistically by using SPSS version 16 [13]. All the quantitative data was presented in the form of frequency, percentage and mean ± S.D. The qualitative data was presented in the form of proportion and percentage where appropriate. T-test was used to access the difference of means between reactive and non-reactive house hold and direct contact personals. Chi-square test was used to analyze the qualitative data. A P-value < 0.05 was considered to be significant. Odds Ratio with 95% Confidence interval was used to see the magnitude of dependency on various risk factors.

RESULTS

Total 178 house hold and direct contact personals were selected and tested for Anti-HCV. Among the selected house hold and direct contact personals 26 were reactive for anti HCV. Mean age of reactive and non reactive house hold contact was 31.92±12.82 and 34.05±11.62 years. According to p-value no significant difference was present in the ages of reactive and non reactive individuals. i.e. (p-value>0.05) (Table-1).

In this group total 178 house hold and direct contact personals were selected and tested for Anti-HCV. Among the selected house hold and direct contact personals 26 (14.60%) individuals were reactive for Anti-HCV. Marital status, Qualification, occupation of the patient, income per month, visit to abroad, any kind of surgery, from where you got surgical treatment, blood transfusion, dental procedure, use of drugs Prescribed by, type of relationship in case of relative having the disease, purpose for visiting the barber/beauty salon was insignificantly (P-value>0.05) associated with Anti-HCV status. Significant association was observed for road accident history (P-value<0.05), Gender (P-value<0.05, OR=1.96), disease history of relative (P-value<0.05, OR=2.53) with respect to Anti-HCV status for house hold contacts. **(Table-2).**

No significant association was present for utensils sharing with respect to Anti-HCV status (Reactive/Non-Reactive) i.e. [Comb Sharing (P-value>0.05, OR=2.46), Towel Sharing (P-value >0.05, OR=0.675), Straw Sharing (P-value>0.05, OR=1.20), Razor Sharing (P-value>0.05, OR=1.20), Nail Cutter (P-value>0.05, OR=0.462), Tooth Brush (P-value>0.05, OR=1.563).] and significant association was found for Glass Sharing (P-value <0.05, OR= 3.87), Spoon Sharing (P-value <0.05, OR=2.82) with respect to Anti-HCV status (Table-3).

Table-3: The effect of sharing utensils and other items by House Hold and direct contact Personals

Sn			Anti-HCV		p-value	ODDS Ratio	Confidence Interval
			Reactive	Non Reactive			
1	**Comb Sharing**	**Yes**	22	128	0.970	1.031	0.218-7.605
		No	4	24			
2	**Glass Sharing**	**Yes**	23	101	0.024	3.87	1.11-13.50
		No	3	51			
3	**Spoon**	**Yes**	21	91	0.041	2.82	1.01-7.87
		No	5	61			
4	**Towel Sharing**	**Yes**	20	92	0.258	2.157	0.571-10.44
		No	6	60			
5	**Straw Sharing**	**Yes**	0	10	0.620	1.106	0.043-8.843
		No	26	142			
Odds Ratio was calculated by adding 0.5 in each cell							
6	**Razor Sharing**	**Yes**	-	-	-	-	-
		No	26	152			
7	**Nail Cutter**	**Yes**	18	124	0.306	0.508	0.136-1.888
		No	8	28			
8	**Tooth Brush**	**Yes**	2	2	0.152	0.160	0.009-2.733
		No	24	150			

Table-4: Distribution of HCV Genotypes (Subtypes) in House Hold Contacts.

	Types of HCV Genotypes(Subtypes)						
Group	**Type-1**	**Type-2**	**Type-3**	**MG***	**ND****	**UT*****	**Total**
House Hold Contact	2(1b)	0	22(3a)	0	2	0	**26**

MG*= Multiple Genotypes, **ND****= Not detected, **UT****=** Un-typeable

Table-4 summarizes the distribution of HCV genotypes and subtypes of HCV genotypes in house hold and direct contact personals among the positive cases of the study. Among 26 patients reactive for Anti-HCV, 02 patients' viral genotype was Type-1, 22 patients' viral genotype was Type-3 and 2 patients' viral genotype was not detected.

The most prevalent subtype of HCV enotype was 3a (n=22) followed by 1b (n=2).

DISCUSSION

HCV has infected 180 million people worldwide. Seroprevalence of HCV is 4-7% in the local population. It accounts for 40-60% cases of chronic liver disease. The rate of chronicity is >76%. After 20 years, 6-8% patients with Chronic Hepatitis C (CHC) develop hepatocellular carcinoma. There are 10 million copies of HCV per ml and as little as 0.0001ml of blood can impart infection. The predicted half life of HCV is < 3 hours. Blood-to-blood contact, sexual route and vertical transmission are regarded as the principal modes of infection. The concept of non-conventional spread of HCV has not been adequately investigated. Based on this study, we provide evidence in support of our hypothesis that nonconventional spread of HCV also occurs through person-to-person contact. It is observed that HCV prevailed 2 to 10 times more in the families of HCV infected patients than the general population. Possible routes of spread within families include sexual contact [14] and vertical transmission as well as sharing of razors [15] or injury occurred during daily life may be responsible.

In our study prevalence of HCV among house hold contact was found to be 14.60%. According to the results of study conducted by Pasha *et al*. estimated (1.33%) HCV seroprevalence among the household contacts of HCV-seropositive index cases, which is lower than the finding of other studies, which showed about 16to20% [16] Our results differ due to limitations, i.e. difference in study size, difference in duration, intensity of potential contact with adult patients, low infectivity of HCV in blood, genotypes [17].

Male to female ratio among reactive individuals was 3:2. Among reactive individuals 16 were married and the remaining 10 were unmarried. Marital status, Qualification, occupation of the patient, income per month, visit to abroad, any kind of surgery, from where you got surgical treatment, blood transfusion, dental procedure, use of drugs prescribed by, type of relationship in case of relative having the disease, purpose for visiting the barber/beauty salon was insignificantly associated with Anti-HCV status. A significant association was observed for road accident history, Gender, disease history of relative, Glass Sharing and

Spoon Sharing with respect to Anti-HCV status for house hold contacts (P-value<0.05).

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