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HEPATITIS-C VIRUS INFECTION;
SEROPREVALENCE AND RISK FACTORS IN STAFF NURSES OF LAHORE, PAKISTAN

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ABSTRACT… Objectives: Nursing staff is at potential danger of getting HCV infection. Objective of present study is to determine the prevalence and associated risk factors of hepatitis C among nurses in Lahore, Pakistan. It also aimed to estimate the HCV genotypes and find out any relationship between their working area and the incidence of HCV infection. **Setting:** Various public and private hospitals of Lahore. **Period:** January 2013 to December 2013. **Subjects and Method:** This study comprised 186 Nurses. All the samples were processed for Anti-HCV antibody detection through ELISA by using third generation ELISA Kit. Genotyping was also performed on all positive samples. In this study the data were analyzed using SPSS version 16. A P-value < 0.05 was considered to be significant. **Results:** A total of 186 nurses were enrolled and screened for Anti HCV in the study. The mean age of reactive and non reactive nurses was 22.33 ± 1.15 and 23.66 ± 1.97 years, respectively. Working experience in surgical wards, habits for going to beauty salon as well as the purpose for which nurses visited beauty salon was significantly associated with HCV status. i.e. p-value<0.05. Out of 9 reactive nurses, 8 patient nurses had 3a viral genotype while 01 patient had un-typeable viral genotype. **Conclusion:** In our study nine nurses have HCV infection and are at danger of the disease.The working area especially surgical wards is a source of infection of HCV.

Key words: Staff nurses, HCV, Genotype

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Novelty Statement
The study reveals a higher prevalence of HCV infection in Staff Nurses from various public and private sector hospitals of Lahore. It highlights that especially nurses of surgical wards are more infected with HCV than other wards.

INTRODUCTION
Hepatitis C is serious global public health problem with health care workers at more risk of getting infection especially in resource limited settings. Hepatitis is a disease characterized by inflammation of the liver, usually producing swelling and, in many cases, permanent damage to liver tissues. Globally Hepatitis C infects 3 to 4 million people per annum[1] however and it is generally considered that its prevalence is expected to surpass all other blood borne infectious diseasesparticularly among certain risk groups.[2] Pakistan has documented high prevalence of anti-HCV and active HCV infection from Lahore and other regions of Punjab.[3,4,5] Determination of genotypes provides relevant clinical information and particularly response in interferon treatment. In published reports of distribution of different HCV genotypes within the Pakistani population, the most predominant HCV genotype is genotype 3a i.e. 75 percent to 90 percent, followed by genotypes 1, 2, and 5.[6,7]

Blood borne infections are usually considered occupational hazard for years and they also share common route of transmission.[8] Nursing staff is at the forefront of exposure to HCV due to needle stick injuries and non precautionary measures in high burden resource limited countries. Accidental needle stick injuries are considered most associated risk factor for transmission of

Hepatitis B and C among health care workers.[9] The nurses constantly place themselves in potential danger, by attending to infected patients.[10] While acquiring infection from an infected patient is common, transmitting infection from an infected HCW to a patient is also being documented in an increasing frequency. The present study aimed to investigate the seroprevalence of Hepatitis C among nurses in population of Lahore Metropolitan city and to evaluate the risk factors of hepatitis C infection in the nurses. It also aimed to find out any relationship between their working area and the incidence of HCV infection andto find the distribution of genotypes of HCV in Anti-HCV positive nurses.

METHODS

Present study was carried out to observe the prevalence of laboratory based confirmed Hepatitis-C patients nurses among the population of Lahore metropolitan. For collection of data on a pretested questionnaire (to study the risk factors associated with HCV infection) and blood samples, a convenient sampling technique was used in nursesbelonging to different public sector and private hospitals of Lahore city. This study was approved by the ethical committee of the University of veterinary and Animal Sciences Lahore. After taking informed consent from enrolled nurses, the pre-tested questionnaire were got filled (to study the risk factors associated with HCV infection) during the period of one year (January 2013 to December 2013). All the samples were processed 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.[11] To study the different genotypes of Hepatitis-C virus, the Anti-HCV positive serum samples were subjected to Real time PCR(RT-PCRCepheid smart cycler was applied by using QIAamp Mini column kit and Sacace HCV Genotyping kit). In this study the data so collected was analyzed statistically by using SPSS (version 16).[12] 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. For quantitative data, t-test for independent sample was used for analytical statistics. 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

A total of 186 nurses were enrolled and screened for Anti HCV in the study. Out of these 9 (4.83%) nurses were reactive for Anti-HCV. The mean age of reactive and non-reactive nurses was 22.33±1.15 and 23.66±1.97 years, respectively. The mean age was insignificantly associated (p-value > 0.05) with HCV infection in nurses as given in table-I.

	Anti HCV Status		Total
	Reactive	Non-Reactive	
Number (%)	9 (4.83%)	177 (95.16%)	**186**
Mean(Age)	22.33	23.66	**23.60**
Std. Deviation	1.15	1.97	**1.95**

Table-I: Distribution of reactive (Positive) & non-reactive (Negative) Staff Nurses from healthy population of Lahore Metropolitan
P-value=0.525 statistically insignificant at 5% α level

As far as the marital status of these positive nurses is concerned, all were un-married. Marital status with respect to Anti-HCV status was not found to be statistically significant (P-value>0.05). The monthly income of all these nurses was <Rs.20,000 PKR. Among these 9 nurses who were found reactive, 03 was student of B.Sc. nursing and the remaining 06 nurses had qualified B.Sc. nursing and were employed at rank of staff nurses (P-value<0.05) as shown in table-II.

The data on working experience of nurses who were found reactive for anti-HCV was collected. All the reactive nurses revealed that they had experience of working in surgical wards. Working experience was significantly associated with Anti-HCV status ($p< 0.05$). All these 9 HCV positive nurses had history of treating HCV patients. 03 nurses gave the past history of being pricked by sharp objects out of 09 reactive nurses. The association of being pricked by sharp objects

Demographic Characteristics		Anti HCV Status		P-value	Odds Ratio	Confidence Interval	
		Reactive	Non-Reactive				
Gender	Male	-	-	-	-	-	-
	Female	9	177				
Educational Status	B.Sc. Nursing	9	177	-	-	-	-
Marital Status	Married	0	9	0.593	2.306	0.09	54.01
	Un-Married	9	168				
Rank	Student	3	3	0.002	0.034	0.002	0.773
	Staff Nurse	6	174				

Table-II. Distribution of Hepatitis C Virus reactive & Non-reactive Staff Nurses according to Demographic characteristics from healthy population of Lahore Metropolitan

Chi-Square test was applied and P<0.05 at 95% confidence interval was considered as significant

Odds Ratio was calculated by adding 0.5 in each cell

and anti-HCV status was found statistically insignificant i.e. p-value>0.05. Out of 09 reactive nurses for anti-HCV, none had a history of neither surgery nor history of blood transfusion or visiting any dentist (p-value>0.05). Among 09 reactive nurses Only 06 had a habit of going to beauty salon. According to p-value significant association was present for visit to beauty salon with respect to Anti-HCV status. i.e. p-value<0.05, OR=0.622 However, the purpose for which they visited beauty salon was significantly associated with Anti-HCV status. i.e. p-value<0.05 as shown in table-III.

Indicators	Response	Anti-HCV Status		P-value	Odds Ratio	Confidence Interval	
		Reactive	Non-Reactive				
Working Experience	Medical Wards	0	21	0.000	1	0.046	21.33
	Surgical Wards	9	156				
Working Hour/Day	6 Hours	9	162	0.824	0.7064	0.032	15.53
	12 Hours	0	15				
Working Shift	Morning	9	102	0.345	-	-	-
	Evening	0	30				
	Worked in all Shifts	0	45				
Length of Service	1-10 Years	9	177	-	-	-	-
Ever treated HCV Patients	Yes	9	138	0.63	2.032	0.09	41.82
	No	0	39				
Ever been Pricked	Yes	3	27	0.406	0.360	0.02	4.40
	No	6	150				
How many times you have been pricked	Pricked	3	27	0.406	2.778	0.227	33.94
	Not Pricked	6	150				
Pricked for what	Syringes	3	27	0.406	2.778	0.227	33.94
	Not Applicable	6	150				
History of Surgery	General	0	18	0.917	1.176	0.05	25.4
	No	9	159				
Blood Transfusion	No	9	177	-	-	-	-
How often you visit a Dentist	Never Visited	9	144	0.740	1.66	0.08004	34.42
	Visited	0	33				
Are you habitual for going beauty salon	Yes	6	42	0.005	0.622	0.05	7.38
	No	3	135				
For what proposes	Plucking	6	33	0.039	-	-	-
	Threading	3	6				
	Not Applicable	0	135				

Table-III: Summary of association between Hepatitis C and various indicators about Staff Nurses from healthy population of Lahore Metropolitan

Chi-Square test was applied and P<0.05 at 95% confidence interval was considered as significant

Odds Ratio was calculated by adding 0.5 in each cell

Table-IV summarizes the distribution of HCV genotypes in nurses. Among 186 respondents reactive for Anti-HCV, 08 patients' viral genotype was Type-3 and subtype detected was 3a, and 01 patients had un-typeable viral genotype.

Groups	Types of HCV Genotypes						
	Type-1	Type-2	Type-3	MG*	ND**	UT***	Total
Nurses	0	0	8(3a)	0	0	1	**9**

Table-IV. Distribution of HCV Genotypes(Subtype) in Staff Nurses
MG* = *Multiple Genotypes,* ***ND**** = *Not detected,*
UT* = *Un-typeable*

DISCUSSION

Staff nurses are at forefront of the battle against blood borne viral and bacterial infections as they place themselves constantly in potential danger of acquiring infections as shown in our study that HCV prevalence was 4.83 percent which is alarmingly high in comparison with other studies (1.8 percent).[13] Our study is in accordance with and Jindal et al.[14] A study conducted in Pakistan reported very interesting facts about HCV prevalence of nursing staff i.e. 6% had HCV infection and 18% nurses had HBV infection. Moreover they also reported that HCV alone were seen in 5.6% of participants. HBV and HCV together were seen in 3.2% of positive cases.[15] Their findings are almost similar to the findings of the present study and some other reports in literature.[16,17] Discussed in their study about the prevalence of HCV, while they found it was most frequent and common in nurses. However prevalence of HCV can be found by screening total nursing staff of hospitals of Pakistan.

Results from the study of (Akhtar et al 2014)[18] showed that a higher risk of HCV infection in pregnant women who had undergone any kind of surgical treatment. The present study recorded that all the reactive nurses were those who had experience of working in surgical wards. Working experience was significantly associated with Anti-HCV status. All these 9 nurses who were reactive for anti-HCV have had history of treating HCV patients. According to the results of another study conducted in Lahore history of surgery and blood transfusion were significantly associated with anti-HCV status among blood donors whereas tattooing on the body was found to be the risk factor as the odds ratio was 3.0.[3]

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PREVIOUS RELATED STUDY

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