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Seroprevalence of Hepatitis C Virus Among Indoor and Outdoor Patients of A Tertiary Care Hospital: One Year Study

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ABSTRACT- Aim: The present study was to know the seroprevalence of Hepatitis C virus among indoor and outdoor patients of a teaching tertiary care hospital in North India.

Study design: Place and duration of study: Department of Microbiology, Pt. B. D. Sharma PGIMS Rohtak, Haryana, India, between August 2013 to July 2014.

Methodology: This is a retrospective study performed on blood samples collected from patients of all ages and both sexes. Commercially available Erba Lisa Hepatitis C ELISA kits were used which detects anti-HCV IgG antibodies. Statistical analysis was performed when two or more variables were needed to compare. SPSS version 17 was used to calculate *P* value.

Results: The prevalence of HCV was 3.74% in our study. 72.7% were from males and 27.3% were from females. Highest number of positive samples was from 11-20 years age group (5.6%). The positivity for anti-HCV antibodies was higher in indoor samples (7.8%) as compared to outdoor samples (2.3%).

Conclusion: Strict need to follow universal precautions for HCV control and education of public so that high risk activities should be controlled.

KEYWORDS: Hepatitis C virus, Seroprevalence, anti-HCV antibodies, Indoor, HCV control

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INTRODUCTION

Hepatitis C is an infectious disease affecting the liver caused by Hepatitis C virus (HCV). HCV is a RNA virus, heterogenous in nature showing multiple genotypes and subtypes. HCV infection is a global health problem with approximately 170 million persons are chronically infected worldwide, an estimated prevalence ofapproximately 2% and 3 to 4 million persons newly infected each year.[1] Hepatitis C can present as acute or chronic hepatitis. Most of the cases of acute hepatitis C are asymptomatic with patients unaware of the underlying infection. Symptomatic acute hepatitis with jaundice is seen in only 25% of the infected patients.

Nearly 54-86% of the infected personprogresses to chronic hepatitis and about one fifth of the patients develop cirrhosis. The patients with cirrhosis are at a higher risk of developing hepatocellular carcinoma and about 1-4% of patients are developing this complication every year.[2]

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HCV antibody prevalence varies from 0.4-2% in different parts of the world. In India, prevalence rate is between 1.5-2% in general population.[3]

Transmission of HCV is primarily by parenteral route which occur byneedlestick injuries, sharing of contaminated needles in intravenous drug addicts, ear and nose piercing, tattooing, sharing of shaving razor, dental procedures and use of contaminated blood inblood transfusion. Recipients of multiple blood transfusions such as patients of thalassemia, haemoglobinopathies, clotting disorders, patient on haemodialysis are particularly at higher risk for acquiring HCV infection.[4]Other mode of transmission is vertical transmission from infected mother to children. Approximately 7-8 percent of HCV positive women transmit HCV to their offsprings with a higher rate of transmission seen in women co-infected with HIV.[5]

Detection of Anti-HCV IgG by serological tests is the most common laboratory procedures used for diagnosing hepatitis C. Enzyme linked immunosorbent assay (ELISA), immunoblot assays and more recently immunechromatography based rapid tests are used for serological testing. The most commonly used initial blood test for Hepatitis C is ELISA. However, none of these tests have potential to discriminate between active and resolved HCV infection.[6]This study was undertaken on serum samples sent from patients admitted in different wards of our

tertiary care teaching hospital and also on patients attending outpatient departments to know the seroprevalence of HCV.

MATERIALS AND METHODS

Hepatitis C testing was carried out in our clinical Microbiology laboratory on those blood samples which were collected by clinicians and received in vacutainers with no anticoagulant from the patients admitted in different wards and intensive care units (ICUs) as well as patients attending the outpatient departments. This is a retrospective study conducted during time interval of one year from August 2013 to July 2014. Commercially available Erba Lisa Hepatitis C ELISA kits were used which detects anti-HCV IgG antibodies. These kits are procured from Transasia Bio-Medicals Ltd, Daman. In the laboratory, serum was extractedby centrifugation as soon as possible to avoid haemolysis. These serum samples were numbered and stored in refrigerator at 2-8^{0}C. When ELISA was put, these frozen serum specimens were brought to room temperature and were thawed properly. All the reagents were also brought to room temperature and shaken well before use. Erba Lisa Hepatitis C is based on indirect ELISA using a solid phase prepared with the mixture of synthetic peptides and recombinant proteins of HCV i.e. CORE, NS3, NS4 and NS5. This kit detects only IgG type of anti-HCV. The whole test was performed as per manufacturer's instructions. Optical density was read at 450nm by ELISA reader and cut off value was calculated. Samples with an Optical density less than the cut off value were considered non-reactive. Samples with an Optical density equal to or greater than the cut off value were considered initial reactive. These samples were retested and on retesting if the optical density was less than the cut off value it was considered as non-reactive and if the retest cut off value of the sample is found more then it was considered reactive. Statistical analysis was performed when two or more variables were needed to compare. SPSS version 17 was used to calculate *P* value.

RESULTS AND DISCUSSION

A total of 10750 blood samples were received during study period for Hepatitis C testing. Out of 10750, 403 (3.74%) samples were reactive for anti-HCV antibodies. Among 403 reactive samples, 293 (72.7%) were from males and 110 (27.3%) were from females (table 1). In terms of *P* value it was extremely significant (<0.0001). Maximum number of samples was received from age group 21-30 years (23.5%), while highest number of positive samples was from 11-20 years age group (5.6%) (Table 2). Studies from different regions of the world show wide variation in prevalence of HCV. Study from south India reported 4.8% seroprevalence of HCV among hospital based general population. In the same study, seroprevalence in males and females was 5.9% and 3.3% respectively.[7] However, low rate of anti-HCV antibody positivity among blood donors has also been reported such as 0.34%, 0.4% and 0.5% rate from Turkey, Saudi Arabia and Pakistan respectively.[8-10] Monthwise distribution of samples are shown in table 3.

Table 1: Sex wise distribution of reactive samples

Total no. of samples received		Number and percentage of Reactive samples		
10750	Male=7031 Female=3719	403(3.74%)	Male=293(4.16%) Female=110(2.95%)	*P* value <0.0001

Table 2: Age wise distribution of reactive samples

Age in years	Total no. of samples	No. and percentage of positive samples
0-10	661	29 (4.4%)
11-20	1549	87(5.6%)
21-30	2526	60(2.4%)
31-40	1869	71(3.8%)
41-50	1448	56(3.8%)
51-60	1265	59(4.6%)
61-70	903	31(3.4%)
71-80	358	07(1.9%)
81-90	171	03(1.8%)
Total	10750	403(3.7%)

Table 3: Monthwise distribution of total and positive samples

Month	Total no. of samples	No. and percentage of Positive samples
Aug 2013	55	0(0)
Sep 2013	275	09(3.3%)
Oct 2013	354	10(2.8%)
Nov 2013	649	18(2.7%)
Dec 2013	761	14(1.8%)
Jan 2014	865	39(4.5%)
Feb 2014	818	20(2.4%)
March 2014	1201	29(2.4%)
April 2014	1282	93(7.2%)
May 2014	1379	64(4.6%)
June 2014	1607	60(3.7%)
July 2014	1504	47(3.1%)
Total	10750	403(3.74%)

The positivity for anti-HCV antibodies was higher in indoor samples (7.8%) as compared to outdoor samples (2.3%) (Table 4 and 5). Statistically this difference was also very significant (*P* value 0.0031).

Table 4: Outdoor and indoor distribution of total and positive samples

Total outdoor	Total no. of samples	No. and percentage of Positive samples
Surgery OPD	3320	47(1.4%)
Medicine OPD	1233	68(5.5%)
Gynaecology OPD	172	09(5.2%)
Paediatrics OPD	70	04(5.7%)
Skin OPD	33	01(3%)
ENT OPD	3088	51(1.6%)
Burn plastic surgery ward	37	03(8.1%)
GIC	146	13(8.9%)
Respiratory intensive care unit	23	01(4.3%)
Cardiovascular surgery ward	70	04(5.7%)
Orthopaedicsward	143	07(4.9%)
Gastro surgery ward	343	45(13.1%)
Nephrology ward	104	06(5.7%)
Thalassemia unit	750	96(12.8%)
Urology ward	867	29(3.3%)
Other wards	351	19(5.4%)

Table 5: Total number and percentage of positive outdoor and indoor samples

Total outdoor samples	Number of positive outdoor	Total indoor samples	Number of positive indoor samples	*P* value
7916	180(2.3%)	2834	223(7.8%)	0.0031

In our study, anti-HCV antibodies were detected in 13.1% of patients undergoing routine dialysis in nephrology ward. Similar results has also been reported in a study from Coimbatore in which 12.4% of patients on haemodialysis were found to be anti-HCV positive.[11] A number of risk factors have been identified for HCV infection among the dialysis patients, which include cross infections from the sharing of dialysis machines and the dialysis equipment, the reprocessing of dialyzers and blood lines and the increased requirement of blood transfusions.[12, 13]

Thalassemia patients are more prone to develop HCV and other transfusion transmitted infections. In our study, 12.8% of the thalassemia patients were found to be positive for anti-HCV antibodies. Unsafe therapeutic injections and not properly screened blood used for transfusion are the predominant modalities of transmission of Hepatitis C in India. In India, mandatoryscreening for HCV was introduced as late as in 2002.However, now a day serological markers for HBV, HCV and HIV are screened in blood banks routinely. The interval from the onset of hepatitis to seroconversion to anti-HCV antibody is 4-32 weeks. As ELISA test detects only anti-HCV antibodies so, if the donors who are infected with Hepatitis C virus but have not develop seroconversion they are missed by ELISA. So, it is essential to adopt strict criteria in the selection of donors and to avoid unnecessary transfusion.This should also be supplemented with health education of general population to increase awareness about this virus and its modes of transmission.

CONCLUSIONS

Although prevalence of HCV in our study is comparable with other studies from different parts of world, even then there is need to follow the universal precautions for HCV control strictly.

AUTHOR'S CONTRIBUTIONS

Author 1 performed data collection, organise the data and managed the literature searches. Author 2 designed the study, performed the statistical analysis, and wrote the manuscript. Author 3 and Author 4 managed the analysis of the study. All authors read and approved the final manuscript.

CONSENT

This study doesn't involve human subjects directly. Blood samples were taken by clinicians from patients. We performed testing on those samples which were received in our department. So, we didn't get consent form from patients.

ETHICAL APPROVAL

All the procedures and investigations conducted in this study are standard and do not carry any harmful effects on the patients. Thus the present study is well within the ethical norms and is ethically justified. All the biomedical waste generated in the laboratory is discarded as per the recommended guidelines. So, this study is not against the public interest.

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