

Original Research Article

Seroprevalence of HCV Infection at a Tertiary Care Hospital, Western Uttar Pradesh, India

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ABSTRACT

Introduction: Hepatitis C virus (HCV) infection is a major cause of acute and chronic liver disease. The incidence of this is rising rapidly in India, and spreads by contaminated blood and blood products. This infection is detected by presence of anti-HCV antibody in patient's serum. This study aims to determine HCV seroprevalence in our region.

Methods: This cross sectional hospital based study was conducted from May to December 2018. 2-4 ml of venous blood sample was collected from all patients, and subjected to anti-HCV antibody detection by Chemiluminescence ELISA in Viral Research and Diagnostic Laboratory (VRDL) at Department of Microbiology.

Results: A total of 9340 blood samples were screened for anti-HCV antibody, of these 217 (2.3%) were found positive. This seroprevalence was contributed by 122 (56.2%) males and 95 (43.8%) females. The mean age and standard deviation of all seropositive cases was (Mean±SD) 40.35±15.38 years. Although, most of the seropositivity was seen in the age group of 20-39 (47%), and least (4.6%) in age group 0-19 years.

Conclusion: HCV infection predominantly affects young adults, which is due to cumulative risk of exposure with increasing age. Infection approximately equally distributed in both gender.

Key words: Seroprevalence, anti-HCV antibody and chemiluminescence

INTRODUCTION

The Hepatitis C virus (HCV) infection is an important and major cause of acute and chronic liver disease (e.g. cirrhosis and hepatocellular carcinoma) thus accounting for a major public health concern. [1] Globally, it is estimated that 110 million people are positive for HCV antibody, of which 80 million have viraemia and World Health Organization (WHO) has estimated that there are 10-24 million population living with active HCV infection in India. [2] The seroprevalence of HCV among healthy population ranges from 0.09 to 2.02% in India. [3,4]

Most of the general population remain unaware of their infection and therefore frequently present with advanced disease and may transmit to others. The transmission of HCV infection remains high in groups such as IV drug abusers, unsafe sexual practices, recipients of unscreened blood products, patients in hemodialysis centers, and organ transplant patients. Besides this, infection may also be transmitted vertically from mother to child. [5]

Currently preventive vaccine for HCV is not available commercially, although highly effective antiviral drugs are

available for treatment of HCV infection. If cases are timely identified and promptly treated, the rate of infection can reduce the mortality from liver cancer and cirrhosis. [6] The infection is detected by the presence of anti-Hepatitis C virus antibody (anti-HCV antibody). This antibody is seen in more than 95% of chronic infections and in only 40% of acute infections. [7] Therefore, an accurate detection of HCV infection is a crucial component to receive the necessary care and treatment to prevent or delay progression of liver disease. Keeping the above facts in mind, the present study is aimed to evaluate the seroprevalence of anti-HCV antibodies among patients attending different OPD and IPD of this Tertiary Care Hospital.

MATERIALS AND METHODS

Study design and participants

This cross-sectional hospital-based study was conducted from May to December 2018 in the Department of Microbiology, at this Tertiary Care Hospital of Western Uttar Pradesh. All those patients, who visited OPD/IPD of this Hospital and were advised to undergo HCV screening from different clinical departments, were included in this study.

Data and specimen collection

The patients' information including demographic profile was noted in prescribed Performa. The universal safety precautions were observed during collection and handling of the blood samples. A total volume of 2-4 ml venous blood sample was collected by venipuncture from each patient, and subjected for anti-HCV antibody test. All the samples were labeled properly and processed in Viral Research and Diagnostic Laboratory (VRDL) under Department of Microbiology.

Processing of blood sample

All samples were tested by Chemiluminescence ELISA (ARCHITECT anti-HCV assay, Abbott Diagnostics, Germany) method as per manufacturer's instructions. In brief, anti-HCV assay is a two-step immunoassay, using

chemiluminescent microparticle immunoassay (CMIA) technology, for the qualitative detection of anti-HCV in human serum and plasma. In the first step, sample, recombinant HCV antigen coated paramagnetic microparticles and Assay Diluent are combined. Anti-HCV present in the sample binds to the HCV coated microparticles. After washing, anti-human acridinium-labeled conjugate is added in the second step. Following another wash cycle, Pre-Trigger and Trigger Solutions are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs). A direct relationship exists between the amount of anti-HCV in the sample and the RLUs detected by the ARCHITECT System optics.

Statistical Methods

The data were entered in MS Excel on daily basis and analyzed with Statistical Package for Social Sciences (SPSS) version 22.0 (IBM Corp., Armonk, New York, USA). Frequencies were reported as percentages. Chi-squared statistics was used to estimate whether a significant difference existed between gender prevalence of HCV. Ethical Approval: The study has been approved by the University Ethics Committee "E.C. No.148/ 2017/ Dean/ UPUMS".

RESULTS

A total 9340 samples were screened for anti-HCV antibody, of these 217 were found positive. Thus the total seroprevalence of HCV accounted 2.3% in this study. Among all anti-HCV antibody positive cases, 122 (56.2%) were males and 95 (43.8%) females. The gender ratio of amongst male to female was 1.3:1 calculated, although gender difference was not statistically significant ($p > 0.05$). The mean age and standard deviation (Mean \pm SD) was 40.35 \pm 15.38 years seen for all seropositive subjects. The individual analysis for male, it was 40.72 \pm 15.83 years and for female 39.86 \pm 16.47 years.

The maximum seropositivity of anti-HCV was seen in age group 20-39 years (47%) followed by age group 40-59 years (36.86%), ≥ 60 years (11.52%) and 0-19 years (4.6%) of age. (Table No.1)

Table No 1: Age and gender wise seroprevalence of HCV infection

Age Groups	Male	Female	Total
0-19	08 (3.7%)	02 (0.9%)	10(4.6%)
20-39	48 (22.1%)	54(24.9%)	102(47%)
40-59	47(21.6%)	22(10.1%)	69(31.8%)
≥ 60	19 (8.7%)	17(7.8%)	36(16.6%)
Total	122(56.2%)	95 (43.8%)	217 (100%)

DISCUSSION

The infection of HCV is rising rapidly in India, spread by transfusion of contaminated blood or blood products. The infection is detected by serological (anti-HCV antibody) and molecular methods (HCV-RNA) in patient's whole blood/serum. In order to estimate the seroprevalence of HCV in this region, both IPD and OPD visiting patients were screened for presence of anti-HCV antibody who were advised by their respective treating physician/surgeon. In the current study, overall seroprevalence of anti-HCV observed was 2.3%. The above prevalence was significant proportion of the global HCV burden. A significant variation in prevalence has been noted across various geographical regions in India. There is paucity of large population-based studies studying the prevalence of hepatitis C in the general population. [8] A similar study reported prevalence of 2.02% from eastern coast of Southern India. [9] Another study from Eastern India, found seroprevalence of HCV to be 0.87% amongst 2973 subjects. [10] The seroprevalence of HCV also varies among different hospital based studies. Mishra *et al.*, [11] have reported prevalence of 1.57%, Irshad *et al.*, [12] 1.4% while Bhattacharya *et al.*, [13] found 4.8%. Few studies conducted in the tribal populations of India have reported altered prevalence of anti-HCV positivity (7.89% in Lisu community in Changland district of Arunachal Pradesh and 2.02% in Lambada tribe in Andhra Pradesh). [14,15] The

variation in seroprevalence may be due to different sample size, geographical, genetic difference, other socioeconomic characteristic and immunity variation also may contribute to this difference.

In the current study, the gender based contribution and differentiation also observed, it was consisting 56.2% males and 43.8 % females. The gender based differences was not significant varied because approximately equally distribution of HCV infection was seen in general population in current study ($p > 0.05$). A recent similar findings reported from Uttar Pradesh [16] found that 54.5% male and 45.5% female while Jahan *et al.*, [7] found 47% male and 53% female. Another study by Sood *et al.*, [17] with large sample size, reported 46.2% males and 53.8% females contributing to all seropositive cases. Chaudhary *et al.*, [10] reported no gender based difference.

In present study, it was observed that HCV infection targets youth, the mean age \pm SD was calculated 40.35 ± 15.38 years among all seropositive cases. Alike young age group involvement as reported by Jahan *et al.*, [7] mean age was 35.7 ± 16.8 years and Agarwal *et al.*, [16] found 45.5% patients belong to 25-35 years age group. The involvement of young age group has been taken with much seriousness as this is indirectly responsible for decrease in India's GDP. In current study, higher positivity was seen in the age group of 20-39 years followed by 40-59 years. (Table No.1) A study conducted in Singapore showed high frequency of HCV infection in age group 36-40 years (76.92%) and second common age group were 31-35 year (71.43%). [18] The reason behind that high rate of HCV infection in youths are IV drug abusers through the sharing of needles; the reuse or inadequate sterilization of medical equipment, especially syringes and needles in healthcare settings; unsafe sexual practices and the transfusion of unscreened blood and blood products. HCV can be transmitted from an infected mother to her baby; however these modes of transmission

are much less common. [5] In this study, least infected group was 0-19 years and showed only 4.6% of HCV infection.

The sentinel surveillance requires efficient diagnostic tools to know the actual prevalence. The routine screening of HCV mainly based on anti-HCV immunochromatographic rapid card in resource limited countries while it to be showed low specificity for capturing HCV infection. Even though, only referrals hospital are performing ELISA based confirmatory tests. In the present study all samples were tested by Chemiluminescence ELISA method. This method having high sensitivity and specificity which is the main tool of screening in this study thus giving final results of seroprevalence.

CONCLUSION

HCV is one of the emerging infections in India due to lack of awareness, poverty and ignorance in general public. In order to prevent transmission of infection, health education of general people regarding these modes of transmission and precautions, prompt diagnosis using appropriate tools may prove useful in effective preventions esp. in developing nations.

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Conflict of interest: None

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