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Seroprevalence of Hepatitis C Virus in Diagnostic Patients and Blood Donors in and Around Davangere

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Hepatitis C virus (HCV) infection represents a major health problem. Chronic HCV infection is generally asymptomatic with a large reservoir. The most common serious complication of blood transfusion is post-transfusion hepatitis from the HCV. The present study determines the distribution of antibodies to Hepatitis C virus (HCV) in diagnostic patients and blood donors attending a tertiary care hospital in Davangere. Blood samples were collected from 200 diagnostic patients whose blood samples were sent to laboratory for routine blood investigation – 128 (64%) males and 72 (36%) females. Also Blood samples were taken from 200 Blood donors – 170 (85%) males and 30 (15%) females. Detection of antibodies to HCV (anti-HCVs) was carried out by Enzyme Linked ImmunoSorbent Assay (ELISA).

Out of 200 diagnostic patients, 5(2.5%) were positive which included 2 (1.6%) male and 3 (4.2%) females. Out of 5 positive patients, 2 were CRF patients on Haemodialysis, 1 each was a case of Hepatitis, Pyrexia of Unknown Origin (PUO), and secondaries in liver. The patient with secondaries in liver was coinfected with Hepatitis B Virus(HBV) From 200 Blood donors, 4 (2%) donors were anti-HCV positive and all are males (2.4%). The overall HCV seroprevalence among diagnostic patients and blood donors was 2.0% (9/450). As per the literature search, no work has been done on this topic from in and around Davangere, hence the study was undertaken. This study provides the estimates of HCV seroprevalence in hospital based population and among blood donors. The seroprevalence in this population is similar to that reported from developing countries like India. The total reservoir of infection is significant and calls for public health measures, including health education to limit the magnitude of the problem.

Key words: Hepatitis C virus; seroprevalence; blood donor; diagnostic patient; ELISA.

Since the introduction of reliable serological tests for Hepatitis-A (HAV) and Hepatitis-B viruses (HBV) in the 1970s, it has become apparent that most cases of post transfusion hepatitis are now caused by neither of those viruses. Later, it was identified as a positive-stranded RNA virus that appears to be distantly related to the flaviviridae family.[1,2]

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Globally, Hepatitis C Virus (HCV) has infected more than 170 million people and represents a viral pandemic. In India, approximately 1.8 – 2.5% of the population is presently infected by HCV and about 20 million people are already having HCV infection.[3]

The vast majority of the patients in the acute phase are asymptomatic. Symptoms occur in less than 25% of those infected. Progression to chronic disease occurs in 70%-80% of those infected. Cirrhosis complicates 20% of chronic cases with 20 years of infection. Once cirrhosis has begun, hepatocelluar carcinoma [HCC] develops in 1-7% of patients over a 15-20 year period.[4]

Blood transfusion is a major mode of HCV transmission. HCV is also transmitted by any act that brings the virus to blood contact like injection drug use, earpiercing, acupuncture, tattoos. It is also transmitted perinatally, by improperly sterilized dialysis equipment.

High rates of HCV infection have been found in patients with alcohol abuse. By unprotected sex with an infected partner, it is transmitted and those with other sexually transmitted infections like HIV are at a greater risk of contracting HCV.[3,5]

Approximately 10% of patients deny known transmission risk factors. HCV infection is not spread by casual contact including hugging, kissing or sharing of food utensils.[6]

PEG-IFN in combination with ribavirin has been proposed as the standard therapy for chronic hepatitis patients.[7] Many persons with chronic HCV infection are asymptomatic. Population based serologic studies are needed to estimate the prevalence of the infection and to develop and evaluate preventive efforts.[8]

The primary serologic screening assay for HCV infection is ELISA. This test has a sensitivity of 97% and specificity of 80% and have shortened the mean time to seroconversion by 2-3 weeks.[9,10]

As there are no previous reports on this entity from our place (Davangere), the present study aims to determine the seroprevalence of HCV among patients of different departments and in blood donors of J.J.M. Medical College, Davangere.

MATERIAL AND METHODS

The study was conducted in the Department of Microbiology, J.J.M. Medical College, Davangere from May 2006 to April 2007.

A total of 450 serum samples in the age group 15-45 years were tested for the seroprevalence of HCV antibodies (anti-HCVs). This includes 200 blood donors from Bapuji Blood Bank and 200 patients attending Out Patients Departments (OPD) and inpatients from Bapuji Hospital (BH) and Chigateri General Hospital (CGH) attached to J.J.M. Medical College, Davangere. Fifty age matched samples from general population without any past or present history of risk for Hepatitis C disease, was included as normal healthy controls and their serum samples were simultaneously screened for anti-HCVs.

The sera were screened for anti-HCVs using a third generation ELISA kit [SDHCV ELISA 3.0, manufactured by SD BIOSTANDARD Diagnostics PVT. LTD., INDIA]. The SD HCV ELISA 3.0 is indirect sandwich ELISA for the qualitative detection of antibodies against HCV. The test contains a microplate which is precoated with recombinant HCV antigens (Core, NS3, NS4 and NS5) on well. The test was carried out as per the standard test procedure mentioned by the manufacturer.

Colorimetric reading was performed by using a spectrophotometer at 450 nm.

Table 1. Percentage of hcv positivity in different groups

S. No.	Groups	No. tested	Positive	Percentage%
1	Diagnostic group	200	5	2.5
2	Blood donors	200	4	2.0
3	Control groups	50	0	0
	Total	450	9	2.0
$\chi^2 = 1.2$	$p = 0.52$	NS		

RESULTS

A total of 450 serum samples were tested which included 200 each from diagnostic patients, blood donors and 50 were healthy controls. From 200 diagnostic patients, 5 (2.5%) showed anti-HCVs - males were 1.6% (2/128) and females were 4.2% (3/72). In both the sexes, it was predominant among later age groups i.e. 26-35 yrs and 36-45 yrs (Fig. 1). Out of 5 anti-HCV positive patients, 2 were CRF patients on hemodialysis, 1 each was a case of hepatitis, PUO and secondaries in liver. Out of 200 blood donors, 4 were anti-HCVs positive and all are males (4/170) (Fig. 2). The overall seroprevalance was 2.0% [9/450] (Table 1). All the 50 healthy personnel who were taken as controls were found to be seronegative for anti HCVs

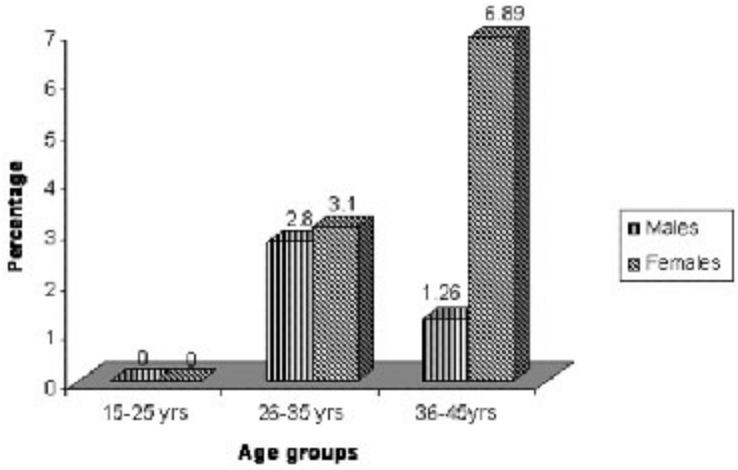

Fig. 1. Age and genderwise distribution of diagnostic patients positive for HCV antibodies

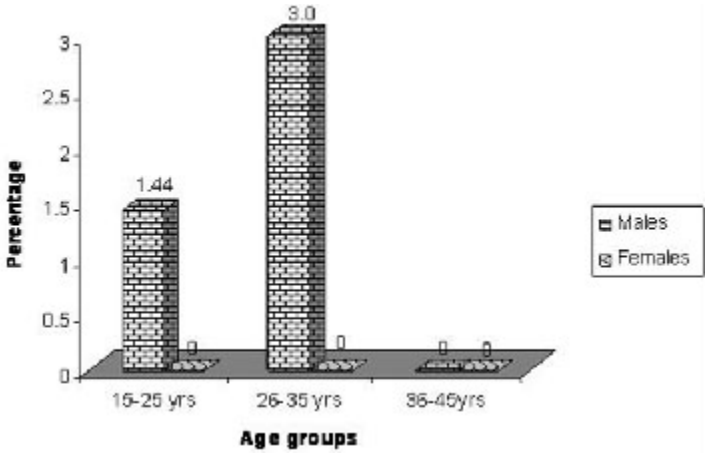

Fig. 2. Age and genderwise distribution of blood donors positive for HCV antibodies

DISCUSSION

In the present study, the seroprevalence was estimated by the sensitive screening assay like 3rd generation ELISA.The total seroprevalance was found to be 2%. From the diagnostic patient group, the seroprevalence was 2.5%. Among blood donors, it was 2%.Studies conducted in different regions of the world show wide variation in HCV prevalence though the incidence is higher among

less developed nations [11].In India, HCV prevalence varies from 0.3% in the North to as high as 11.3% in the South in the general population.[12] A study by Bhattacharya S et al[13] (1999) has shown a 4.8% prevalence in a hospital based general population. Similar studies by Phukan AC et al[14] (2000), Mishra S et al[15] (2000), have shown prevalence rates of 7.89%, and 1.57% respectively. In the present study, subject was hospital based population as it offers several advantages. Individuals attending a hospital undergo a series of investigations that leads to giving a blood sample. The samples in the present study were collected after consent from laboratory and blood bank meant for other investigations. Hence, no extra episode of venepuncture was needed for serum sampling. This saved time, manpower and cost. Convincing healthy individuals in a less informed community to give blood sample for the study is a difficult task. These problems were avoided by conducting the study in a hospital where serum samples sent for routine investigations were tested for HCV seroprevalence. The results from our study donot correlate with any of the above studies. This wide variation in the results may be due to cultural factors and social habits that influence HCV transmission.[16] From 20 CRF patients on haemodialysis tested, 2 were anti-HCV positive (10%), and from 55 hepatitis patients,1(1.8%) was anti-HCV positive. There was a patient of secondaries in liver known to be HBS Ag positive which was also anti-HCV positive.

The probable reason for anti-HCVs to be seen predominantly in males (Fig.2) from out study might be that males are commonly involved in the practices leading to transmission of infections like blood transfusion and visiting barber's shop. So they are more prone to get the infection at a much frequent rate as compared to their female counterparts in society. Abraham P[17] *et al.*,(1995), Irshad M[18] et al(1995), Apichartpiyikul[19] *et al.*,(1999), Thakral[20] *et al.*,(2005) in their studies reported the seroprevalence as 0.48%, 1.5%, 3.2% and 0.44% respectively. These differences may be due to the type of donors from which samples were collected i.e. may be either Voluntary or Replacement donors.

CONCLUSIONS

HCV infection is the global health problem involving exclusively human of any age with no sex predilection. There is an increasing prevalence rate with the risk of incidence raises with the age. Antiviral therapy is not affordable by the vast majority of people in developing countries like India. Prevention against the disease is not possible due to lack of suitable vaccine. All anti-HCV positive patients are potentially infectious and must be prohibited from donating blood, organ or tissue or semen. Therefore prevention by health education is likely to be the critical intervention that might help limit the spread of these infections.

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