

## Hepatitis C Seropositivity in a Tertiary Care Hospital in Moradabad, U.P, India

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Impact of hepatitis C infection is emerging in India. Indian blood banking has serious shortcomings. There is reuse of improperly sterilized needles. Both these factors are potential sources of spread of hepatitis C in India. Hepatitis C is emerging as a serious threat to human by causing serious morbidity and mortality. This study was conducted to observe seropositivity of hepatitis C. The study was done in the department of Microbiology, Teerthanker Mahaveer Medical College and Research Center over a period of one year. Serum sample of 13189 patients attending the hospital were collected and tested for Hepatitis C virus over a period of one year. Samples were tested for hepatitis C virus by card test and ELISA test. 13189 patients attending the hospital were tested for HCV. Out of 13189 patients 402 (3.04%) patients were found positive by both rapid card test and ELISA. Maximum 99 (24.62%) cases were detected positive between 21-30 years. Hepatitis C is an emerging infection in India. Prevention should target those at risk of acquiring the hepatitis C virus and should be provided education, risk reduction counselling, HCV screening and substance abuse treatment.

**Key words :** Hepatitis C, Seropositivity, emerging, bloodborne, Hepatitis.

Hepatitis C was discovered in 1989 using molecular biology techniques, it is a RNA virus which belongs to the Flaviviridae family and genus Hepacivirus.<sup>1</sup> Hepatitis C is an important agent responsible for transfusion transmitted infections.<sup>2</sup> It is recognized as a major cause of chronic liver disease worldwide. Hepatitis C virus is an evolving public health problem worldwide.<sup>3</sup> HCV is the leading cause of liver transplant in developed countries it is most common chronic bloodborne infection in the USA.<sup>4</sup>

Global prevalence of hepatitis C virus infection is about 2%, 170 million persons are chronically infected with hepatitis C virus. Each year there are 3-4 million new cases occur.<sup>1</sup>

In the USA, HCV accounts for about 20% of acute viral hepatitis cases, of which less than 5% are associated with blood transfusion. The prevalence of anti-HCV is highest in injecting drug users and haemophilia patients (up to 98%), highly variable in haemodialysis patients (<10%-90%), healthcare workers and family contacts of HCV infected persons (1%-5%), and lowest in volunteer blood donors (0.3%-0.5%).

**In the general population it varies (0.2%-18%).<sup>5</sup>**

Hepatitis C is an important cause for hepatic cirrhosis and hepatocellular carcinoma and it is most common indication for liver transplantation in the United States, Northern Europe and Japan. In the developing countries of Asia and Africa, HCV is emerging rapidly as an infection warranting attention.<sup>3</sup> In developing countries of Asia and Africa HCV is emerging rapidly as an infection warranting attention. Although HCV is endemic worldwide, there is a

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large degree of geographic variability in its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialised nations in North America, northern and western Europe, and Australia. Populous nations in the developed world with relatively low rates of HCV seroprevalence.<sup>4</sup>

Low rates of HCV seroprevalence include Germany (0.6%), Canada (0.8%), France (1.1%), slightly higher seroconversion is seen in USA (1.8%), Japan (1.5-2.3%), Italy (2.2%), China seroprevalence is high (3.2%).<sup>4</sup> The estimated Prevalence of HCV was 1-1.9 in India.<sup>7</sup>

Those exposed to HCV 40% fully recover, remaining whether they had symptom or not become chronic carrier, of these 20% develop cirrhosis, from these cirrhosis cases 20% develop hepatic carcinoma.<sup>5</sup>

Impact of hepatitis C infection is emerging in India. Indian blood banking has serious shortcomings. There is reuse of improperly sterilized needles. Both these factors are potential sources of spread of hepatitis C in India.<sup>1</sup>

Hepatitis C is emerging as serious threat to human by causing serious morbidity and mortality. This study was conducted to observe seropositivity of hepatitis C.

## MATERIALS AND METHODS

The study was done in the department of Microbiology, Teerthanker Mahaveer Medical College and Research Center over a period of one year. Serum sample of 13189 patients attending the hospital were collected and tested for Hepatitis C virus over a period of one year. General history of age, sex, socioeconomic status. History of blood transfusion, surgery, exposure to blood products

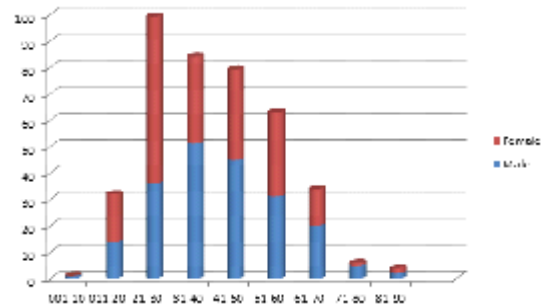
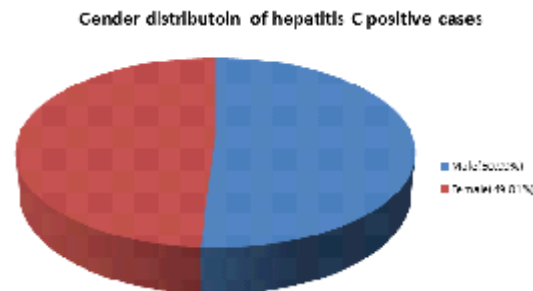
and sexual history was taken. Sample were collected from patients attending the hospital. Aseptically 5 ml venous blood is collected in a sterilized plain vial and transported to microbiology laboratory. It was centrifuged and serum was separated. Sample were tested for hepatitis C virus by card test and ELISA test. To detect hepatitis C virus test were done by using commercially available HCV TRI DOT (Diagnostic enterprises). ELISA test was also done for positive samples by HCV Microlisa (J.Mitra & Co. Pvt. Ltd.).

### Rapid Card Test

HCV TRI-DOT is a rapid visual test for the qualitative detection of antibodies to hepatitis C virus in human serum or plasma. HCV antigens are immobilized on a porous immunofiltration membrane. Sample and the reagents pass through the membrane and are absorbed into the underlying absorbent pad. Through the membrane patient's sample passes. If HCV antibodies are present then it binds to the immobilized antigens. Unbound serum/plasma proteins are removed in the subsequent washing step. Then the protein A conjugate is added which binds to the Fc portion of the HCV antibodies to give distinct pinkish purple dot against a white background at the test region T1 and T2. At the control region C a built in quality control dot has devised to confirm the proper functioning of the device, reagent and correct procedural application.

### ELISA test

HCV Microlisa is based on highly sensitive technique, Enzyme linked Immunosorbent Assay. Which detects antibody against HCV in human plasma and serum. In the serum HCV proteins are present well below the limits of detection. Immunodiagnosis of HCV infection is based on detection of host generated antibodies (anti-HCVs) to viral proteins. HCV



Microlisa utilizes a combination of antigen with the sequence of both HCV structural and non-structural antigen that is CORE E1,E2,NS3,NS4 and NS5.It has improved sensitivity and specificity. The combination of antigens for the structural and non structural HCV proteins are coated onto the microwells.

Diluted samples and controls were added to microwell and then incubated.If antibodies to HCV were present it binds to immobilized HCV antigens on the microwell during this incubation period.

The microwells are then washed thoroughly with diluted wash buffer to remove excess of unbound anti-HCV or other human IgGs which may interfere with the test. Then an enzyme conjugate ,anti –human IgG conjugate with HRPO (horseradish peroxide) are added .Excess of enzyme conjugate complex is again removed with diluted wash buffer .At this stage microwells hold the bound antigen anti HCV- enzyme conjugate complex .Then the freshly prepared substrate solution is incubated with the complex in the microwells. The enzyme substrate reaction leads to development of blue colour which indicates that Ag-Ab reaction has occurred in the microwell .Finally stop solution is added and the optical density of the developed colour is read photometrically .

## RESULTS

The present study was done in the department of Microbiology ,Teerthanker Mahaveer Medical College and Research Center. 13189 patients attending the hospital were tested

**Table 1.** Seropositivity according to age and sex

Age	Male	Female	Total
01-10	01(0.24%)	0 (0.00%)	1 (0.24%)
11-20	14(3.48%)	18(4.47%)	32(7.96%)
21-30	36(8.95%)	63(15.67%)	99(24.62%)
31-40	51(12.68%)	33(8.21%)	84 (20.89%)
41-50	45(11.19%)	34(8.45%)	79(19.65%)
51-60	31(7.71%)	32(7.96%)	63 (15.67%)
61-70	20(4.97%)	14(3.48%)	34(8.45%)
71-80	5(1.24%)	1(0.25%)	6 (1.49%)
81-90	2 (0.49%)	2(0.49%)	4(0.99%)
	205 (50.99%)	197 (49.01%)	402(100%)

for HCV .Out of 13189 patients 402(3.04%) patients were found positive by both rapid card test and ELISA. Out of 402 positive cases 205 (50.99%)were men and 197(49.005%) were women .

Maximum 99(24.62%) cases were detected positive between 21-30 years . 84(20.89%) patients were positive between 31-40 years .Between 41-50 years 79(19.65%) patients were detected HCV positive. Between 51-60 years 63(15.67%) cases were positive .In Extrems of ages positive cases were detected less . Only one (0.24%) case was detected between 1-10 years . Between 71-80 years 6((1.49%) cases were detected positive .

## DISCUSSION

The present study was done in the department of Microbiology ,Teerthanker Mahaveer Medical College and Research Center over a period of one year.Serum sample of 13189 patients attending the hospital were collected and tested for Hepatitis C virus over a period of one year. In the present study out of 13189 patients 402(3.04%) patients were found positive by both rapid card test and ELISA .

In a study done by Sangeeta Pahuja et.al in 2007 India has been kept In Intermediate zone of prevalence of hepatitis C by the world health organization (2-7% prevalence rate ),In the study prevalence of HCV , 1-2% was reported.<sup>2</sup> Study done by Abhijeet Chaudhry et. Al. in 2003 in 0.87% cases hepatitis C antibody was positive.<sup>3</sup>

In a study done by Colin W.Sheferd et. Al in 2005 reported that relatively low rate of HCV seroprevalence is found in Germany (0·6%), Canada (0·8%), France (1·1%), and Australia (1·1%). but slightly higher seroprevalence rates have been reported in the USA (1·8%), Japan (1·5–2·3%), and Italy (2·2%). In China, has a reported seroprevalence of 3·2%. In India, reported an overall rate of 0·9%. Indonesia's rate is 2·1%, In Pakistan, where most reported rates range between 2·4% and 6·5%. Egypt, has the highest reported seroprevalence rate, 22%.<sup>4</sup>

**WHO estimates that about 3% of the world's population has been infected with HCV.<sup>5</sup>**

In a study done by D. Lavanchy in et.al.in 2010 suggest that most populations in the Americas, western Europe and Southeast Asia have prevalence rates of antibody to HCV (anti-HCV)

under 2.5%. Anti-HCV prevalence rates for eastern Europe average from 1.5% to 5%, those for the Western Pacific region from 2.5% to 4.9%, and those for the Middle East and Central Asia from 1% to more than 12%.<sup>6</sup>

In a study done by William Sievert et al in 2011 prevalence of HCV in general adult population in Australia 1.3% ,China 1–1.9% ,Egypt 14.9% ,India 1–1.9% ,Japan 1–1.9% ,Korea 1.3% ,Pakistan 4.7% ,Saudi Arabia 1–1.9% ,Syria 1–1.9% ,Taiwan 4.4% ,Thailand 2.8% Vietnam 2–2.9% .<sup>7</sup>

In a study done by Khayriyyah Mohd Hanafiah et al. in 2013 Central and East Asia and North Africa/Middle East are estimated to have high prevalence (>3.5%); South and Southeast Asia, sub-Saharan Africa, Andean, Central, and Southern Latin America, Caribbean, Oceania, Australasia, and Central, Eastern, and Western Europe have moderate prevalence (1.5%-3.5%); whereas Asia Pacific, Tropical Latin America, and North America have low prevalence (<1.5%).<sup>10</sup>

In a study done by Theodore Sy et al. in 2006 found that Among Central and South America, a recent community based study in San Juan, Puerto Rico, showed that estimated prevalence of HCV in 2001–2002 was 6.3%. In Europe, general prevalence of HCV is about 1% but varies among the different countries. The estimated prevalence in Australia has been recently reported as 2.3%.<sup>11</sup>

In the present study 402 cases were positive, Maximum 99(24.62%) cases were detected positive between 21–30 years . 84(20.89%) patients were positive between 31–40 years.

In a study done by Abhijit Chowdhury et al in 2003 Age-specific prevalence of HCV was low in children (0.31%), but increased progressively from adolescents (0.83%) to adults (1%) and older persons (1.85%).<sup>3</sup>

In a study done by MIRIAM J. ALTER in 1999 Sixty-five percent of all anti- HCV–positive persons were 30 to 49 years old.<sup>8</sup>

In a study done by S. K. ACHARYA et al in 2006 HCV infection in India is a disease of adults. Age group 20–39 years n=935 out of them 10(1.1%) were Anti HCV positive.<sup>9</sup>

In a study done by S.Chandrashekar et al in 2000 The age group predominantly, i.e. in 29 out of 31 cases found positive for anti HCV, was above 15 years.<sup>12</sup>

## CONCLUSION

Hepatitis C is an emerging infection in India. Blood transfusion and use of unsterile glass syringe are the dominant mode of transmission of HCV in India. Stringent blood banking laws are needed to be introduced and sterilisation and reuse of needles are discouraged .

There should be centralised blood collection system having better personnel and equipments. Antiviral therapy is not affordable by the vast majority of people in developing countries. The high prevalence of global HCV infection necessitates renewed efforts in primary prevention, including vaccine development, as well as new approaches to secondary and tertiary prevention to reduce the burden of chronic liver disease and to improve survival for those who already have evidence of liver disease. Prevention should target those at risk of acquiring the hepatitis C virus and should be provided education ,risk reduction counselling,HCV screening and substance abuse treatment.

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