

## SEROPREVALENCE OF HEPATITIS C VIRUS AMONG HEALTH CARE WORKERS OF A RURAL TEACHING HOSPITAL IN TAMILNADU

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**ABSTRACT:** Hepatitis C is an emerging infection in India whose long term implications will be felt in the decades to come. In the present study the seroprevalence of HCV infection among 85 healthcare workers was determined. Blood samples were collected from healthcare workers which included doctors, nurses, lab technicians and lab attenders and the sera was tested for anti-HCV antibodies using third generation immunoassay kit. In our study the prevalence of HCV was 1.17%. It is imperative that health care workers be sensitized about universal precautions and safe disposal of needles and other contaminated materials to decrease the risk of infection through continuous medical education programmes. Our study supports that the screening of HCV among healthcare workers is mandatory.

**KEY WORDS:** Hepatitis C Virus, Health Care Workers, anti-HCV antibodies, Needle Stick Injury, Universal Safety Precautions.

**INTRODUCTION:** Hepatitis C is an emerging infection in India and an important pathogen causing liver disease. The high risk of chronicity of this blood-borne infection and its association with hepatocellular carcinoma underscores its public health importance.<sup>1</sup> Hepatitis C virus is a parenterally transmitted virus that poses an occupational hazard to health care workers.

Hepatitis C was first detected in 1989 using molecular biology techniques after extensive testing of serum from experimentally infected animals. It was later characterized to be an RNA virus that belongs to the flaviviridae family and genus hepacivirus. Ever since its discovery it became clear that this virus was the major cause of acute hepatitis after blood transfusion that was neither related to hepatitis A nor to hepatitis B (hence the early name for this disease, non-A non-B hepatitis). It is widely recognized as one of the common etiological agents for cirrhosis of liver. It is the leading cause of liver transplantation.<sup>2</sup>

Hepatitis C can present as acute or chronic hepatitis. Most of the acute cases are asymptomatic with patients unaware of underlying infection. Symptomatic acute hepatitis with jaundice is seen in only 25% of patients and this virus usually does not cause fulminant hepatitis in immunocompetent individuals. The only acute life threatening illness caused by hepatitis C is a variant called fibrosing cholestatic hepatitis which is seen in liver transplant recipients.<sup>3</sup>

Common modalities of spread of HCV are blood transfusion, injection drug use, unsafe therapeutic injections and needle stick injuries in healthcare settings. It can be transmitted both sexually and from mother to child. Blood transfusion is an effective mode of transmission of HCV infection as it allows a large quantum of infective virions into the susceptible patient. Blood transfusion and unsafe therapeutic injections by infected needles are two preventable modalities of spread of hepatitis C infection.<sup>4</sup>

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High prevalence is associated with so called “risk groups” which includes recipients of blood transfusion or solid organ transplants, chronic hemodialysis patients, current or former injection drug users, hemophiliacs, multiple blood transfused patients, recipients of blood products from donor who tested HCV positive, children born to HCV positive mothers. The two most common causes of needle stick injuries are two handed recapping and the unsafe collection and disposal of sharps waste.

Health care professionals are also included in the high risk groups. Healthcare workers are at higher risk for acquiring hepatitis C infection as they come in contact with potentially infected patients.

The high prevalence of HCV among health care workers may be due to their exposure in the form of accidental needle pricks, contact of cut skin surface with blood/blood products, improper disposal of infected medical waste, etc.<sup>5,6</sup> There are few studies from India regarding the prevalence of HCV infection in health care staff working in the hospitals but there are no published reports from rural teaching hospital. Hence, the present study was undertaken.

**AIMS AND OBJECTIVES:** To determine the seroprevalence of Hepatitis C virus in health care workers of a rural teaching hospital

To study the age and sex wise distribution of HCV infection among healthcare workers.

To elicit the risk factors for acquiring HCV infection.

## **MATERIALS AND METHODS:**

**Type of study:** Prospective observational study

**Setting:** Rural teaching hospital

**Duration:** 2 months (June and July 2012)

**Sample design:** After explaining the study methodology, blood samples were collected in a vacutainer using venepuncture method from 85 healthcare workers. Healthcare workers included were 15 Doctors, 13 Nurses, 40 lab technicians and 17 lab attenders. Before collecting the sample, informed consent was obtained from the participants and they were asked to fill in the Questionnaire form. Institutional Ethics Committee clearance was obtained prior to the study. Healthcare workers (Doctors, staff nurses, lab technicians, lab attenders) of both sexes and all age groups and those who were willing to participate were included in the study. Healthcare workers with recent confirmed HCV infection, hepatocellular carcinoma, Cirrhosis of liver, intravenous drug abusers and chronic alcoholics were excluded.

**Processing of the sample:** The collected blood samples were centrifuged to separate the sera. Separated sera were transferred to laxpro vials and stored at -70° C deep freezer. On the day of ELISA testing, the sera samples were thawed to process for detection of antibodies against HCV proteins c22-3, c 33-c, c 100-c and NS-5 using third generation ELISA kit (HCV Microlisa, J.Mitra, India). The test was performed according to the manufacturer’s instructions with adequate controls. Serum sample was placed in them icrotitre wells and diluted(in the ratio of sample 10 micro litre: sample diluent 100 micro litre). 100 micro litre negative and positive controls were added to the wells. The microtitre plate was covered and incubated for 30 min at 37°C. Working wash solution and working conjugate solution were prepared separately. After incubation was over, wells were washed

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with prepared wash solution. Then 100 microlitre working conjugate solution was added in each well and incubated. Substrate solution was prepared separately in the last 5 min of incubation. Then wells were washed again and 100 microlitre working substrate was added. It was incubated at room temperature (20-30°C) in dark for 30 minutes. Then 100 microlitre of stop solution was added and the absorbance of the solution in the wells was read at 450 nm within 15 minutes of the final step by Biorad ELISA reader.

**OBSERVATIONS AND RESULTS:** The study included total of 85 healthcare workers with age group ranging from 21 to 70. Participants include 24 males and 51 females. Age wise, sex wise and category wise distribution of samples were tabulated (Table 1). Seroprevalence was found to be 1.17% (Fig 1) The seroprevalence of anti-HCV antibodies among lab technicians was 25% (1 of 40). The lab technician was from microbiology laboratory. None of the doctors, nurses and lab attenders was seropositive. Risk factor details of healthcare workers are shown in (Fig 2).

**Follow-up Study:** Case history revealed that the technician had history of needle stick injury two years ago. Further the subject was referred to a consultant gastroenterologist. HCV Viral load by Taqman PCR was done. Viral load was found to be within normal limits (<15 IU/ml). Liver function tests were also within normal limits. The subject was also tested for HIV and HBsAg after pretest counselling and was found to be seronegative. The subject was advised regular follow-up every 6 months under the care of Medicine Department.

AGE GROUP	DOCTORS(15)		NURSES(13)		LAB TECHNICIANS(40)		LAB ATTENDERS(17)	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
21-30	2	3	2	9	6	20	0	2
31-40	3	2	0	2	4	8	0	6
41-50	0	1	0	0	1	0	1	6
51-60	1	1	0	0	1	0	2	0
61-70	1	1	0	0	0	0	0	0

TABLE 1: AGE WISE, SEX WISE & CATEGORY WISE DISTRIBUTION OF SAMPLES (Total -85)

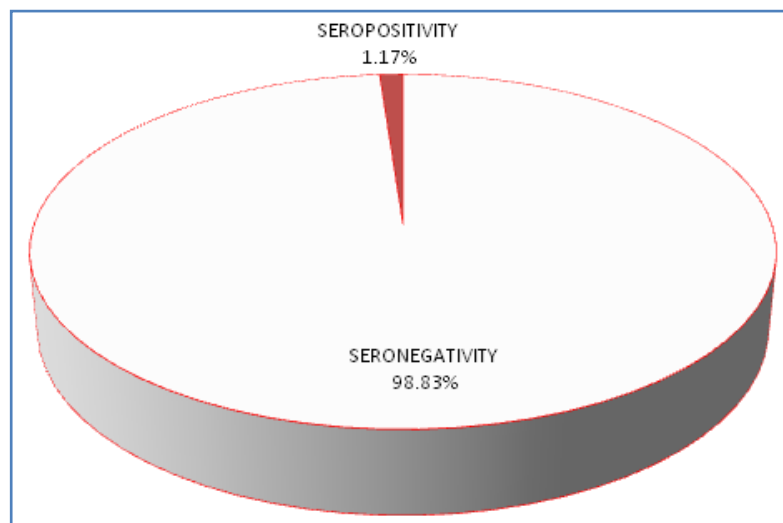
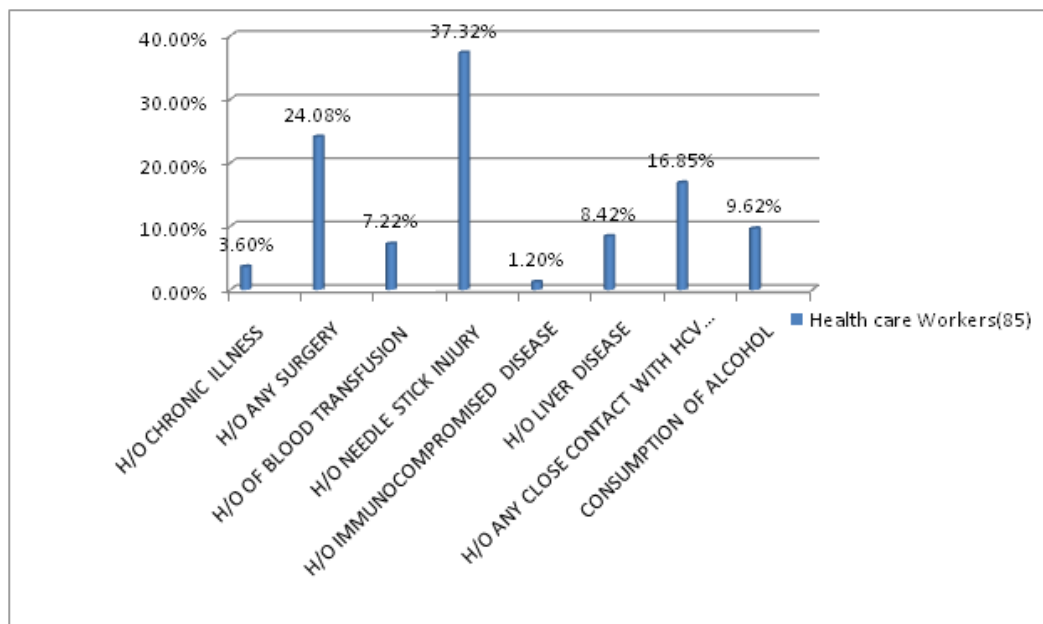


Fig. 1: seropositivity of HCV among healthcare workers



**Fig. 2: Risk factor details of healthcare workers**

STUDY	SEROPREVALENCE OF HCV (%)
New Delhi (Jindal et al., 2006) <sup>7</sup>	4%
Rajasthan (Ganju and Goel et al., 2000) <sup>8</sup>	5.4%(Dentist only)
Central Italy (Catalani et al., 2004) <sup>9</sup>	4.7%
West Scotland (Thorburn et al., 2001) <sup>10</sup>	0.28
Brazil (Cirolia et al., 2007) <sup>11</sup>	1.7%
Our study	1.17%

**COMPARATIVE ANALYSIS OF SEROPREVALENCE OF HCV IN HEALTHCARE WORKERS**

**DISCUSSION:** HCV is a parenterally transmitted virus that may pose an occupational hazard to the healthcare workers. The seroprevalence of HCV in the general population has been studied extensively and reports from different parts of India show the seroprevalence of HCV infection to be as varied as 0.3 to 11.3%.

In our study the prevalence of HCV was 1.17%. This is in concordance with Uddin et al., (2009) study.<sup>12</sup> Ganju et al., (2000) reported that the prevalence of HCV among healthcare workers was about 0-4%. Jindal et al., (2006) found that exposure to infected blood/blood products of patients of HCV infection in the form of accidental needle pricks, contact of cut skin surface with blood/blood products, improper disposal of infected medical waste, etc. are the reasons for occupational risk of transmission of HCV and also that the duration of occupational exposure was not a significant risk factor.

In our study, the seropositive sample belonged to a lab technician and the risk history showed that the person had needle prick injury two years ago. The percentage of needle stick injury in our study was 37.32%. In contrast to this, Susan et al., (2004) reported 91% needle stick injury

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among junior doctors.<sup>13</sup>Hussain et al., (2010) reported that 53.5% of healthcare workers had needle stick injury.<sup>14</sup>

In our study there was no significant difference between male and female individuals in relation to HCV seropositivity which is in concordance with Bhattacharya et al., (2003) study.<sup>15</sup>

## CONCLUSION:

1. These seroprevalence of HCV among healthcare workers in our study population was 1.17%
2. One of our microbiology lab technicians was found to be seropositive.
3. The risk factor for acquiring HCV infection in this case is needle stick injury.
4. HCV Viral load by Taqman PCR was within normal limits.
5. Liver function test results were also within normal limits.
6. The subject was seronegative for HIV infection.

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