

## Hepatitis C virus infection in health care workers: A clinical study

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### Abstract

**Background:** Hepatitis C virus infection is a major public health problem worldwide. It is common in health care workers. Hepatitis C infection is one of the transfusion transmissible infections. The present study was conducted to determine HCV infection among health care workers.

**Materials & Methods:** This study was conducted to determine the risk of hepatitis C infection among hospital employees. This study was conducted in the department of general medicine in year 2015. This study consisted of 500 participants (260 males and 240 females) of varying age groups. Information such as gender, age, education, economic status, and residency, occupation, vaccination status, duration of employment was recorded. In all subjects, enous blood samples were collected, centrifuged (2, 500 × g for 10 minutes), and aliquots of serum were stored at -20°C until used. Antibodies to HCV were detected using enzyme-linked immunosorbent assay kit. HCV RNA was detected in seropositive samples with an Amplicor kit. Genotyping was conducted in samples positive for HCV RNA using Innolipa kits from Innogenetic.

**Results:** A total of 500 subjects (Male - 260, female - 240) were included in the study. The difference among distribution of males and females was non-significant (P- 1). Out of 260 males, 12 (4.6%) and out of 240 females, 8 (3.3%) found positive of Hepatitis C virus infection. The difference of prevalence among males and females was non-significant (P-0.3). Out of 125 residents 2 were HCV ±ve. 4 nurses, 10 laboratory technicians and 4 sanitary staff found to be HCV ±ve. The difference was non-significant (P - 0.3). Seropositivity on the basis of duration of profession. 250 subjects were having experience of 0-15 years, 140 subjects having experience 16-30 years and 110 subjects were having experience more than 30 years. Seropositivity was seen in 10 subjects (>30 years), 6 subjects (16-30 years) and 4 subjects (0-15 years). The difference was non-significant (P- 0.1).

**Conclusion:** The risk of Hepatitis C virus infection is more among health care workers hence healthcare workers should take proper precaution while handling blood. Aseptic procedures should be carried out to prevent needle stick injury.

**Keywords:** hepatitis c, lab technician, immunization

### 1. Introduction

Hepatitis C is a major public health problem worldwide. It is estimated that more than 170 million people are infected with the hepatitis C virus (HCV) worldwide. Infection with HCV is the most common cause of patients requiring liver transplants in the world [1].

Hepatitis C infection is one of the transfusion transmissible infections. Transmission of HCV occurs through percutaneous or permucosal exposure to infective body fluids. This can be transmitted from person to person through sexual contact and drug injection, intravenous drugs users, and those who have used non-disposable syringes and patients undergoing hemodialysis. Nosocomial transmission is one of the risk factor, even in hospitals with high hygiene standards.

The Number of HCV carriers range from 0.4% to 3% [2].

Moughtat S [3] in his study reported numerous cases of HCV infected health care workers (HCWs) who potentially perform exposure prone procedures (EPPs).

Improved hygiene, increased vaccine coverage, increased awareness of medical staff, and highly sensitive testing of blood products, these are the recent measures that should be implemented to decrease nosocomial HCV infections. Studies showed higher prevalence of HCV infection markers among the elderly, probably reflecting a longer exposure to risk factors. However, another possible explanation would be a real change in the epidemiologic profile of HCV infection in a

similar way to that observed in the human immunodeficiency virus (HIV) infection, with a displacement of the prevalence curve for higher age groups [4].

It has been shown that some areas of healthcare can represent a higher risk, with surgery, gynaecology, and orthopaedic services heading this unfortunate list. The most common route of transmission is via needlestick injuries, especially those involving hollow needles. Operating in cavities where the tips of the fingers holding sharp surgical instruments are not always visible also poses an important risk for those performing exposure-prone procedures. It is therefore essential that HCWs acknowledge the risk, and exercise caution. When injuries do occur, it is also important that they are reported and the circumstances examined; standardization of such reporting procedures would help the process of data collection and analysis considerably [5].

The present study was conducted to estimate risk of hepatitis C virus infection among health workers.

### Materials & Methods

This study was conducted in the department of general medicine in year 2015 which included residents, nurses, laboratory attendants, sanitary staff etc. This study consisted of 500 participants (260 males and 240 females) of varying age groups. Subjects were informed regarding the study and written consent was taken. Information such as gender, age,

education, economic status, and residency, occupation, parenteral exposures, sexual partners, vaccination status, duration of employment was recorded. In all subjects, a sample of blood was drawn with an aseptic technique and was collected in plain vial.

Venous blood samples were collected, centrifuged (2, 500 × g for 10 minutes), and aliquots of serum were stored at -20°C until used. Antibodies to HCV were detected using enzyme-linked immunosorbent assay kit. HCV RNA was detected in seropositive samples with an Amplicor kit. Genotyping was conducted in samples positive for HCV RNA using Innolipa kits from Innogenetic. Results were subjected to statistical analysis using chi square test. P value <0.05 was considered significant.

**Results**

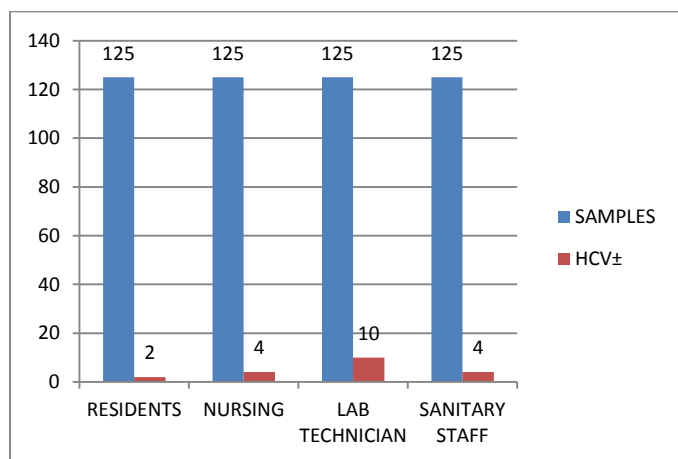
A total of 500 subjects (Male - 260, female - 240) were included in the study. The difference among distribution of males and females was non-significant (P- 1) (Table 1) Table 2 shows that out of 260 males, 12 (4.6%) and out of 240 females, 8 (3.3%) found positive of Hepatitis C virus infection. The difference of prevalence among males and females was non-significant (P-0.3). Fig 1 shows that out of 125 residents 2 were HCV ±ve. 4 nurses, 10 laboratory technicians and 4 sanitary staff found to be HCV ±ve. The difference was non-significant (P - 0.3). Fig 2 shows that seropositivity on the basis of duration of profession. 250 subjects were having experience of 0-15 years, 140 subjects having experience 16-30 years and 110 subjects were having experience more than 30 years. Seropositivity was seen in 10 subjects (>30 years), 6 subjects (16-30 years) and 4 subjects (0-15 years). The difference was non- significant (P- 0.1).

**Table 1:** Distribution of Subjects

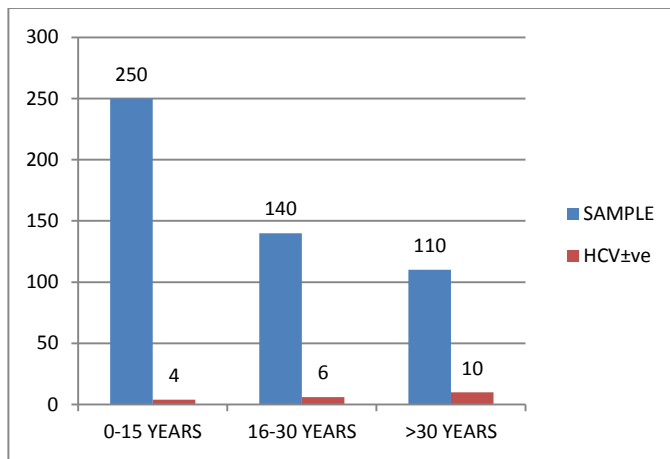
Total- 500		
Male	Female	P Value
260	240	1

**Table 2:** Prevalence of HCV

Total- 500			
Gender	Male	Female	P Value
Total	260	240	0.3
Prevalence	12 (4.6%)	8 (3.3%)	



**Fig 1:** Distribution of Seropositivity on Basis of Profession



**Fig 2:** Distribution of Subjects on the Basis of Duration of Profession

**Discussion**

The hepatitis C virus is an RNA virus that belongs to the family flaviviridae. HCV replicates in the cytoplasm of hepatocytes, but is not directly cytopathic. Persistent infection appears to rely on rapid production of virus and continuous cell-to-cell spread, along with a lack of vigorous T-cell immune response to HCV antigens. The HCV turnover rate can be quite high with replication ranging between 10<sup>10</sup> to 10<sup>12</sup> virions per day, and a predicted viral half-life of 2 to 3 hours. The rapid viral replication and lack of error proofreading by the viral RNA polymerase are reasons why the HCV RNA genome mutates frequently. There are six known genotypes (numbered 1 through 6) and more than 50 subtypes. Frequent HCV mutations and numerous subtypes have made the search for an HCV vaccine challenging [6].

In present study, we analyzed the presence of Hepatitis C virus infection among healthcare workers such as residents, lab technicians, nursing staff and sanitary staff. In our study, we included 500 subjects (males- 260, females- 240) and were assessed for the seropositivity of HCV. We found 20 subjects positive for Hepatitis C virus infection. The prevalence rate was 4%. Various studies have reported marked variation in the prevalence of HCV positive among health care workers (HCWs). A study of CDC (USA) estimated the annual risk of HBV infection 3% among of laboratory technicians, 1.4% among physicians, and 1.7% among nurses [7, 8].

In our study, we included residents, nursing staff, lab technician and sanitary staff. Seropositivity was seen more in lab technician (10) than resident (2), nursing staff (4) and sanitary staff (4). The higher rate of infection in laboratory technician can be explained by the fact that laboratory technicians are prone to get needle stick injury as compared to other group. A study of Basit L [9] concluded that lab technicians come to contact of blood more frequently as compared to other professionals and hence care should be taken to avoid needle stick injury.

We also correlated the seropositivity and work experience among subjects. In our study, we found that 10 subjects were having more than 30 years of experience in his/her profession. 6 had experience of 16-30 years while 4 had less than 15 years of work experience. Pattison CP [10] in his study found that the prevalence rate of 3.6% in subjects having >25 years of service as a health care worker. Sullotto F [11] found that healthcare

workers are more susceptible to get Hepatitis C virus infection as compared to any other professional.

There are few reports of HCV transmission from infected HCWs to patients and most cases have not been associated with the performance of exposure-prone procedures but rather with the use of illicit drugs by the HCW. The transmission of hepatitis C virus from HCW to one patient carries a risk during a single procedure of 0.00036%-0.0036%. The risk of transmission to at least one patient during n procedures is 0.017%-1.7% per 500 interventions and 1%-12% per 3500 interventions. Since HBV and HCV share some modes of transmission, HCWs who are at risk may become infected with both viruses<sup>[12]</sup>. HCWs co-infected with HBV and HCV are more likely to suffer from more severe histological liver disease than those infected with only one of the blood-borne pathogens.

### Conclusion

The risk of Hepatitis C virus infection is more among health care workers hence healthcare workers should take proper precaution while handling blood. Aseptic procedures should be carried out to prevent needle stick injury.

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