

## Seroprevalence of Hepatitis C Infection among Laboratory Health Care Workers in Isfahan, Iran

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### ABSTRACT

**Objectives:** Clinical laboratory health care workers can become infected through their occupation with blood-borne pathogens by percutaneous injuries and mucocutaneous blood contacts such as cuts, needle sticks, splashes to mucous membranes or other body injuries. The purpose of this study was to determine the seroprevalence of, Hepatitis C virus (HCV), and some of the risk factors in medical laboratory health care workers.

**Methods:** Through a descriptive cross sectional study, 203 participants employed in the clinical laboratories of the city of Isfahan, composed of medical laboratory technologists, technicians and cleaning staff were studied. Participant data were obtained through a self-reporting questionnaire and the level of anti-HCV antibody was measured by enzyme linked immunosorbent assay (ELISA). Chi-square test was used to determine risk factors associated with infection.

**Results:** The mean age of the individuals (n = 203) was  $35.8 \pm 9.54$  years. There were 115 women (56.7%) and 88 men (43.3%). All of the subjects were negative for HCV Ab.

**Conclusions:** Hepatitis C infection is infrequent in laboratory health care workers in Isfahan province.

**Keywords:** Anti HCV antibody, health care workers, occupational exposure

### INTRODUCTION

Exposure to blood borne pathogens can lead to serious infections among health care workers (HCWs). At least 26 different pathogens have been known to be involved in occupational infectious transmission.<sup>[1]</sup> According to the World Health Organization (WHO) and the Center for Disease Control (CDC), more than 85 million HCWs have been reported to be continuously exposed to injury with contaminated sharp medical devices, worldwide.<sup>[2]</sup> In spite of wide preventive programs and using of modern medical equipments, HCWs are at high risk of exposure to blood borne pathogens like Hepatitis C Virus (HCV).<sup>[3]</sup>

HCV is a major public health problem that can cause severe medical outcomes such as acute hepatitis, chronic liver diseases and hepatocellular carcinoma.<sup>[3]</sup> Among all of health care workers who annually exposed to sharp contaminated devices, the number of those getting infected by hepatitis C virus (HCV) was found 926000 in the world. The annual incidence of occupational exposure to patients' blood and body fluids has been reported 3% for HCV.<sup>[4]</sup> The HCV transmission risk among HCWs with needle stick injuries has been found 3-10%. The risk of HCV transmission with high levels of virus load in the source patient increases by more than tenfold.<sup>[5]</sup> Therefore infectious occupational diseases can be transmitted from patients to HCWs and vice versa and also HCW's families and community.<sup>[3]</sup>

According with standard and worldwide precautions, CDC and Occupational Health and Administration (OHSA) suggest every patient should be considered as a possible carrier infection and to reduce the transmission of infectious agents by direct contacts, appropriate personal protective equipments must be performed.<sup>[6]</sup> The present study was undertaken to evaluate the frequency and risk factors of infection with HCV, among laboratory personnel as a risk group for hepatitis C equation in Isfahan Iran.

## METHODS

This descriptive cross sectional study was conducted from July to September 2010 among medical laboratory technologists (Laboratory workers responsible for analyzing body fluids), medical laboratory technicians (Laboratory workers responsible for sampling, preparing specimens) and laboratory staff (laboratory workers responsible for cleaning surface and equipment) who were potential for high risk exposures. The sample size includes 203 subjects and sampling was voluntary-basis using simple random sampling method. The participants accepted informed consent form and the information was anonymous. The laboratory health care workers were employed in the hospitals and medical laboratory centers in Isfahan city. An

inclusion criterion was work history of more than 6 months. Questionnaire was filled out by the subjects to collect personal and occupational injuries within the last 12 months including splashes to mucous membranes hepatitis history, general health, and other contributing factors. Five ml of venous blood was obtained from each participant and separated serum was sent to the laboratory of the Infectious Diseases and Tropical Medicine Research Center in a cold chain. HCV Anti bodies were measured by means of enzyme linked Immunosorbant assay (DIAPRO kits, Diagnostic Bio probes s.r.l, Italy) according to the manufacturer recommendations.

Statistical analysis was done by SPSS statistical software version 15 (InC, Chicago, IL). Descriptive statistical method was used for data analysis

## RESULTS

Two hundred and three participants including 123 (62.1%) technologists, 40 (19%) lab technicians and 40 (19%) lab cleaning staff were studied. 88 (43.3%) were male and 115 (56.7%) were female. The age range of the study individuals was 20-69 years, and the mean and standard deviation were 35.8 and 9.54 respectively. Demographic characteristics of subjects are shown in Table 1. Of the 203 participants who studied, 75.1% had hand abrasions, 66.8% skin wounds and 29.8% had a history of eye splashing. In nobody of the participants the HCV-Ab was detected (0%). According to the HCV prevalence among HCWs, no risk factors could be evaluated.

## DISCUSSION

Hepatitis C virus is a common cause of occupational blood-borne disease that transmitted from patients to health care workers and frequently leads to a chronic asymptomatic carrier condition for a long time before the development of symptomatic liver disease.<sup>[7,8]</sup> Therefore health care workers with HCV infection may be unaware of their disease or carrier condition and infect other persons like as their families or patients.<sup>[7]</sup>

**Table 1.** Characteristics of study participants

Characteristics	Number (percent)
<b>Age group (year)</b>	
20-29	62 (30.8%)
30-39	68 (33.8%)
40-49	34 (16.9%)
>50	37 (18.4%)
Total	201 (100%)
<b>Occupation</b>	
Technologist	123 (62.1%)
Lab technician	40 (19%)
Lab cleaning staff	40 (19%)
<b>Gender</b>	
Female	115 (56.7%)
Male	88 (43.3%)

In our study none of the medical Laboratory health care workers over the study period showed the presence of antibodies to hepatitis C virus and our finding was similar to a study that performed among health care workers of Sudan.<sup>[9]</sup> Alavian *et al.* studied the general population of Iran and estimated low HCV infection prevalence rate in Iran (0.16%; 95% confidence interval [CI]: 0%-0.59%) that shows our result can be expected.<sup>[10]</sup>

However CDC reported that 1.4% of hospital workers are infected with HCV, the roots of HCV or HBV transmission to HCWs have not been completely recognized.<sup>[11]</sup> Several studies in European countries have reported that hepatitis (HBV/HCV) transmission among HCWs was significantly related to exposure of the patients open tissues to the blood of the workers.<sup>[12,13]</sup> There are several reports of HCV transmission through percutaneous exposure contaminated needles, splashing fluids to mucus membrane and other sharp instruments in HCWs.<sup>[14-16]</sup> In our study 75.1% of participants had a history of abrasion on hand, 66.8% skin hurt and 29.8% had a history of eye splashing, that none of them leads to HCV infection. According to the investigations among HCWs, surgeons, nurses, Laboratory technicians, accidental emergency and cleaning staff have been recognized as having an increased risk of occupational infection with HCV.<sup>[12,13]</sup> Some explanations for infection transmission which is observed in HCWs are

less skilled HCWs, high load of patients, insufficient protective devices, unexpected movement in patients and performing usual protocols by the less expertise employees.<sup>[9,17]</sup> Although there was nobody infected with HCV in our study, regular training and education teaching about risk of occupational contacts with body fluids and pre and post exposure management and planned vaccination is necessary in laboratory health care workers.

## CONCLUSION

Laboratory health care workers and patients can both be comforted that laboratory personnel who are infected with HCV is extremely low frequency and the risk that a patient may become infected from Laboratory worker is certainly low. However, performing universal precautions and reporting needle stick injuries should be performed.

Furthermore, efforts should be continued for HCV screening in laboratory health care workers. Finally better devices and examinations should be supplied for detection of HCV-RNA in negative HCV antibodies in high risk groups.

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