

# Evaluation of Incidence of Hepatitis C in Health Care Workers

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## Abstract

**Background:** Hepatitis C virus infection continues to be a major public health problem warranting high priority efforts for control and treatment. Aim: An observational, cross-sectional facility-based study was conducted to measure the prevalence of HCV infection and to identify risk factors associated with HCV infection among health care workers. **Subjects and Methods:** A total of 109 participants were selected. It conducted through stratified random sampling. For the analysis, Z-test and Fisher's exact test were used. All participants in this study were tested for HCV marker (Anti-HC). **Results:** The positive for Anti-HC was found to be 1.8% (2/109), which was found among nurses and paramedics. The results showed association between Anti-HC positivity and blood transfusion, frequency of blood transfusion and exposure to sharp injuries, P values (0.003, 0.0001 and 0.029) respectively. **Conclusion:** Prevalence rate of Anti-HC was found to be low in HCWs (1.8%). The prevalence rate was found among nurses and medical engineers. Blood transfusion, frequency of blood transfusion and exposures to sharp injuries to be risk factors with Anti-HC positivity.

**Keywords:** HCV marker, Dialysis Centers (Units), health care workers, riskfactors, Khartoum State, Sudan.

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## Introduction

Hepatitis C virus infection continues to be a major public health problem. WHO estimates that HCV infection has an estimated worldwide prevalence of more than 500 million cases.<sup>[1]</sup> Approximately, 170 million people worldwide are chronically infected with hepatitis C virus (HCV).<sup>[2]</sup> The health care workers (HCWs) are at risk of infection with blood borne pathogens through occupational exposure to blood and infectious body fluids.<sup>[3]</sup> Approximately 3 million percutaneous exposures to blood borne pathogens occur annually among 35 million HCWs worldwide. These injuries are estimated to result in 16,000 hepatitis C, 66,000 hepatitis B, and 200 to 5000 HIV infections. Over 90% of these infections are occurring in low-income countries, and most are preventable.<sup>[4]</sup> Low endemicity areas include North America, Western Europe and Australia, where anti-HCV anti-bodies <1.5%. Areas with intermediate endemicity include Mediterranean countries and Asia (Anti-HCV 1–2%), while the highest endemicity has been detected in Africa, South-Eastern Asia and Latin America (Anti-HCV >2%). HCV infections are strongly associated with hepatocellular carcinoma, the prevalence of HCV was found to be 1.5% among the hepatocellular carcinoma patients in Sudan.<sup>[5]</sup> Seroprevalence rate of HCV among Sudanese in range (between 2.2% to 4.8%).<sup>6</sup> In Omdurman-Sudan, a cross-sectional study was conducted showed the seroprevalence of HCV was zero (0.0%) HCWs.<sup>[7]</sup>

Limited information regarding to HCV infection among North Indian health care workers for this reason we conducted this study aims to measure the prevalence of HCV infection and to identify risk factors associated with HCV infection among nurses and paramedics.

## Subjects and Methods

The study was conducted at government medical college, Bettiah. The study was approved by the institutional research committee. This study was observational, cross-sectional facility based study. A total of 109 health care workers participated in the study. Nurses and paramedics in direct or indirect contact with patients or with blood or other body fluids from patients in the hospital were included in the study. The study was explained to the participating subjects, and a written consent was taken.

A pre-tested, pre-coded self administered questionnaire was used to collect socio-demographic characteristics (age, sex, education, marital status, occupation and duration of the work), past medical history (blood transfusion, frequency of blood transfusion, surgical operation, exposure to needle stick, using shared razors and tattoos).

Under sterilized condition about (5 ml) of venous blood was taken from each participant through venepuncture using a vacutainer device (blood collection containers) (EDTA container), the samples were stored upright in an ice box (vaccine carrier)/refrigerator. Then the sera were separated

by centrifugation at 3000 rpm for 5 minutes and stored at -20o centigrade till testing. ELISA was used to screen Anti-HC.

The data was tabulated and subjected to statistical analysis using SPSS (statistical package for social sciences) version 10. For the analysis, binomial test (Z-test) for single proportion and some nonparametric tests such as Fisher's exact test were used, Pvalue of <0.05 was considered statistically significant.

## Results

A total of one hundred and nine HCWs were recruited to the study. Sixty nine of HCWS (65.1%) were female and (34.9%) were male. [Figure 1]

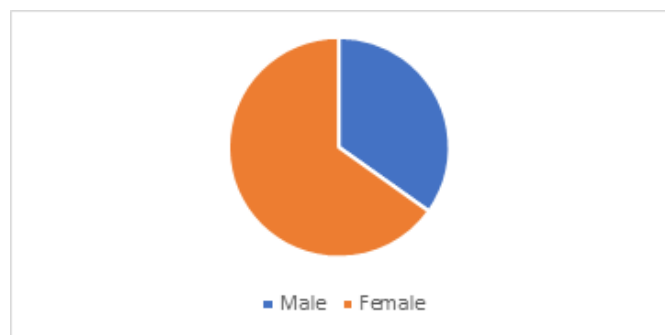


Figure 1: frequency of males and females.

The age group 21-30 years represents 63.3% of participants, followed by the age group 31-45 years 38 (34.9%) and only 2 (1.8%) in 18-20 years. [Figure 2]

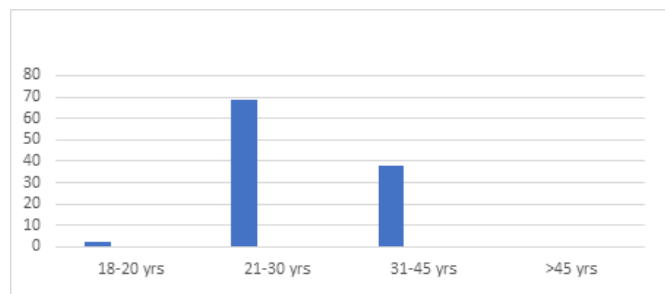


Figure 2: Number of subjects in age range.

Twenty seven of HCWs (24.8%) were married while 82 (75.2%) unmarried. [Figure 3]

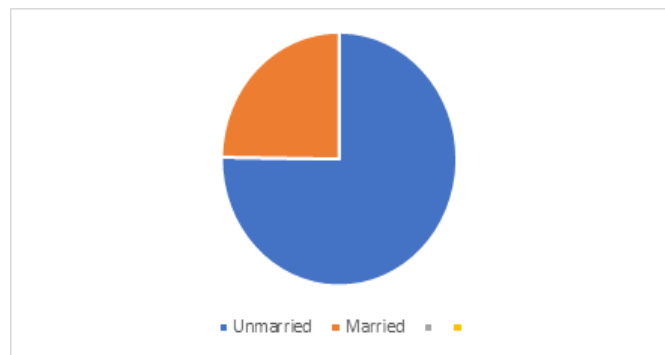


Figure 3: Married Vs Unmarried

Concerning educational level 81.7% of HCWs were Secondary level educated, 12.8% were graduate, 4.6% high school and 1% primary education.

Regarding the occupation 73 (67%) HCWs were nurses, 11 (10.1%) lab. Technician, 10 (9.2%) dresser, 8 (7.3%) ot assistant, 4 3.7% Para medicals, Concerning to the duration of the work 60.5% of HCWs in 1-5 years followed by the duration 6 -10 years 15.6%, less than one year 14.7% and more than ten years 9.2%. [Table 1]

Table 1: Demographic characteristic of anti-HC positive subjects and healthcare workers

Characteristic	Frequency	Anti -HC Positive
<b>Sex</b>		
Male	38	0
Female	71	2
<b>Age group</b>		
18-20	2	0
21-30	69	2
31-45	38	0
>45	0	0
<b>Marital status</b>		
Married	27	0
Unmarried	82	2
<b>Educational level</b>		
High school	6	0
Secondary	89	2
Graduate	14	0
<b>Occupational category</b>		
Dresseer	12	0
Nurse	73	1
Paramedical	05	0
Lab technician	11	1
Ot assistant	08	0
<b>Duration of work</b>		
<1 year	20	1
1-5 year	69	1
6-10 year	13	0
>10 year	07	0

Socio-demographic characteristics associated with Anti-HC positivity shows the socio-demographic characteristics of HCW, from table the positive cases among female 2.8% (2/71). Regarding to the age group the tow positive cases recorded in age group 15-30 years. Also the two positive cases among unmarried 2.4% (2/82). For the educational level the positive cases among secondary level 2.2% (2/89). Concerning to the occupation, the prevalence among lab technician and nurses 12.5% and 1.4% respectively.

## Discussion

The overall prevalence of HCV infection was 0.18 % [Table 1] and rate of prevalence females were higher. Prevalence of HCV infection was different in all age group in range 0 to 1.8 %. The study showed maximum prevalence of HCV infection in aged 15-30 years. Out of total positive maximum number of patients were identified in unmarried females.

Acute HCV infection is usually asymptomatic so infection remains undiagnosed, usually it diagnosed accidentally or when it becomes chronic. It is estimated that only 30-50% of individuals infected with HCV are aware of their disease (Rajesh, 2012).

Hepatitis C infection is found worldwide, prevalence rates are also different e.g. 5.5% in Africa, 4.6% in the Eastern Mediterranean region, 4% in the Western Pacific region, 2% in South East Asia, 1.7% in the United States of America (USA), 1% in Europe and 28% in Egypt were noted in past (Sy et al., 2006).

Risk factors for HCV transmission differ between developed and developing countries. Transmission of HCV was strongly associated with intravenous and percutaneous drug users (IDUs). Studies from the developed countries also reveals that most of the new HCV infection associated with injection drug use (Wasley et al., 2000).

In the developing countries, unsafe therapeutic injections and transfusions are likely to be the major modes of transmission, especially in countries where age-specific seroprevalence rates suggest ongoing increased risk of HCV infection (Shepard et al., 2005).

The seroprevalence of HCV among general population of India has been reported between 0.22-1.8 per cent (Gowri et al., 2012; Jaiswal et al., 1996).

In our study overall prevalence of HCV infection is 0.18% which is similar to study done by Gowri et al., (0.22%), lower seropositivity was reported from Madurai, while study done by Preeti Mindolli et al., (2.6%) and Mishra et al., (1.57%) Showed higher prevalence as compare to our study. Differences in prevalence rates may be due differences in health resources and educational levels awareness of the disease in different regions. The prevalence of HCV in both genders is controversial. While some studies showed higher HCV incidence among men, other population based surveys showed similar rates in both sexes. In this study prevalence were higher for females. The present study revealed significant trend of HCV seropositivity with relation to age, highest prevalence was noted in adults. Study done by Preeti Mindolli et al., also showed contrast result, in present study highest prevalence was noted in older age group, may be the reason that late diagnosis in older age group due unavailability of facilities at that time. After older age group significant numbers of HCV positive patients were found in younger age group (20-29 yr). Intravenous drug abuse is very common in this age group so it can be the first reason of HCV transmission and early diagnosis due to improvement in health care facilities as well as patients awareness of diseases can be the other reason.

## Conclusion

HCV would be responsible for emerging infection in India. In order to prevent transmission of infection, educational program and screening to target group as well as illiterate people in collaboration with health care provider are require.

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