

**ORIGINAL RESEARCH**

# Prevalence and risk factors of hepatitis c virus infection in a tertiary care hospital of central India- A cross sectional study

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Received date: 09 January, 2024

Acceptance date: 30 January, 2024

## ABSTRACT

**Background:** Hepatitis C virus (HCV) infection is considered one of the growing public health problems. Identification of HCV associated risk factors is pivotal for developing appropriate prevention strategies. **Aims & objective:** This study determine the prevalence of HCV infection and their associated risk factors in our. **Material & method:** This cross sectional study was conducted in the Department of Microbiology, M G M Medical College, M.P. A total of 500 Blood samples were received during the study period in serology section for detecting Hepatitis C virus infection. The patient socio-demographic data (name, age, sex and address), Inpatient/outpatient number, risk factors, history of blood transfusion and clinical history were noted. **Results:** The prevalence of HCV infection was 4.4% (22/500). Majority of the patients 26.8% in total and 50% in HCV positive cases were 21-30 years age group. Among total cases 69.4% were males whereas among HCV positive patients 77.27% were male. The risk factor for HCV transmission was observed as blood transfusion (81.8 %), haemodialysis (4.54%), unsafe injection (9.09%) and IV drug abuse in only one case (4.54%). **Conclusion:** The study identified multiple risk factors for acquiring HCV infection and suggests appropriate interventions targeting high-risk populations

**Keywords:** Prevalence, Risk factors, HCV infection, blood transfusion

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## INTRODUCTION

Hepatitis C virus (HCV) infection has emerged as a serious public health threat. The World Health Assembly formulated Global Health Sector Strategy for eliminating viral hepatitis as a public health threat by 2030 [1]. There is a great variability in its geographical distribution, associated to the degree of nation development. High prevalence is found in Africa and Asia, in opposite to low-prevalence areas localized in industrialized nations in North America, north and west Europe, and Australia [2-3]. HCV is the most frequent cause of chronic hepatitis, with the frequency of 2550% (depending on the world region), and it is one of the most significant risk factor of hepatocellular carcinoma, found among approximately some 60% of those afflicted by this malignancy [4]. The World Health Organization (WHO) estimated approximately 290,000 HCV deaths globally in 2019 [5]. Recipients of blood transfusion, persons who inject drugs (PWID), non injecting drug

use, unsafe injections, and tattooing are the main risk factors observed in India.[6-7] Blood safety, injection drug use (IDU), and reuse of unsterilized needles/syringes and surgical instruments remain the areas of major concern. IDU is one of the leading risk factors of HCV transmission and explains the uneven distribution of HCV infection prevalent worldwide [8]. The distribution of different genotypes also varies according to the studied population and viral transmission risk factors [9]. WHO identified major gaps in HCV prevention, testing, and treatment among vulnerable populations and advocates integrating community level services to fill these gaps.[2] Primary care physicians are perfectly placed to offer services through interdisciplinary approach [10]. There is a need for more studies to better understand the epidemiological risk factors of HCV infection in our state. That by, this study was planned to determine the prevalence and risk factors of hepatitis C infection among adults in a tertiary care hospital in central,

India, which will be helpful in the prevention and control of HCV infection.

**MATERIALS AND METHODS**

This cross sectional study was conducted in the Department of Microbiology, Mahatma Gandhi Memorial Medical College, Indore (M.P.) over a period of 12 months. A total of 500 Blood samples were received during the study period in serology section of our department for detecting Hepatitis C virus infection.

**Inclusion criteria**

- Adequate samples in proper container with levelling
- Samples with completely filled request form

**Exclusion Criteria**

- Unlabeled sample
- Hemolyzed sample or Lipemic sample
- Insufficient quantity
- Insufficient patient information etc

The patient socio-demographic data (name, age, sex and address), Inpatient/outpatient number, risk factors, history of blood transfusion and clinical history were noted.

Rapid card test and ELISA test for HCV antibody is performed using kit as per manufacturer instruction and samples is tested for detection of HCVRNA by reverse transcription and real time polymerase chain reaction (RT-PCR) [11]. Rapid test (Oscar HCV test) was used for qualitative detection of antibodies (IgG) to HCV in human serum/plasma by Immunochromatography. The HCV ELISA test (VoxEL Bio LTD.) is an Enzyme immuno absorbent assay for the qualitative detection of antibodies against HCV in human serum and plasma.

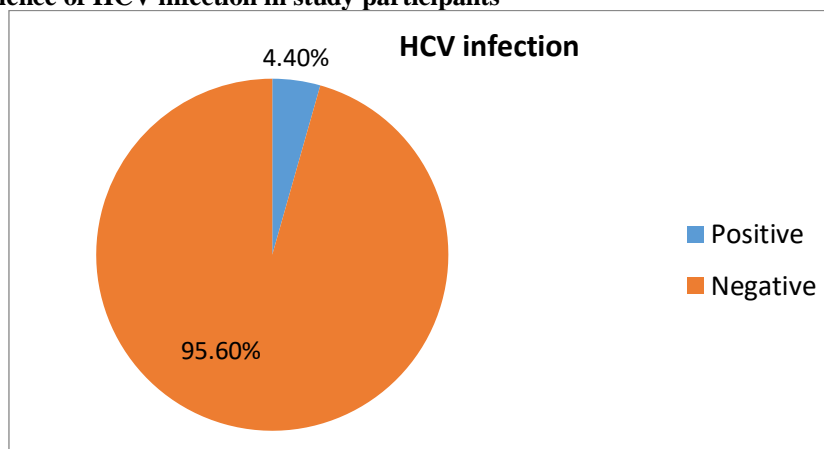
**Statistical analysis**

Data was analysed using SSPS version 22. Frequency and central tendency measures, and 95% confidence intervals were calculated. Associations between risk factors and genotype were analyzed using chi-square test. P value <0.05 was considered statistically significant.

**RESULTS**

A total of 500 specimens received in our department for the detection of HCV infection. In which 22 samples detected positive for HCV by using both the method RAPID card test and ELISA The prevalence of HCV infection was 4.4%.

**Figure 1: Prevalence of HCV infection in study participants**



Age ranged of the patients was 0-70 years. Majority of the patients 134 (26.8%) were 21-30 years age group, followed by 116 (23.2%) were 31-40 years age group. Among 22 positive cases majority of the cases (50%) belong to 21-30 years age group. 18.2% cases were 0-20 years and 41.50 years age group. Among total samples under study group, 347 (69.4%) were males and 153 (30.6%) were females respectively. Among the 22 Anti-HCV positive patients, 17(77.27%) and 5 (22.72%) were males and females respectively

**Table 1: Age and gender wise distribution of HCV cases**

Parameters		Total no of samples (n=500)	ELISA positive cases (n=22)
Age groups	0-20 years	62 (12.4%)	4 (18.2%)
	21-30 years	134 (26.8%)	11 (50%)
	31-40 years	116 (23.2%)	3 (13.6%)
	41-50 years	78 (15.6%)	4 (18.2%)
	51-60 years	55 (11%)	0 (0%)
	61-70 years	38 (7.6%)	0 (0%)
	>70 years	17 (3.4%)	0 (0%)
Gender	Male	347 (69.4%)	17 (77.27%)
	Female	153 (30.6%)	5 (22.72%)

In the present study, the risk factor for HCV transmission was observed as blood transfusion in 18 cases (81.81%), haemodialysis in 1 case (4.54%), unsafe injection in 2 cases (9.09%) and IV drug abuse in only one case (4.54%).

**Table 2: Distribution of HCV cases based on risk factor associated with HCV infection**

Risk factor	No of cases	Percentage
Blood transfusion	18	81.81%
Haemodialysis	1	4.54%
Unsafe injection	2	9.09%
Drug abuse	1	4.54%

The serological assay was done for detection of Anti-HCV antibodies. Out of 500 samples tested for Anti-HCV antibodies 22 (4.4%) were positive by RAPID and ELISA.

## DISCUSSION

Numerous risk factors promote HCV acquisition, and multiple risk factors may be present in a single individual. Infected persons cannot be dichotomised into “injection drug users and blood product recipients”, many in each group may have other factors as well. Health care facilities were considered a significant source of HCV, mainly because of a lack of injection safety, unsafe blood transfusion and risky medical procedures.

The prevalence of hepatitis C infection in current study was low (4.4%), our findings consistent with the Vickery et al [12] and Okasha, et al [13], reported prevalence of HCV were 4.7% and 8% respectively.

In our study maximum (50%) HCV positive cases were in 21-30 years age group, in agreement with the M Jadoul, et al [14] and Leland J, et al [15].

Our results shows that male were predominantly affected (77.2%) from HCV infection than female, similar finding also reported by Paraboni, et al [16] and Nickbakhsh S, et al [17].

A study conducted by Sood et al [18], found that low education was an important risk factor associated with higher HCV infection.

The current study identified health care- related risk factors such as blood transfusion, dental procedure, and intravenous injection/ infusion from quacks or traditional healers independently influencing HCV infection, our results comparable with the Sharma P, et al [19] and Kelley Chana, et al [20].

In our study blood transfusion was the most important predictive risk factors of HCV infection, concordance with the many previous studies: Rosa *et al* [21] and Perz JF, et al [22], observed that history of blood transfusion had a significant independent association with HCV infection.

Unsafe injection practice by health care workers was the second common risk factor for the HCV infection, our results concise with the Kandeel *et al*. [23] and Ambekar A, et al [24].

Current study was observed that using IV drugs was significantly associated with HCV infection, accordance with the Suan MA, et al [25] and Nikola, et al [26].

## CONCLUSIONS

The present study identified multiple risk factors associated with HCV infection. Thus, the existing screening activities among this high-risk population should be strengthened to detect HCV-infected cases. Blood remains a major route of HCV transmission. There is a need for effective implementation and monitoring of blood banks to improve blood safety practices. Preventive and promotive interventions by periodic awareness generation outreach camps on prevention of substance abuse and dangers of piercing/tattooing from street hawkers, particularly among adolescents and young adults, are required. Educational programs for current intravenous drug users regarding the need to use sterilized needles are suggested..

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