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Epidemiological Characteristics of Hepatitis C Patients Attending a Tertiary Care Hospital

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ABSTRACT

Background: Hepatitis C infection is a major public health concern in Nepal. Epidemiological information on hepatitis C virus along with the status of co-infection with hepatitis B virus and human immunodeficiency virus is essential to controlling the hepatitis C burden. The objective of this study was to determine the sero-prevalence of hepatitis C virus infections, proportions of co-infections with human immunodeficiency virus and hepatitis B virus, and identify the demographic characters, and routes of transmission.

Methods: A cross-sectional study was conducted from December 2019 to February 2024 at Tribhuvan University Teaching Hospital. The serological tests were performed by enzyme-linked immunosorbent assays from 25133 patients' serum in four years.

Results: The sero-prevalence of hepatitis C virus -infected patients was 0.8% (211/25133). Among them, 6.6% (14/211) were co-infected with human immunodeficiency virus and 1.4% (3/211) with hepatitis B virus. Among 211 hepatitis C virus patients, 174 (82.5%) were male, 156 (73.9%) were young aged 15–47 years with various professions, 167 (79.1%) were literate, and almost one-third of the patients (33.2%, 70/211) were regular alcoholics. Needle sharing among intravenous drug users (45.5%, 96/211) and sexual intercourse (28%, 59/211) were the most common modes of transmission.

Conclusions: Although the prevalence of hepatitis C infections is less than 1%, it is more common among young male intravenous drug users. Awareness of the spread of hepatitis C infections among this population needs to be emphasized to control hepatitis C in Nepal.

Keywords: characters; co-infection; hepatitis C, sero-prevalence.

INTRODUCTION

Approximately 50 million people around the world have been chronically infected with HCV, of whom 242,000 died in 2022, mostly from cirrhosis and hepatocellular carcinoma (HCC).[1] In Nepal, 5-10% of the patients with HCC were found HCV seropositive, and approximately 130,000 people are HCV-infected.[2,3] Higher prevalence rates have been found in Europe, Japan, and parts of the middle east, sometimes up to 19% among Egyptian blood donors.[4,5] Studies have reported that the seroprevalence of anti-HCV in the Nepalese population was around 1%. [6-10]

Intravenous drug use by needle sharing is the most common route of HCV transmission, accounting for 55-65% of all infections.[11,12] Studies in Nepal have shown high rate of HCV infection among intravenous drug users (IDUs).[6,9] Similarly, high rate of HCV infection was found among the patients co-infected with human immunodeficiency virus (HIV).[13-15]

True prevalence of HCV is difficult to estimate because of a high proportion of asymptomatic cases. In the context of Nepal, it is important to understand hepatitis C epidemiology. The objective of this study was to determine sero-prevalence of hepatitis C among clinically suspected patients at TUTH, proportions of co-infections with HIV, HBV, and identify the demographic factors and transmission routes.

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METHODS

This study was a hospital-based cross-sectional study conducted at Tribhuvan University Teaching Hospital (TUTH), a referral-level 850-bed hospital located in Kathmandu, it is a national governmental hospital where patients from all over the country seek treatment for a variety of illnesses. We collected the blood samples along with sociodemographic details and risk factors from the hepatitis C virus-infected patients.

The period of the study was from December 2019 to February 2024. We screened 25133 clinically suspected patients for hepatitis C and verified for HCV infections at the Department of Microbiology, TUTH. Among them, 211 were sero-positive for HCV infection, and their demographic data as well as laboratory investigation data were collected.

A semi-structured questionnaire was completed with the hepatitis C sero-positive patient. Data on demographic characteristics, risk behaviours, and modes of transmission were explored.

The serological tests were performed using enzyme-linked immunosorbent assays (ELISA) to detect total antibodies for hepatitis C virus (HCV) (Autobio Diagnostics Co., Ltd., Zhengzhou, China) and surface antigens for hepatitis B virus (HBV) (Autobio Diagnostics Co., Ltd., Zhengzhou, China), as well as total antibodies for HIV (Autobio Diagnostics Co., Ltd., Zhengzhou, China), from the patient serum according to manufacturer's instructions.

All the data were analyzed and presented in texts, tables, and graphs after being input into the Excel spreadsheet in Windows 10 and SPSS version 25. The prevalence of hepatitis C cases was calculated as the number of HCV sero-positive cases among the total tested. Co-infections of HCV infected patients with HBV and HIV were determined. A descriptive analysis of hepatitis C infections was performed along with demographic data, risk behaviours, and transmission routes. A chi-square test of independence was performed to examine the relationship between gender, caste, age and HCV infection. A p-value ≤ 0.05 was regarded as statistically significant.

We received ethical approval from the Ethical Review Board of the Nepal Health Research Council (Ref. 775/2019). We obtained written informed consent from each patient before collecting data and a blood sample. The data was kept confidential.

RESULTS

The sero-prevalence of HCV infection was 0.8% (211/25133) during the study period. HCV patients co-infected with HIV and HBV were 6.6% (14/211), and 1.4% (3/211), respectively. However, co-infection with both HBV and HIV was not found in any patient (Figure 1).

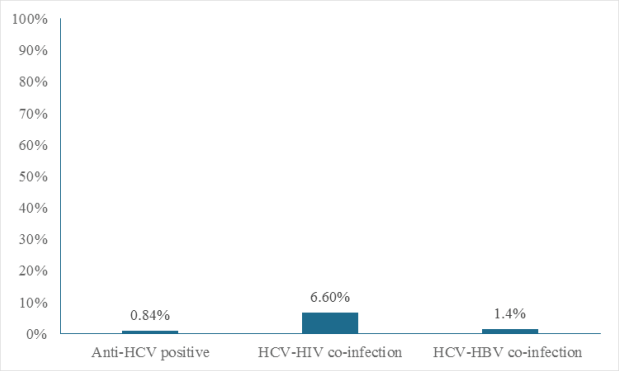

Figure 1. Hospital based sero-prevalence of HCV, HCV-HIV and HCV-HBV co-infections .

Among the total 211 HCV patients, 63 (29.9%) were from Kathmandu followed by Sunsari and Chitwan, each with 11 (5.2%) patients, and 126 from other districts. Among the 77 districts of the country, patients were from 49 districts of Nepal (Figure 2).

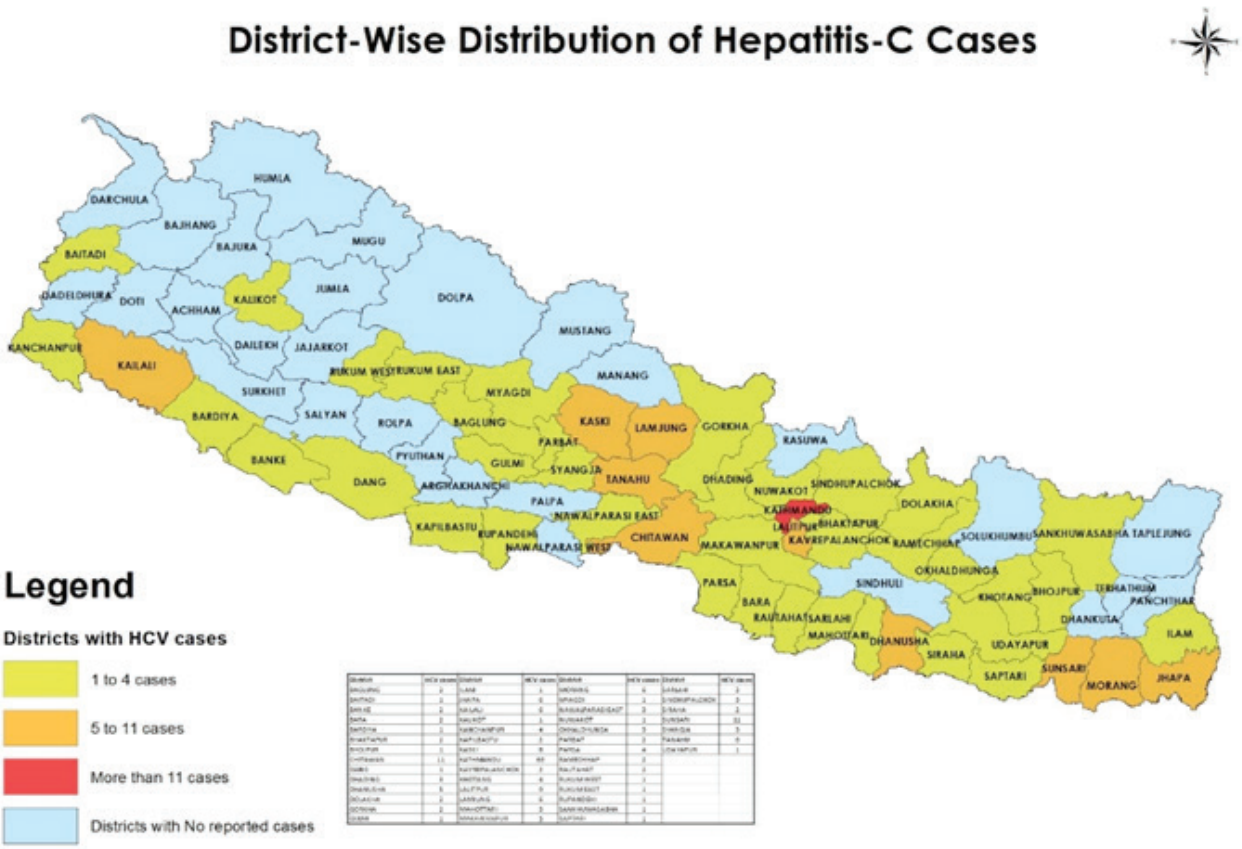

Figure 2. Geographical distribution of HCV patients. (N=211)

Among the 25133 tested, males were 12980 (51.6%), females were 12148 (48.3%), and the remaining 5 (0.02%) were of the third gender. HCV infection among male (1.3%) was significantly higher than female (p = <.00001). Among the total tested, 334 (1.3%) patients did not mention their caste. Among the represented castes, the infection prevalence was highest among Janajatis 1.2%, which was statistically significantly higher than the other castes (p =.000067). Similarly, age-specific sero-prevalence showed that the adult population aged 15-47 years had a sero-prevalence of about 1.0%, which was significantly higher than other age groups (p = <.00001) (Table 1).

Table 1. Hospital-based seroprevalence according to sex, caste, and age variables of HCV patients.

Variables		Number (N)	Positive (N)	Prevalence%	P-value
Sex	Male	12980	174	1.34	<.00001
	Female	12148	37	0.30	
Caste	Brahmin/Chhetri	11798	69	0.58	
	Dalit	1776	14	0.79	
	Janajati	8591	105	1.22	.000067
	Madeshi	2045	19	0.93	
	Thakuri	589	4	0.68	
Age	Paediatric group (0-14 yrs)	882	1	0.11	
	Young group (15-47 yrs)	15107	156	1.03	<.00001
	Middle age group (48-63 yrs)	5784	48	0.83	
	Elderly group (above 64 yrs)	3360	6	0.18	

Among HCV-positive cases, the majority were Hindu (77.3%), followed by Buddhist (11.8%) and Christian (8.5%). The illiterate patients were only 8.5%. HCV patients had various professions, although most patients were farmers, followed by laborers, drivers, businessmen, homemakers, and others (Table 2).

Table 2. Distribution of HCV patients according to religion, education level and profession. (N=211)

Variables	Categories	HCV positive Number (%)
Religion	Buddhist	25 (11.8)
	Christian	18 (8.5)
	Hindu	163 (77.3)
	Islam	3 (1.4)
	Kirat	2 (0.9)
Education	Illiterate	18 (8.5)
	Read and write	25 (11.8)
	Pre school	1 (0.5)
	Primary	19 (9.0)
	Lower secondary	41 (19.4)
	Secondary	58 (27.5)
	Higher secondary	32 (15.2)
	Bachelor and above	17 (8.1)
Professions	Farmer	31 (14.7)
	Laborer	20 (9.5)
	Driver	18 (8.5)
	Businessman	17 (8.1)
	Homemaker	15 (7.1)
	Unemployed	11 (5.2)
	Private service employee, shopkeeper (each 8)	16 (7.6)
	Security guard	7 (3.3)
	Wall painter	5 (2.4)
	Policeman, cook, waiter, student (each 4)	16 (7.6)
	Co-driver, tourist guide, butcher, legal writer, marketer, tailor (each 3)	18 (8.4)
	Astrologer, office helper, salesman, carpenter, Beautician, plumber, civil construction supervisor, Housemaid, nurse, broker, artist (each 2)	22 (9.9)
	House constructor, kumale, mason, sportsman, sex worker, worker at IVDUcenter, transportation cashier, guest room helper, aluminium fitting worker, graphic designer, workshop worker, contractor, co-cook, government employee, teacher (each 1)	15 (7.5)

The most common reported modes of transmission of HCV among the patients were intravenous drug use (45.5%, 96/211) and sexual route (28%, 59/211). Any mode of HCV transmission could not be identified among 11.4% (24/211) of the HCV-infected population (Figure 3).

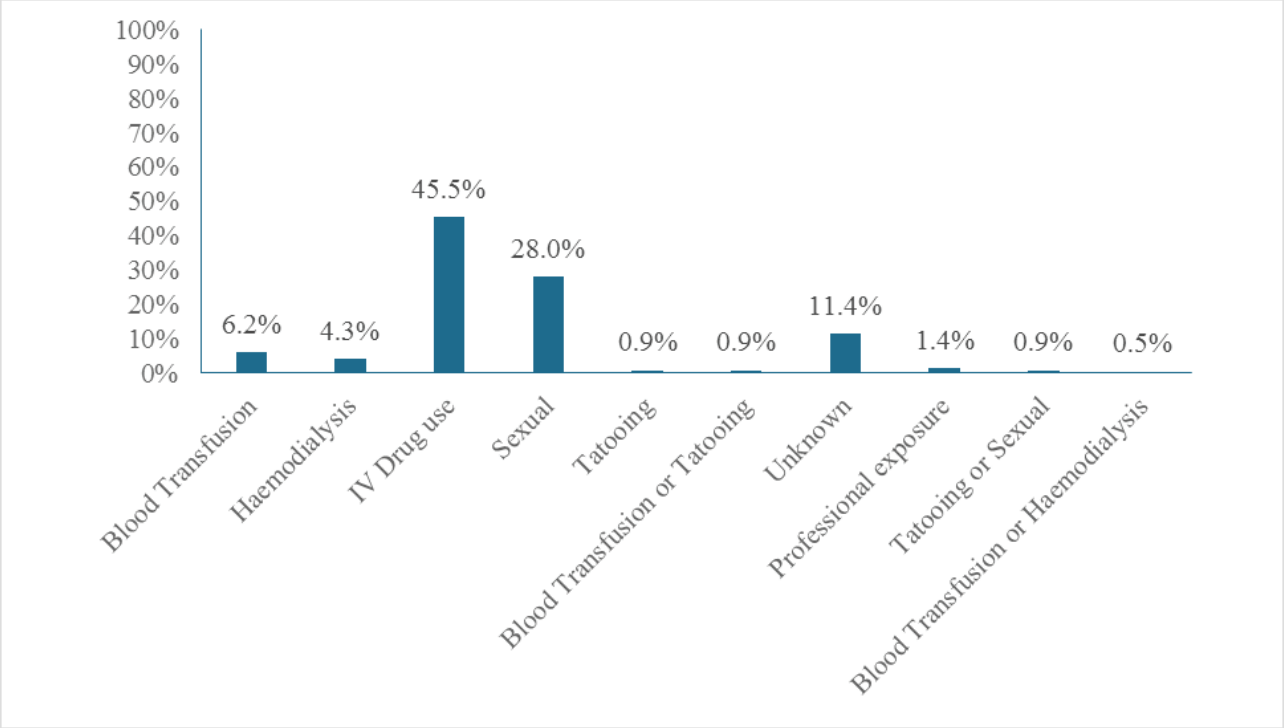

Figure 3. Mode of transmission of HCV in Nepal. (N=211)

One third of the HCV patients (33.2%) were also found to be regular alcoholics (Figure 4).

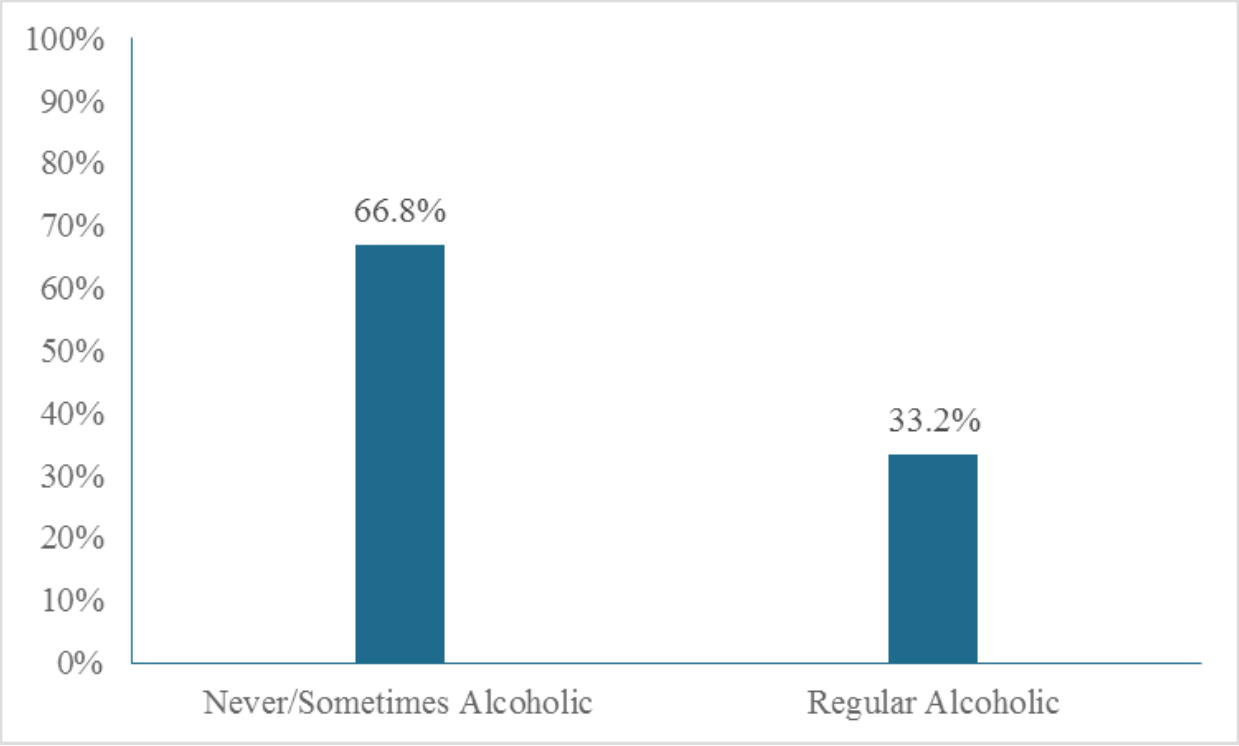

Figure 4. Alcohol intake habits among HCV patients (N=211)

DISCUSSION

We found that hospital-based HCV infection prevalence is below 1% among patients enrolled at TUTH. Since large proportion of patients of HCV infection are asymptomatic, it is often challenging to determine the actual prevalence. This suggests that hospital-based epidemiological studies provide important information to understand the disease burden. Therefore, we conducted this study to describe the epidemiology of hepatitis C infection at TUTH. In our study, patients were from 49 districts out of 77 districts. That somehow reflects the scenario of HCV distribution in most parts of the country.

We found that the hospital-based prevalence of HCV infection was 0.8% over the study period. According to Shrestha et al. (1998), 0.6 percent of healthy adults in Nepal were found to be anti-HCV positive.[6] According to MoHP Nepal (2020), an estimated sero-prevalence of HCV was 0.4% among the general population.[16] Since then, the prevalence rate of HCV seems to be almost unchanged among the general population. The symptomatic patients with liver disease is the major group of the HCV-positive population, the HCV prevalence in hospital patients is higher compared to the general population. According to a study at a hospital in Kathmandu, 1.9% HCV seroprevalence was found among the jaundiced patients.[17] In contrast to their study population, our population included both asymptomatic and symptomatic patients. Therefore, this may explain that the HCV prevalence in our results is lower than in the previous study. The trends in HCV prevalence over the years might have changed due to improved awareness and interventions. A systematic review of HCV prevalence estimated that the global prevalence of viraemic HCV is around 1%.[18] Different studies conducted at different parts of India have shown similar results. Kumar et al. in 2023 reported varying prevalence rates of HCV infection from 0.5% to 53.7%.[19] However, anti-HCV positivity rates varied across states of India, with a population prevalence of around 1%.[20-23]

The 69th World Health Assembly has endorsed a global strategy to eliminate viral hepatitis by 2030. There is no vaccine for HCV developed yet for the protection of human beings from infection with HCV. Nevertheless, chronically infected patients can be treated with direct-acting antivirals, which have a success rate of more than 95% and stop the transmission of viruses from cured patients to other humans.[1] That seems to be the most promising action for controlling HCV infections, which have shown a low prevalence rate over the years in Nepal.

HCV, HBV, and HIV are all bloodborne viruses. Hence, people get infected with these viruses through the same modes of transmission. This study found that a few HCV patients were co-infected with HIV or HBV. Among HCV patients co-infected with either HIV or HBV or both, progresses to liver fibrosis and liver cirrhosis in short periods of time as compared to mono-infected patients.[24]

In this study, we found that HCV prevalence among adult males was significantly higher. However, this varies from one study to another. One study from India had similar results as we detected whereas another study found the opposite findings.[22,25] A study carried out in Nepal at different time periods showed a predominance of female HCV patients; with majority of infected cases among the young age group.[17]

According to the 2021 national census, the predominant religion was Hindu, followed by Buddhism and others.[26] Similar to the proportion of different religions in the country, this study showed an almost similar rate of HCV infection, representing the population of different religions.

Although sero-prevalence of HCV is low among the general population, high seroprevalence is found among intravenous drug users. HCV is a bloodborne infection, and people who share the blood-contaminated needle and syringe may be more susceptible to infection. In our study, the most common reported modes of transmission of HCV were intravenous drug use and sexual routes. The MoHP report 2023 also showed the high HCV prevalence rate among intravenous drug users and sex workers.[16] A systematic review study conducted on hepatitis C infected Nepalese patients in 2018 revealed higher sero-prevalence of hepatitis C among intravenous drug users which is similar to our findings.[27] Another descriptive study of hepatitis C among inject drug abusers (PWIDs) was carried out in southern India and found that almost half of the tested were HCV-infected.[28] In addition, blood transfusion during the window period, use of unsterile injections, and sex with multiple sex partners might be other factors contributing to the spread of HCV in this country.

Our study showed the one-third of the HCV patients were regular alcoholics. Regular alcohol consumptions is one of the risk factors for the development of liver cirrhosis in HCV infected patients.[29] Therefore, significant numbers of HCV patients in Nepal might suffer from liver cirrhosis.

In this study, we presented data from a tertiary care hospital based on serological testing within four years. Further, the patient's information was collected based on

self-reporting. We did not confirm the present status of HCV sero-positive patients by polymerase chain reaction. Despite these limitations, this study provides updated prevalence of HCV infection, co-infection of HCV with HIV and HBV, and demographic characteristics of HCV infected patients.

CONCLUSIONS

The prevalence of hepatitis C infection is below 1% in Nepal. HCV infection is more common among young male intravenous drug users. Although in less proportion, both HIV and HBV co-infection was found among the HCV-infected patients.

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CONFLICT OF INTEREST

The authors declared that they have no conflict of interest. "The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated."

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