Int J Med. Public Health., 2023; 13(3):133-136.
https://www.ijmedph.org

Brief Communication

Insights into the Epidemiology of Hepatitis C Virus Infection in Delhi: Findings from a Tertiary Care Hospital

Belinda Jothi J, Pooja Yadav, Arpita Panda, Shilpee Kumar*

Department of Microbiology, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi, INDIA.

ABSTRACT

Background: The initial stage in the cascade of care for Hepatitis C Virus (HCV) infection involves the identification of infected individuals, which enables the initiation of the care sequence. This study aimed to assess the prevalence of HCV infection and estimate its burden. **Study design:** This retrospective study was conducted in a hospital setting. **Materials and Methods:** All consecutive samples received by the Microbiology department between February 2019 and December 2022 were subjected to HCV infection testing using ELISA to detect Ag/Ab, and were included in the study. **Results:** Out of the 82,614 samples tested for HCV infection, 1,580 were found positive, resulting in a seroprevalence rate of 1.9%. More than half of the seropositive individuals fell within the 19-40-year age group. **Conclusion:** The implementation of widespread HCV infection screening programs in the community, coupled with awareness initiatives on HCV transmission and prevention, is crucial.

Keywords: HCV Infection, HCV prevalence, Hepatitis C.

Correspondence:
Dr. Shilpee Kumar
Professor, Department of Microbiology, Room No 515, V Floor, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi-110029, INDIA.
Email: drshilpee17@yahoo.in

Received: 07-04-2023;
Revised: 16-06-2023;
Accepted: 13-10-2023.

INTRODUCTION

Hepatitis C Virus (HCV) is a significant viral pathogen that leads to hepatitis, liver cirrhosis, and hepatocellular carcinoma. Upon HCV infection, a small subset of individuals experiences acute hepatitis, while most people remain asymptomatic. The infection can either progress to chronic infection or clear spontaneously. Chronic HCV infection is prevalent in the majority of affected individuals, and more than 20% of those with chronic infection develop severe chronic liver conditions such as cirrhosis or Hepatocellular Carcinoma (HCC).[1]

Based on 2015 data, the latest global estimates indicate that approximately 71.1 million individuals worldwide are viremic with HCV, resulting in a prevalence of 1%. The prevalence varies across regions, with the Eastern Mediterranean Region (EMR) having the highest number of infected individuals (approximately 15 million), followed by the European Region (14 million), the Western-Pacific Region (14 million), and the African Region (10 million).[2] In India, the estimated prevalence of HCV infection ranges from 0.5% to 1.5%, with higher rates observed in the northeastern region, tribal populations, and Punjab, which are considered HCV hotspots. In contrast, lower rates are found in the western and eastern parts of the country.[3]

Regarding treatment, approximately 950,000 patients received treatment in 2015, with a successful Sustained Virological Response (SVR) achieved in around 700,000 cases. In the same year, the World Health Organization (WHO) estimated 1.7 million new infections. Direct-acting antiviral agents have proven to be highly effective in reducing the burden of HCV infection. Understanding the epidemiology of the virus, identifying infected individuals, linking them to treatment facilities, and implementing surveillance programs for those with advanced liver disease are essential components of the "HCV cascade of care".[2]

To initiate the sequential care process, the first step involves identifying individuals who are infected, which prompted the undertaking of this study aimed at assessing the prevalence of Hepatitis C virus infection.

MATERIALS AND METHODS

Study design

This retrospective investigation was carried out.

Site of study

The study was conducted at a government hospital in Delhi, North India, which serves as a tertiary care facility with a bed capacity of 2800. The hospital caters to Delhi and nearby states, with an average daily influx of 12,251 out-patients and 515 in-patient admissions.

DOI: 10.5530/ijmedph.2023.3.20

Study period

The study spanned four years, from February 2019 to December 2022.

Inclusion criteria: The study included all consecutive samples received in the Microbiology department for HCV infection testing. The test results were retrieved from the records and subjected to analysis.

Laboratory investigations

The presence of anti-HCV antibodies and capsid antigen in serum or human plasma was detected using a commercially available kit (Monolisa™ HCV Ag-Ab ULTRA V2, Bio-rad France) based on the enzyme-linked immunosorbent assay (ELISA). The tests were performed following the manufacturer's instructions.

Statistical analysis

Data from the manual record (paper and pen) were entered into an Excel sheet for analysis. The statistical analysis was conducted using SPSS software version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.).

Ethics

The study adhered to the principles outlined in the Declaration of Helsinki. The data obtained from this retrospective study were kept anonymized to ensure confidentiality.

RESULTS

A total of 82614 samples were tested for HCV infection between 2019 to 2022 and 1580 were tested positive. The seroprevalence of HCV infection in the study population was 1.9%. The year wise distribution is depicted in Table 1.

65% (1025/1580) of the patients reported positive for HCV infection were male and same trend was observed every year Table 2.

Half of the HCV infected patients belonged to 19-40 age group (Table 3).

DISCUSSION

Assessing the prevalence of HCV infection is essential for developing effective strategies for prevention, diagnosis, and control. In this study, HCV seroprevalence was determined by detecting HCV antigen/antibody using ELISA. According to hospital protocols, patients were screened for HCV infection prior to surgery, invasive procedures, chemotherapy, dialysis, or if there were suspicions of HCV infection. The study revealed a seroprevalence rate of 1.9% (1580 out of 82614).

As summarized in Table 4, the seroprevalence of HCV infection in India varies from 0.46% to 3.6%. The heterogeneity in seroprevalence rates may occur due to different study models and sampling bias. When the study is community-based, the selected population may not be a true representative of the

Table 1: Seroprevalence of HCV infection, 2019-2022.

	2019	2020	2021	2022	2019- 2022
HCV Negative	22189	12857	17459	28529	81034
HCV Positive	501	229	305	545	1580
Total samples tested	22690	13086	17764	29074	82614
Seroprevalence	2.2	1.7	1.7	1.9	1.9

Table 2: Gender distribution of patients with HCV infection.

	2019 n (%)	2020 n (%)	2021 n (%)	2022 n (%)	2019-2022 n (%)
MALE	324 (65)	152 (66)	199 (65)	350 (64)	1025 (65)
FEMALE	177 (35)	77 (34)	106 (35)	195 (36)	555 (35)
Total	501	229	305	545	1580

Table 3. Age wise distribution of patients with HCV infection.

Age (Years)	n (%)
<18	171 (10.8)
19-40	787 (49.8)
41-60	415 (26.3)
>60	207 (13.1)
Total	1580

Table 4: Comparison of seroprevalence of HCV infection across India.

Study	Place of study	Year of study	Study population	Samples tested	HCV sero-prevalence
Patil S *et al.*[4]	Mumbai	2017	Hospital	25129	0.46%
Goel A *et al.*[5]	India	1991-2017	Metanalysis-Community	414 data points from 327 publication	0.85%
Rahaman J *et al.*[6]	Kolkatta	2016	Hospital	10802	1.06%
Rajani M *et al.*[7]	Delhi	2008	Hospital	200	1.5%
Sharma R *et al.*[8]	Jaipur	2003- 14	Hospital	4014	1.7%
Agarwal *et al.*[9]	Uttar Pradesh	2015-16	Hospital	3750	1.76%
Mittal G *et al.*[10]	Uttarakhand	2012	Hospital	495	1.8%
Sood A *et al.*[11]	Punjab	2013- 14	Rural population	5543	3.6%
Present study	Delhi	2019-22	Hospital	82614	1.9%

community. For example, certain pockets of the community and tribal populations have higher seroprevalence rates.[11] When the study is hospital-based, there may be patients who are showing symptoms of viral illness and referred to the hospital, leading to overestimation of the seroprevalence rate. The test method to detect HCV infection may also affect the result of the study. ELISA-based tests are considered more sensitive than immunochromatographic-based tests but require skilled technicians and expensive equipment to run the tests. Tests based on detecting both antigen and antibody against HCV are more sensitive, as used in the present study, than tests based on detecting antibody alone. The performance specifications of the kits to detect HCV antigen/antibody may also influence the result of the study. Nevertheless, such variation in HCV prevalence between states implies that the optimum strategies may differ from state to state for screening and treatment for hepatitis C, and their cost-effectiveness.[5]

In the present study, 50% of those who were seropositive for HCV infection belonged to the 19-40 yr age group, followed by the 40-60 yr age group (26.3%). Hence, it is imperative to implement HCV infection screening in this age group along with awareness programs on transmission and prevention of HCV infection.

In 2018, the National Viral Hepatitis Control Program (NVHCP) was launched by the Government of India, with the goal of eliminating Hepatitis C by 2030. The government is committed to offering free screening, diagnosis, treatment, and counseling services to all individuals, especially those belonging to high-risk groups.[12] The successful implementation of this program is crucial for achieving the elimination of HCV from the country.

However, this study has certain limitations. It was conducted within a hospital setting, which restricts the generalizability of the findings to the wider population. Additionally, the screening for HCV infection relied solely on serological testing, and more sensitive assays such as PCR for detecting HCV RNA were not utilized.

CONCLUSION

The seroprevalence of HCV infection in the present study was 1.9%, and over 50% of seropositive individuals belonged to the 19-40-year age group. It is imperative to implement community-wide HCV infection screening programs and awareness campaigns on the transmission and prevention of HCV infection.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

HCV: Hepatitis C Virus; **HCC:** Hepatocellular Carcinoma; **EMR:** Eastern Mediterranean Region; **SVR:** Sustained Virological Response; **WHO:** World Health Organization; **ELISA:** Enzyme-Linked Immunosorbent Assay; NVHCP: National Viral Hepatitis Control Program; **PCR:** Polymerase chain reaction; **RNA:** Ribonucleic acid.

REFERENCES

1. World Health Organization. Hepatitis C fact sheet. WHO Web site; 2021; [cited Apr 7 2023]. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-c.
2. Lombardi A, Mondelli MU, ESCMID Study Group for Viral Hepatitis (ESGVH). Hepatitis C: is eradication possible? Liver Int. 2019;39(3):416-26. doi: 10.1111/liv.14011, PMID 30472772.
3. Puri P, Anand AC, Saraswat VA, Acharya SK, Dhiman RK, Aggarwal R, *et al.* Hepatitis C virus Infection in India: consensus Statement of HCV Task Force of the Indian National Association for Study of the Liver. J Clin Exp Hepatol. 2014;4(2):106-16. doi: 10.1016/j.jceh.2014.05.006, PMID 25755548.
4. Patil SR, Datkhile KD, Ghorpade MV, Patil SS, Kakade SV. Seroprevalence, risk factors and genotype distribution for hepatitis C infection: A study from rural hospital in Maharashtra. Indian J Med Microbiol. 2017;35(4):563-7. doi: 10.4103/ijmm.IJMM_16_96, PMID 29405150.

5. Goel A, Seguy N, Aggarwal R. Burden of hepatitis C virus infection in India: A systematic review and meta-analysis. J Gastroenterol Hepatol. 2019;34(2):321-9. doi: 10.1111/jgh.14466, PMID 30176181.
6. Rahaman J, Sengupta M, Barik G, Sarkar S, Sarkar R, Sengupta M. Seroprevalence and co-infection of hepatitis B and hepatitis C among patients in a tertiary Care Hospital in Eastern India. J Assoc Physicians India. 2019;67(9):27-9. PMID 31561684.
7. Rajani M, Jais M. Age-wise seroprevalence of hepatitis C virus infection in clinically suspected infectious hepatitis patients attending a tertiary care hospital in Delhi. Int J Med Public Health. 2014;4(1):78-81. doi: 10.4103/2230-8598.127163.
8. Sinha P, Bachiwal R, Rishi S, Sharma R. Seroprevalence of anti-hepatitis C virus antibody in a hospital-based population of Jaipur, Rajasthan. Indian J Community Med. 2007;32(2):158-9. doi: 10.4103/0970-0218.35670.
9. Agarwal L, Singh AK, Agarwal A, Singh RP. Incidental detection of hepatitis B and C viruses and their coinfection in a hospital-based general population in tertiary care hospital of Uttar Pradesh. J Fam Med Prim Care. 2018;7(1):157-61. doi: 10.4103/jfmpc.jfmpc_196_16.
10. Mittal G, Gupta P, Gupta R, Ahuja V, Mittal M, Dhar M. Seroprevalence and risk factors of hepatitis B and hepatitis C virus infections in Uttarakhand, India. J Clin Exp Hepatol. 2013;3(4):296-300. doi: 10.1016/j.jceh.2013.10.006, PMID 25755517.
11. Sood A, Suryaprasad A, Trickey A, Kanchi S, Midha V, Foster MA, *et al.* The burden of hepatitis C virus infection in Punjab, India: A population-based serosurvey. PLOS ONE. 2018;13(7):e0200461. doi: 10.1371/journal.pone.0200461, PMID 30048454.
12. Ministry of Health and Family Welfare, Government of India. National viral hepatitis control program operational guidelines. MOHFW Web site; 2018 [Updated 13 March 2023]; [cited Apr 7 2023]. Available from: https://main.mohfw.gov.in/documents/program-guidelines.

Cite this article : Jothi BJ, Yadav P, Panda A, Kumar S. Insights into the Epidemiology of Hepatitis C Virus Infection in Delhi: Findings from a Tertiary Care Hospital. Int J Med Public Health. 2023;13(3):133-6.