



Population-Based Demographic Epidemiology of Hepatitis C Virus Infection in a Tertiary Care Hospital and medical college of Southern Rajasthan: A Five-Year Retrospective Analysis

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Abstract

Background: Hepatitis C virus (HCV) infection is a major cause of chronic liver disease worldwide. Understanding demographic distribution is essential for targeted screening and prevention strategies, especially in resource-limited settings.

Objectives: To analyse the demographic characteristics and temporal trends of HCV-reactive patients attending a tertiary care hospital in Southern Rajasthan.

Materials and Methods: A retrospective, record-based study was conducted from January 2021 to December 2025. Anti-HCV antibody testing was performed using third-generation ELISA. Demographic variables including age, sex, residence, patient type, and clinical department were analysed using descriptive statistics.

Results: Of 158,104 samples tested, 79 were reactive for HCV, giving an overall seroprevalence of 0.05%. Male patients constituted 60.8% of cases. Individuals above 50 years accounted for 65.8% of infections. Rural residents (65.8%) and inpatients (77.2%) formed the majority. General Medicine was the most common department of detection. Positivity rates remained below 0.1% throughout the study period.

Conclusion: HCV infection in the present setting predominantly affects elderly males from rural areas. Demographic profiling can guide focused screening and public health interventions.

Keywords: Hepatitis C virus, Demography, Seroprevalence, ELISA, Rural population

Introduction

Hepatitis C virus (HCV) infection remains a significant global health challenge due to its chronic course and potential for severe liver-related complications. Although effective antiviral therapies are available, many infected individuals remain undiagnosed, particularly in developing countries. Demographic analysis of HCV infection helps identify vulnerable groups and informs targeted prevention strategies.

In India, HCV prevalence varies considerably across regions and populations. Rural populations often face higher risk due to unsafe injection practices, limited healthcare access, and lower awareness. Hospital-based demographic studies provide valuable epidemiological insights where population-based data are scarce.

The present study focuses on a detailed demographic evaluation of HCV-reactive patients identified at a tertiary care hospital in Southern Rajasthan over a five-year period.

Materials and Methods

Study design and setting: Retrospective, descriptive study conducted in the Department of Microbiology at a tertiary care teaching hospital in Southern Rajasthan.

Study period: January 2021 to December 2025.

Study population: All patients whose serum samples were tested for anti-HCV antibodies during the study period.

Laboratory testing: All donated blood units were screened for anti-Hepatitis C virus (anti-HCV) antibodies using a third-generation enzyme-linked immunosorbent assay (ELISA). Screening was performed with the Erba LISA® HCV Gen3 (v2) kit (Transasia Bio-Medicals Ltd., Daman, India) according to the manufacturer's instructions. The assay is a solid-phase indirect ELISA employing recombinant and synthetic HCV antigens derived from the core, NS3, NS4, and NS5 regions of the viral genome. Serum samples were incubated in antigen-coated microwells, followed by addition of horseradish peroxidase-conjugated anti-human IgG and substrate development using tetramethylbenzidine. Optical density was measured at 450 nm with a reference wavelength of 620–650 nm. Cut-off values were calculated as per kit guidelines. Samples reactive on repeat testing were considered positive and corresponding blood units were discarded.

Data collection: Demographic details such as age, sex, residence (rural/urban), patient type (IPD/OPD), and clinical department were retrieved from laboratory records.

Statistical analysis: Data were analysed using descriptive statistics and expressed as frequencies and percentages.

Table 1. Demographic Profile of HCV-Reactive Patients (n=79)

Male: 48 (60.8%) | Female: 31 (39.2%)

Age >50 years: 65.8%

IPD cases: 77.2%

Rural residence: 65.8%

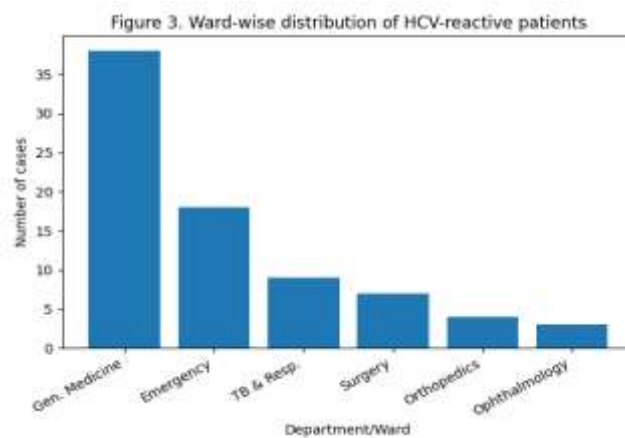
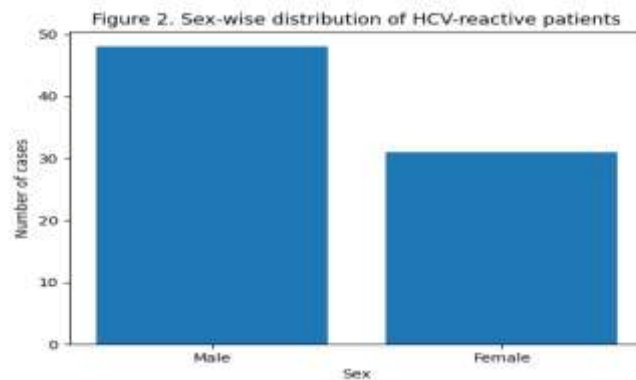
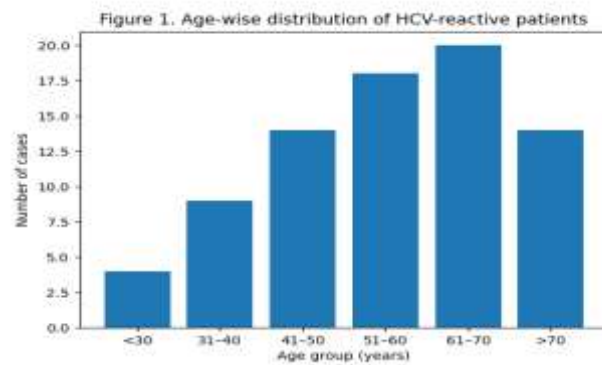
Most common department: General Medicine (48.1%)

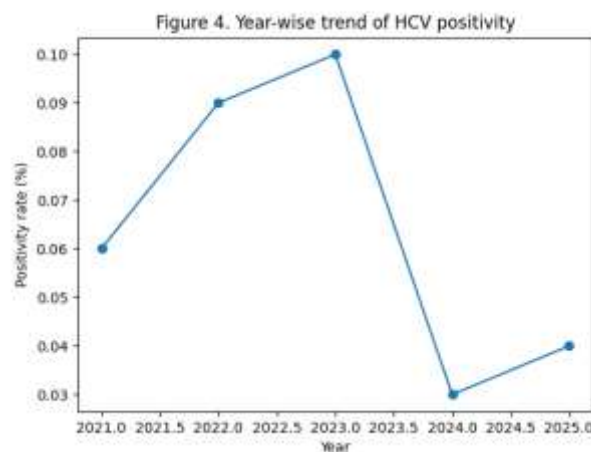
Table 2. Year-wise Distribution of HCV Positivity

2021: 0.06% | 2022: 0.09% | 2023: 0.10% | 2024: 0.03% | 2025: 0.04%

Overall prevalence: 0.05%

Figures





Ethical considerations: The study was approved by the Institutional Ethics Committee. As a retrospective study, informed consent was waived and patient confidentiality was maintained.

Results

During the study period, 158,104 samples were tested for anti-HCV antibodies, of which 79 were reactive, yielding an overall seroprevalence of 0.05%.

Sex distribution showed male predominance, with 48 males (60.8%) and 31 females (39.2%). Age-wise analysis revealed that infections were predominantly observed in older individuals, with 65.8% of cases occurring in patients above 50 years of age.

A majority of HCV-reactive patients were admitted cases (77.2%), indicating detection during inpatient care. Rural residents constituted 65.8% of cases, suggesting a higher burden in rural populations.

Department-wise distribution showed that most cases were identified in General Medicine (48.1%), followed by Emergency Medicine and TB & Respiratory Diseases. The year-wise trend demonstrated consistently low positivity rates, remaining below 0.1%.

Discussion

The present study provides a comprehensive demographic profile of HCV infection in a tertiary care hospital setting. The low seroprevalence observed is comparable to findings from other hospital-based studies in India, reflecting the impact of improved infection control practices.

Male predominance may be attributed to greater occupational exposure and healthcare utilization. The higher prevalence among older age groups suggests past exposure before widespread implementation of safe injection and blood screening practices.

Rural predominance highlights persistent gaps in healthcare access and awareness. Detection mainly in inpatient departments underscores the importance of routine screening during hospital admissions. Demographic insights from this study emphasize the need for targeted screening programs focusing on elderly and rural populations.

Limitations

The study is limited by its retrospective design and single-centre nature. Risk factor analysis and molecular confirmation by HCV RNA testing were not performed.

Conclusion

This demographic analysis demonstrates that HCV infection in the study population predominantly affects elderly males from rural areas. Incorporating demographic profiling into routine surveillance can aid in early detection and focused public health interventions.

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