

Incidental Detection of Hepatitis B and C Viruses in Tertiary Care Hospital in Rural Population in Telangana

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections pose significant public health challenges, particularly in rural India, where they contribute to chronic liver disease, cirrhosis, and hepatocellular carcinoma. This study aimed to determine the incidental seroprevalence of HBV and HCV in a hospital-based rural population in Telangana. **Material and Methods:** A prospective study was conducted from July 2022 to June 2024 at Kamineni Institute of Medical Sciences, Narketpally, screening 21,155 in patients undergoing routine pre-procedural testing. Serum samples were tested using immunochromatographic rapid assays, with positives confirmed by enzyme-linked immunosorbent assay (ELISA). Liver function tests (LFTs) were performed on positive cases. Data on demographics, departments, and LFT parameters were analyzed. **Results:** Of the participants, 56.1% were male and 87% rural. HBV seroprevalence was 1.11% (235 cases; 1.23% in males, 0.95% in females), peaking in the 41-60 age group (39.18%). HCV seroprevalence was 0.12% (27 cases), also highest in 41-60 years (51.85%). One case (0.004%) of HBV-HCV coinfection was identified. Most detections occurred in Ophthalmology (69 HBV, 9 HCV) and General Medicine (61 HBV, 8 HCV). LFTs in HBV positives showed derangements in alkaline phosphatase (ALP; 83.3%), total protein (41.6%), and albumin (39.5%). In HCV positives, ALP was elevated in 100%, with bilirubin deranged in 57.1%. **Conclusion:** The low but notable seroprevalence of HBV and HCV in this rural cohort underscores the value of routine screening for early detection. Targeted interventions, including vaccination and awareness, are essential to mitigate the burden in high-risk groups.

Keywords: Hepatitis B, Hepatitis C, Incidental Findings, Rural population.

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INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections, which can cause both acute sickness and long-term consequences, are responsible for a significant percentage of liver illnesses globally.^[1,2]

Hepatitis B and C infections are a serious global and public health problem. Hepatitis B virus (HBV) is highly infectious and can be transmitted covertly by percutaneous routes and overtly by blood transfusion. The hepatitis B surface antigen (HBsAg) in serum is the first seromarker to indicate active HBV infection, either acute or chronic.^[3]

The prevalence of chronic HBV infection is highly variable, ranging from 0.1% in the United States to 20-30% in some Pacific Island nations. There are an estimated 360 million people who are chronically infected, of whom almost one million people die annually of HBV-related liver disease. Chronic hepatitis B is the major cause of hepatocellular carcinoma in the world.^[4]

India had an estimated 29.8 million individuals living with Hepatitis B (HBV) infection and 5.5 million with Hepatitis C (HCV) infection, placing India among the countries with the highest burden of both viruses. Viral hepatitis is recognized as a significant public health issue in India, with chronic HBV infection prevalent in about 3-4% of the population and contributing significantly to cirrhosis and hepatocellular

carcinoma (HCC).^[5-7]

Hepatitis B and C infections frequently result in cirrhosis and hepatocellular cancer as long-term aftereffects. Hepatitis B and C together account for around 80% of the deaths of all hepatocellular carcinoma patients and kill about 1.4 million people annually, making it the seventh most common cause of death globally.^[1,4,8]

The hepatitis caused by HBV and HCV is extremely obscure. Symptoms appear only in 35.0% of those infected by HBV and in 25.0% of those infected by HCV. However, HBV and HCV are highly transmissible.^[9]

Progression to cirrhosis and hepatocellular carcinoma occurs in 15%–25% of the carriers and may become fatal in many cases.^[10]

Majority of the individuals developing acute hepatitis C remain asymptomatic, while approximately 70%–90% of them become

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chronic carriers due to non-clearance of virus during the acute phase of disease. Cirrhosis develops in 5%–20% of individuals with chronic.

About 5% of infected individuals die from liver illness as a result of the chronic infection's aftereffects.^[11,12]

The goal of the current study is to ascertain the seroprevalence of HBV and HCV in the rural population of the Nalgonda area to understand the disease dynamics and to aid in its load in the community and for effective prevention and control.

Aim

To determine the incidental detection of hepatitis B and C in a tertiary care hospital in a rural area in Telangana.

Objectives

1. To determine seroprevalence of Hepatitis B
2. To determine seroprevalence of Hepatitis C
3. To assess the prevalence of HBV–HCV coinfection.

MATERIALS AND METHODS

Study design and participants: The study was a prospective study conducted in hospital based population at Kamineni Institute of Medical Sciences, Narketpally, for a duration of 2 years from July 2022 to June 2024.

Inclusion Criteria: After being admitted to the inpatient departments, patients were recommended to have an HBV and HCV screening prior to any invasive, therapeutic, or surgical operations as a part of routine surgical screening were included in the study group.

Exclusion criteria: Patients attending outpatient services or inpatients previously tested positive for HBV or HCV were excluded.

Sample size: 21,155

Place of study: Department of microbiology, Kamineni Institute of Medical Sciences, Narketpally, Telangana.

Study Procedure: Screening was done by immunochromatographic rapid test followed by the confirmation of all positive samples by enzyme immunoassay. Confidentiality has been maintained.

Ethical approval: Institutional Ethical Committee clearance was obtained before commencement of the study.

Data collection

Sample Collection and Processing

Approximately 2 mL of venous blood was collected from each patient under aseptic precautions. The samples were centrifuged to obtain serum, which was subsequently used for hepatitis B virus (HBV) and hepatitis C virus (HCV) testing.

HBV Screening and Confirmation

Screening for HBV was performed using a lateral flow immunoassay (Hepacard). All samples that tested positive were further confirmed by the flow-through method and enzyme-linked immunosorbent assay (ELISA).

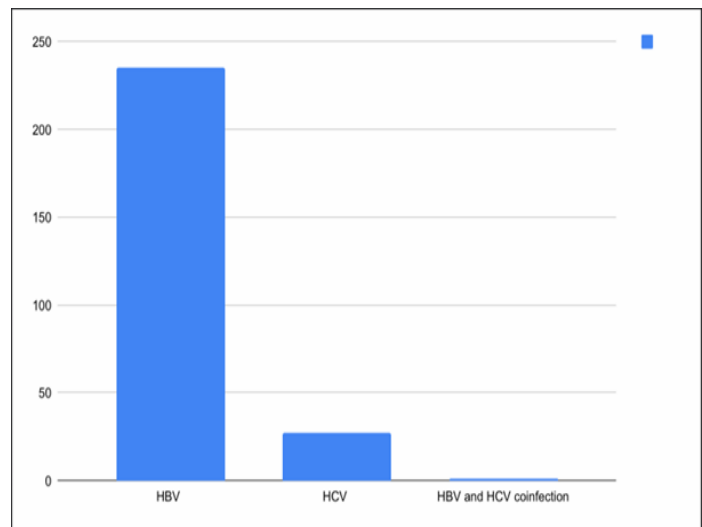
HCV Screening and Confirmation: Screening for HCV infection was carried out using a lateral flow immunoassay. All positive samples were confirmed by ELISA.

Data was collected by noting all incidental detections of HBV and HCV during routine pre surgical screening. Patients details such as department of admission, age and other demographic details have been collected.

LFT for positive patients: Blood samples from the HBV and HCV positive patients were processed for liver function tests using autoanalyser.

RESULTS

Social demographic characteristics: Of the 21,155 individuals in our observational study, 56.1% were male and 43.9% were female, and they were examined for HBV and HCV infection. Eighty-seven percent of the participants were from rural areas, while only thirteen percent were from urban areas.



Hepatitis B virus seroprevalence: Every sample that tested positive by the fast immunodiagnostic test also tested positive by ELISA. 1.11% was the overall seroprevalence of HBV infection. Male and female HBV infection prevalences were 1.23% and 0.95%, respectively. Patients between the ages of 41 and 60 had the highest HBsAg prevalence.

Table 1: Age wise distribution for Hepatitis B incidental findings

Age distribution in years	Percentage of cases
1-20	2.06%
21-40	22.68%
41-60	39.18%
61-80	35.05%
>80	1.03%

Seroprevalence of hepatitis C virus: all the serum samples reactive by rapid immuno diagnostic test for HCV infection or also positive by Elisa. The seroprevalence of HCV was found to be 0.12 % among hospital based general population

the highest prevalence of anti-HCV antibodies was found among males, married participants and in the age group of 41 - 60 years.

Table 2: Age wise percentages for hepatitis C incidental findings

Age distribution in years	Percentage of cases
1-20	-
21-40	3.79%
41-60	51.85%
61-80	44.44%
>80	-

Co-infection rates for hepatitis B and hepatitis C

Among 21155 participants one individual was found to be infected with both HBV and HCV.

The highest number of HBV cases have been detected from the department of Ophthalmology with 69 cases followed by the department of general medicine with 61 cases. The highest number of HCV cases have been detected from the department of Ophthalmology with nine cases, followed by the department of general medicine with eight cases. A detailed table with the departments and the number of detected cases of HBV and HCV has been given below.

Table 3: Department wise number of incidental findings of Hepatitis B and Hepatitis C

Department	HBV	HCV
Ophthalmology	69	9
General Medicine	61	8
General Surgery	43	4
Orthopaedics	29	2
Urology	9	0
Pulmonology	7	2
Emergency Medicine	6	0
Obstetrics and Gynaecology	6	0
Nephrology	2	2
ENT	2	0
Dermatology and Venereology	1	0
Total	235	27

LFT parameters in cases of incidental HBV finding

Table 4: Liver Function Test Parameters in Hepatitis B incidental finding cases

Parameter	Mean value	Normal Range	Deranged in % of patients	Units
Total Bilirubin	0.96	0 - 1	29.1%	mg/dl
Direct Bilirubin	0.27	0.0 - 0.2	37.5%	mg/dl
AST	28.58	0 - 35	27%	IU/L
ALT	24.69	0 - 45	18.7%	IU/L
ALP	160.31	56 - 128	83.3%	IU/L
Total Protein	6.34	6.4 - 8.3	41.6%	gm/dl
Albumin	3.45	3.5 - 5.2	39.5%	gm/dl
A/G ratio	1.29	1.1 - 2.5	—	—

LFT parameters in cases of incidental HCV finding

Table 5: Liver Function Test Parameters in Hepatitis C incidental finding cases

Parameter	Mean value	Normal Range	Deranged in % of patients	Units
Total Bilirubin	1.03	0 - 1	57.1%	mg/dl
Direct Bilirubin	0.26	0.0 - 0.2	57.1%	mg/dl
AST	32.4	0 - 35	28.5%	IU/L
ALT	17.1	0 - 45	18%	IU/L
ALP	219.1	56 - 128	100%	IU/L
Total Protein	6.34	6.4 - 8.3	42.8%	gm/dl
Albumin	3.51	3.5 - 5.2	28.5%	gm/dl
A/G ratio	1.32	1.1 - 2.5	—	—

DISCUSSION

In this study the incidental finding of HBV was found to be 1.11 %, whereas in other studies including hospital based populations such as Sood S et al in Rajasthan Showed 0.87%,^[13] by Shyamala R et al in Andhra Pradesh showed 1.06,^[14] and by Quadri SA et al in Karnataka showed 1.63%,^[15] which are comparable to our study where as the

study by Agarwal L et al in Uttar Pradesh showed 3.9%,^[2] which is higher compared to our study.

A systematic evaluation and pooled analysis of 161 nations' HBsAg prevalence by Schweitzer et al. revealed that India's HBsAg prevalence was 1.46% (1.44–1.47).^[16]

HCV prevalence in our study was found to be 0.12 %, whereas in the study by Sood S et al in Rajasthan showed 0.28 % which

is comparable to our result.^[13] In the other studies by Agarwal L et al showed 1.76%,^[2] and in study in Pondicherry by Bhattacharya et al,^[17] showed 4.8 % which is far higher compared to our study.

Studies in other countries about HCV seroprevalence showed 5.9 % in Mauritius by Schwarz TF,^[18] and 6 % from Ethiopia by Frommel D,^[19] which are also very high compared to our study.

The seroprevalence of hepatitis B among males and females in our study was 1.23 % and 0.95 % respectively when compared to 5.5 % and 2.4 % in the study conducted by Agarwal L,^[2] which is far higher compared to our study. Males have a higher prevalence, which is consistent with other research showing a higher prevalence in males. One explanation for this could be that females are more effective than males at clearing the HBV infection.

HCV seroprevalence was found to be 0.14% and 0.10% in males and females with higher prevalence in males, which is comparable to other studies.

In comparison to studies by Agarwal L. (0.16%),^[2] Saravanan et al. (5.9% of patients with chronic liver disease), and Reddy et al. (3.7% of patients receiving haemodialysis), the study detected coinfection with HBV/HCV in 0.004% of patients.^[20,21]

The highest number of cases were detected in the department of Ophthalmology probably due to higher number of admissions for corrective surgeries in the department and detection during routine pre-surgical screening.

In this study, liver function tests (LFTs) were analyzed in patients with incidentally detected hepatitis B (HBV, n=235) and hepatitis C (HCV, n=27) during routine pre-surgical screening in a rural Telangana hospital. For HBV, abnormalities were seen in total bilirubin (29.1%, mean 0.96 mg/dL), direct bilirubin (37.5%, mean 0.27 mg/dL), AST (27%, mean 28.58 IU/L), ALT (18.7%, mean 24.69 IU/L), ALP (83.3%, mean 160.31 IU/L), total protein (41.6%, mean 6.34 g/dL), and albumin (39.5%, mean 3.45 g/dL). Most patients had normal transaminases (AST, ALT), suggesting asymptomatic infections, but high ALP and low albumin hint at early liver changes.

For HCV, derangements occurred in total bilirubin (57.1%, mean 1.03 mg/dL), direct bilirubin (57.1%, mean 0.26 mg/dL), AST (28.5%, mean 32.4 IU/L), ALT (18%, mean 17.1 IU/L), ALP (100%, mean 219.1 IU/L), total protein (42.8%, mean 6.34 g/dL), and albumin (28.5%, mean 3.51 g/dL), with even fewer transaminase elevations but universal ALP increases, possibly indicating mild liver stress.

These findings align with studies of asymptomatic HBV carriers, like one in Sudan showing 20% ALT elevation (median 22 U/L), close to our 18.7%.^[22] Another study noted 20% of HBV carriers with normal ALT had liver damage, suggesting our high ALP could signal hidden progression.^[23]

Compared to other Indian studies, our HCV patients had lower transaminase abnormalities. A study in India found 76.9% of asymptomatic HCV patients had elevated ALT (mean 128.9 IU/L), much higher than our 18% (mean 17.1 IU/L), likely due to our early detection in a pre-surgical group.^[24] Another Southern Indian study reported 58.3% ALT elevation (mean 71.2 IU/L) in incidental HCV cases,

still higher than ours, but their bilirubin (1.22 mg/dL) was similar to our 57.1% derangement.^[25]

Globally, 30% of HCV carriers have normal ALT, supporting our findings of minimal transaminase changes but high ALP, which may suggest early cholestasis.^[26] The differences likely stem from early screening in our rural cohort. Routine testing is crucial, as subtle LFT changes, especially high ALP, may predict future risks like cirrhosis, needing further studies on viral load and liver health.

The current study shows that among a rural Telangana population residing in a hospital, the seroprevalence of HBV (1.11%) and HCV (0.12%), though relatively low compared to some regions of India, still represents a significant public health concern. The higher prevalence of HBV, particularly in the 41-60 years age group and among males, underscores the need for targeted preventive strategies in these populations. The low rate of HBV-HCV coinfection suggests limited overlap in transmission dynamics, yet it remains an area of concern for patients at high risk. Given the chronic nature and severe complications of these infections, routine screening in hospital settings, especially prior to surgical and invasive procedures, proves valuable for early detection. Strengthening HBV vaccination coverage, ensuring safe medical and surgical practices, improving blood transfusion safety, and raising awareness about risk factors remain essential to reduce disease burden. In the absence of an effective vaccine for HCV, emphasis must be placed on preventive strategies and timely diagnosis. Primary care physicians can play a pivotal role through early screening, health education, and linkage to care. Expanding such hospital-based studies across diverse populations will further help in mapping regional variations, ultimately guiding policymakers in implementing effective prevention and control programs to reduce the burden of viral hepatitis in India.

CONCLUSION

The present study highlights that the seroprevalence of HBV (1.11 %) and HCV (0.12 %) among a hospital-based rural population in Telangana, though relatively low compared to some regions of India, still represents a significant public health concern. The higher prevalence of HBV, particularly in the 41-60 years age group and among males, underscores the need for targeted preventive strategies in these populations. The low rate of HBV-HCV coinfection suggests limited overlap in transmission dynamics, yet it remains an area of concern for patients at high risk.

Given the chronic nature and severe complications of these infections, routine screening in hospital settings, especially prior to surgical and invasive procedures, proves valuable for early detection. Strengthening HBV vaccination coverage, ensuring safe medical and surgical practices, improving blood transfusion safety, and raising awareness about risk factors remain essential to reduce disease burden.

In the absence of an effective vaccine for HCV, emphasis must be placed on preventive strategies and timely diagnosis. Primary care physicians can play a pivotal role through early screening, health education, and linkage to care. Expanding such hospital-based studies across diverse populations will further help in mapping regional variations, ultimately guiding policymakers in

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Conflicts of interest

There are no conflicts of interest.

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