

# An In-Depth Investigation of Liver Diseases at a Tertiary Care Teaching Hospital

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## ABSTRACT

**Background:** Liver diseases encompass a range of conditions that affect the normal functioning of the liver. They can result from various causes, including viral infections, excessive alcoholism, genetic factors, etc. These conditions can lead to symptoms like jaundice, fatigue, and abdominal pain, and in severe cases, they can pose life-threatening risks. Timely diagnosis and appropriate management are essential to mitigate the impact of liver diseases and improve patients' quality of life. Hence, the present study is planned to investigate the prevalence, risk factors, and management of liver diseases in adults within a tertiary care teaching hospital. **Materials and Methods:** A prospective case analysis study was conducted at the Department of General Medicine and Gastroenterology between October 2021 and March 2022. A total of 90 cases were included in the study. Data were collected on patient demographics, risk factors, clinical presentation, diagnostic tests, and treatment modalities. **Results:** Alcoholic liver disease was most prevalent (48%) liver disease, followed by viral hepatitis (22%) and non-alcoholic fatty liver disease (18%). Majority of patients were male (81%) and fell within the age group of 35 to 50 years (40%). Abdominal distention was the most common clinical complication (54%). Liver function tests and ultrasonography were the primary diagnostic tools. Ceftriaxone and Rifaximin were the most frequently prescribed medications. **Conclusion:** Chronic alcoholism remains a major liver diseases contributor. This study emphasizes the importance of preventive measures against alcohol consumption and provides valuable insights for healthcare professionals managing liver diseases effectively.

**Keywords:** Alcoholic liver disease, Alcohol consumption, Liver function test, Ultrasonography Ceftriaxone.

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## INTRODUCTION

The liver, the second largest organ in the human body, is a multifunctional powerhouse, responsible for more than 5,000 vital bodily functions. These encompass tasks as diverse as blood clotting, nutrient conversion, blood toxin filtration, hormone level regulation, immune response, self-repair after injury, and the metabolism of crucial substances like glucose, iron, and cholesterol. Despite its central role, the liver often escapes our thoughts until something goes amiss. Liver disease, however, is steadily on the rise, affecting one out of every three individuals.<sup>1</sup>

Liver diseases can stem from a myriad of factors, some hereditary, while others are influenced by a range of environmental conditions. Viruses, medications, chemicals, obesity, diabetes, and autoimmune attacks are just a few of the triggers that can precipitate various liver ailments. Left unaddressed, these conditions can progress to life-threatening stages, severely compromising both the liver and bile ducts, sometimes even culminating in liver cancer. These liver maladies often manifest through general symptoms such as fatigue, weight loss, and appetite loss, coupled with additional complications like portal hypertension (resulting in ascites and esophageal varices), hepatocellular insufficiency (leading to jaundice and hepatic encephalopathy), and hepatocellular carcinoma.<sup>2</sup>

To evaluate liver function and diagnose disorders, a battery of tests is available, encompassing serum proteins, albumin, bilirubin (both direct and indirect), Alanine Transaminase (ALT), Aspartate Aminotransferase (AST), Gamma-Glutamyl



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Transferase (GGT), Alkaline Phosphatase (ALP), prothrombin time, and partial thromboplastin time. Imaging techniques like ultrasound and magnetic resonance imaging aid in examining liver tissue and bile ducts. In some cases, elastography can eliminate the need for a liver biopsy. Additionally, biomarkers and *in vitro* diagnostic antibodies are instrumental in diagnosis.<sup>3</sup>

The Model for End-Stage Liver Disease (MELD) score, incorporating serum bilirubin, serum creatinine, and the International Normalized Ratio (INR), serves as a valuable tool in assessing the prognosis of liver damage.<sup>4</sup> Initially designed for patients undergoing trans-jugular intra-hepatic shunts for portal hypertension, it has proven its worth in predicting short-term mortality across a wide spectrum of liver disorders.<sup>5,6</sup> Recent research indicates its potential use as a general predictive tool, transcending the realm of liver disease, and now predominantly guiding organ allocation in liver transplantations.<sup>7</sup>

Against this backdrop, this in-depth study of various liver diseases in tertiary care teaching hospital seeks to explore the etiology, risk factors, disease evaluation parameters, and treatment modalities associated with diverse liver conditions. Key objectives include identifying the types and stages of liver diseases, outlining suitable evaluation criteria, analysing risk factors, and reviewing the treatment approaches employed by physicians in managing these complex liver diseases.

## MATERIALS AND METHODS

The methodology of this study was meticulously designed to investigate six prevalent types of liver diseases in the department of Gastroenterology and General Medicine at Gandhi Medical College and Hospital, Secunderabad, Telangana, India. Study was conducted after receiving approval from The Institutional Ethics Committee of CMR College of Pharmacy (IEC No: CMRCP/IEC/2021-22/02).

Patients with liver diseases including alcohol liver disease, chronic liver disease, liver cirrhosis, hepatitis, acute kidney injury with liver disease, and cholelithiasis were included in the study. These diseases were chosen due to their high frequency in clinical practice. To ensure the study's robustness, a sample size of 111.8 was calculated with a 95% confidence interval, assuming a 20% proportion of liver disease in the population of 200. A structured documentation form was prepared and used during regular visits to record detailed information on selected cases. The inclusion criteria consisted of adult patients of both genders who were admitted with confirmed liver disease, excluding pregnant and breastfeeding women. Cases were collected after consultation with the attending physicians.<sup>8</sup>

Data collection involved gathering comprehensive patient information, including demographics, complications, diagnostic tests, and lifestyle factors such as diet, exercise, smoking, and alcohol history. Various biochemical parameters, such as ALT,

AST, GGT, serum lipid levels, and viral hepatitis serology reports, were documented. Instrumental diagnoses, including ultrasound scans of the abdomen and endoscopy reports, were collected to analyze the findings for different types of liver diseases. Additionally, the Model for End-Stage Liver Disease (MELD) score was calculated for assessing the risk of liver disease mortality. Throughout the study, all collected cases were reviewed daily until their discharge from the hospital. Once data collection was concluded, the information was categorized according to parameters described in the results section.

## RESULTS

The study population consisted of 90 patients, with a significant representation of males (81%). Females represented the remaining 19% of the sample. This finding suggests that liver disease may be more prevalent among men in this particular population. The age distribution of the patients revealed that the majority (40%) fell within the age group of 36-50 years. This was followed by 28% of patients in the 51-65 years' age group, 22% in the 18-35 years' age group, and 10% above 65 years. This indicates a higher prevalence of liver disease among individuals in their middle age (Table 1).

Complications revealed the presence of abdominal distension which emerged as the most common complication observed at the time of admission, affecting 54% of the patients. Jaundice followed closely with 43% of patients presenting with this symptom. Other prevalent complications included ascites (37%), malena (20%), abdominal pain (20%), and pedal edema (20%). Hematemesis, shortness of breath, fever, decreased urine output, and vomiting were reported by 10-15% of the patients each. In types of liver disease; analysis revealed a high prevalence of alcoholic liver disease, accounting for 48% of the diagnosed cases. Chronic liver disease was the second most common diagnosis (15%), followed by cirrhosis of the liver (13%). Liver disease with acute kidney injury (9%), cholelithiasis (8%), and hepatitis (7%) constituted the remaining cases. This information sheds light on the major causes of liver disease in this patient population (Table 2).

An overwhelming majority of the patients (82%) had a history of alcohol consumption. Among them, 17% were diagnosed with hypertension, making it the most frequent co-morbidity. Notably, only 3% of the patients had diabetes mellitus, and just 6% had both diabetes and hypertension. This data highlights the strong association between certain chronic conditions, particularly hypertension, and the development of liver disease (Table 3).

The majority of patients underwent a comprehensive panel of laboratory tests to assess liver function. Serum albumin, complete blood picture, total serum bilirubin, alkaline phosphatase, alanine transaminase, and aspartate transaminase were performed in over 90% of the cases. Prothrombin time was also tested in a significant proportion of patients, indicating its importance in monitoring liver function. In instrumental diagnostic procedure; endoscopy

**Table 1: Demographic distribution**

Gender distribution		
Gender	Number of cases	Percentage (%)
Male	73	81
Female	17	19
Age distribution		
Age group (In years)	Number of cases	Percentage (%)
18-35	20	22
36-50	36	40
51-65	25	28
Above 65	09	10

**Table 2: Distribution of cases according to co-morbidity and length of stay.**

Category	N (No. of Cases)	N %
Co-morbidities		
Hypertension	15	17
Diabetes Mellitus	03	03
Both	05	06
No Co-morbidities	73	74
Length of Stay (LOS)		
1 – 7 Days	28	31
8 – 14 Days	36	40
15 – 21 Days	18	20
>21days	08	09

The above table indicates the percentage of hypertension (17%), diabetes mellitus (3%), both (6%) and length of stay of observed cases mostly range between 8-14 days (40%).

**Table 3: Distribution of drugs according to pharmacological category.**

Pharmacological category	No. of cases	Percentage (%)
Antibiotics	85	77
Laxatives	73	66
Vitamin and supplements	72	65
Blood and its products	64	58
Beta blockers	58	52
Others	53	48
Diuretics	51	46
Antacids	42	38
Analgesics	21	19
Vasodilators	20	18

Others include ursodeoxycholic acid and ademethionine.

and ultrasound abdomen scan were the most commonly employed procedures for diagnosis. Endoscopy allowed for direct visualization of the upper gastrointestinal tract, while the ultrasound scan provided detailed images of the internal organs, including the liver. This combination of procedures facilitated accurate diagnosis and assessment of disease severity (Table 4).

Ceftriaxone antibiotic was the most frequently prescribed medication (60%). Rifaximin, another antibiotic used for hepatic

encephalopathy, followed at 56%. Propranolol, a beta-blocker for managing portal hypertension, was prescribed in 52% of cases. Albumin, a protein for treating ascites, and Looz, a lactulose solution for constipation, were administered to 50% and 43% of patients, respectively. These findings demonstrate the diverse range of medications used in managing different aspects of liver disease (Table 5).

**Table 4: Laboratory test and Instrumental diagnosis Laboratory test wise distribution**

Laboratory test performed	Frequency in out of 90 Cases	Percentage (%)
Serum Albumin	90	100
Complete Blood Picture	89	99
Total Serum Bilirubin	89	99
Alanine Phosphatase levels	89	99
Alanine Transaminase	87	97
Aspartate transaminase	83	92
Prothrombin Time	75	83
Instrumental diagnosis wise distribution		
Instrumental diagnosis performed	Frequency in out of 90 cases	Percentage (%)
Endoscopy	53	59
Ultrasound abdomen Scan	74	82

**Table 5: Prescribed medicines distribution**

Prescribed medicines	Prescribed dose	Frequency of prescription in out of 90 cases	Percentage (%)
Ceftriaxone	1gm	67	60
Rifaximin	550mg	62	56
Propranolol	40mg	58	52
Albumin	20 % in 100ml NS	56	50
Looz	15ml	48	43
Pantoprazole	40mg	42	38
Furosemide	40mg	42	38
Udiliv	300mg	30	27
Lactulose	15ml	25	23
Metronidazole	500mg	23	21
Vitamin K	1amp	23	21
Ademethionine	400mg	23	21
Tramadol	40mg	21	19
Heptagon	-	21	19
Glypressin	1mg	20	18
Piperacillin-tazobactam	2.25gm	17	15
Thiamine	1amp	15	14
A to Z	-	13	12
Spiranolactone	40mg	9	8
Trental	400mg	8	7

**Table 6: Length of stay (LOS) wise distribution.**

Length of stay (LOS)	Number of cases	Percentage (%)
Up to 7 days	28	31
8 – 14 days	36	40
15 – 21 days	18	20
More than 21 days	08	09

**Table 7: Distribution of MELD Score.**

MELD score	Number of cases	Percentage (%)
< 10	13	16
10 – 19	49	54
20 – 29	25	27
30 – 39	03	03
40	00	00

The majority of patients (31%) had a relatively short hospital stay of up to 7 days. Approximately 40% stayed for 8 to 14 days, while 20% remained for 15 to 21 days. A small percentage (9%) required hospitalization for more than 21 days. This data provides insights into the typical duration of inpatient treatment for liver disease patients (Table 6).

The MELD score, a measure of liver function, was predominantly distributed within the range of 10 to 19, with 54% of patients falling into this category. Approximately 27% of patients had a MELD score between 20 and 29, indicating moderate liver dysfunction. The remaining patients exhibited a MELD score of less than 10 (16%) or between 30 and 39 (3%). This distribution highlights the spectrum of liver function impairment observed in the study population (Table 7).

## DISCUSSION

The study's findings reveal a striking gender disparity in liver disease prevalence, with men disproportionately affected compared to women. This observation aligns with the established pattern of higher alcohol consumption among Indian men, a well-documented risk factor for liver disease. This finding is consistent with the observations of Abassy *et al.*, in 2022.<sup>8</sup>

Intriguingly, the study unveils an age-related trend, with the demographic between 35 and 50 years emerging as the most affected. This finding can be attributed to the financial independence and decision-making autonomy gained during this age bracket, which often fosters a predisposition towards alcohol consumption. Similar findings have been reported by Mohammed *et al.* in 2020.<sup>9,10</sup>

The study meticulously identifies a range of complications associated with liver disease, highlighting the importance of comprehensive clinical assessment. Abdominal distention emerged as the most prevalent complication, manifesting in

nearly half of the cases, followed by jaundice and ascites, both observed in approximately 40% of cases.<sup>11</sup>

The study's diagnostic approach stands out for its comprehensiveness, encompassing all standard tests for liver diseases. This meticulous methodology ensures accurate diagnosis and paves the way for effective management strategies. Ultrasound (USG) diagnostic methods played a pivotal role in the study, effectively identifying a spectrum of liver disease manifestations, including hepatosplenomegaly, various stages of liver disease, gallstone presence, and bile duct obstructions.<sup>12</sup>

The treatment strategies employed in the study reflect a prudent approach, with Ceftriaxone serving as the primary treatment in approximately two-thirds of cases. This choice aligns with the established efficacy of Ceftriaxone in managing liver disease complications. The study's remarkable success in discharging 70% of patients within 1 to 2 weeks is a testament to the effectiveness of the implemented management practices. This finding aligns with the observations of Zorati *et al.* in 2021, who reported a correlation between efficient management and reduced hospitalization duration.<sup>13</sup>

The study's emphasis on alcoholic liver disease highlights the critical need for focused attention to this specific domain.<sup>14</sup> Alcoholic liver disease, a spectrum of liver disorders caused by excessive alcohol consumption, represents a significant public health concern, particularly among men in India. Addressing the underlying issue of alcoholism through targeted prevention and intervention strategies is crucial to improving patient care and overall outcomes.<sup>15-18</sup>

## CONCLUSION

The study's findings emphasize the importance of gender-specific and age-specific approaches to liver disease prevention and treatment, highlighting the need for customized strategies to address the specific needs of different patient groups. The study



also emphasizes the need for comprehensive diagnostic and treatment strategies, with a particular focus on alcoholic liver disease. Effective management of alcoholic liver disease requires a multi-faceted approach that addresses the underlying issue of alcohol consumption, provides comprehensive medical care for liver complications, and promotes long-term behavioral change.

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## ETHICAL PERMISSION

The Institutional Ethics Committee of CMR College of Pharmacy approved this study (IEC No: CMRCP/IEC/2021-22/02).

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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