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Clinical Profile, Disease Severity, and Short-Term Outcome Predictors in Patients with Chronic Liver Disease

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Abstract: Background: Chronic liver disease (CLD) is a significant contributor to morbidity and mortality globally, exhibiting a diverse range of clinical symptoms and unpredictable results. For successful clinical management and prognostication, it is important to find out how bad the disease is and what factors might lead to bad outcomes early on.
Methods: A cross-sectional study was conducted in a hospital setting involving 180 adult patients diagnosed with chronic liver disease. Data on demographics, etiological factors, clinical manifestations, laboratory parameters, and complications were collected. The severity of the disease was evaluated using the Child–Pugh classification and the Model for End-Stage Liver Disease (MELD) score.
Results: Most of the patients were middle-aged men, and the most common cause of their liver disease was drinking too much alcohol. Jaundice and ascites were the main signs and symptoms. The majority of patients exhibited moderate to severe illness, with 76.7% categorized as Child–Pugh Class B or C. Recurrent ascites and variceal hemorrhage were common sequelae, with an in-hospital death rate of 12.2%. A multivariate analysis found that a MELD score of 25 or higher, a serum albumin level of less than 2.5 g/dL, hepatic encephalopathy, and an increased INR were all independent risk factors for death.
Conclusion: Patients with chronic liver disease commonly present with advanced disease and significant complications. Prognostic scores and key laboratory parameters are valuable in identifying high-risk patients and guiding clinical decision-making.

Keywords: *Chronic liver disease, Child–Pugh score, MELD score, mortality predictors, cirrhosis*

INTRODUCTION

Chronic liver disease (CLD) is a big and growing global health problem that causes a lot of illness, death, and use of healthcare. It includes a wide range of progressive liver diseases that cause long-term liver inflammation, fibrosis, and changes in the liver's structure. These diseases can lead to cirrhosis, liver failure, and death. The burden of chronic liver disease (CLD) is particularly high in developing countries, such as India, due to the coexistence of alcohol-related liver disease, viral hepatitis, and the fast increasing incidence of non-alcoholic fatty liver disease (NAFLD) caused by metabolic risk factors [1,2].
The clinical manifestation of chronic liver disease (CLD) exhibits significant variability, encompassing asymptomatic cases identified incidentally to advanced decompensated cirrhosis accompanied by comorbidities including ascites, variceal bleeding, hepatic encephalopathy, and hepatorenal syndrome. This variation in presentation makes it very hard to diagnose early, figure out who is at risk, and manage patients in the clinic. Patients frequently arrive at advanced stages of disease, constraining therapy alternatives and negatively impacting outcomes [3,4].
Evaluating the severity and prognosis of chronic liver disease (CLD) depends on a mix of clinical observations, test results, and reliable prognostic grading methods. The Child–Pugh classification and the Model for End-Stage Liver Disease (MELD) score are commonly utilized in clinical practice to assess hepatic functional reserve, forecast short-term mortality, and inform treatment strategies. Nevertheless, despite its prevalent application, outcomes in chronic liver disease (CLD) remain uncertain due to the interplay of various factors, including etiology, nutritional status, coagulopathy, renal dysfunction, and the emergence of acute complications [5,6]. To improve patient care, make the best use of resources, and make sure that

patients can get prompt referrals for sophisticated treatments like liver transplantation, it is important to understand the local clinical spectrum and find the most important indicators of bad outcomes. Cross-sectional investigations in hospital environments yield significant insights into actual illness patterns and short-term outcomes, especially in areas with restricted access to modern diagnostics and prolonged follow-up [6]. This study aimed to evaluate the clinical profile, biochemical irregularities, disease severity, and short-term outcome predictors in patients with chronic liver disease admitted to a tertiary care facility. The study seeks to discover critical predictive markers linked to in-hospital mortality by linking clinical and laboratory data with Child–Pugh and MELD scores, thereby facilitating early risk classification and enhanced therapeutic management.

METHODS

Study Design: A hospital-based cross-sectional observational study was performed to assess the clinical spectrum, disease severity, and determinants of short-term outcomes in patients with chronic liver disease.
Participants and Sample Size: During the trial period, 180 adults with chronic liver disease were included. The sample size was established according to the average yearly admissions for CLD at the study facility and considerations of practicality.
Data Collection: Data were gathered utilizing a standardized case record form via patient interviews, clinical examinations, and the assessment of medical records. Demographics, causes, clinical features, lab results, disease severity levels, complications, and outcomes were all carefully recorded.

Inclusion Criteria

Adult patients (≥18 years) with a confirmed diagnosis of chronic liver disease based on clinical features, biochemical abnormalities, imaging findings, and/or endoscopic evidence were included in the study.

Exclusion Criteria

Patients with acute liver failure**,** acute-on-chronic liver failure, malignancy including hepatocellular carcinoma, post–liver transplant status, and those with incomplete clinical or laboratory data were excluded.

Outcome Measures

The primary outcome measure was short-term in-hospital outcome, including survival or mortality. Disease severity was assessed using Child–Pugh classification and Model for End-Stage Liver Disease (MELD) score**,** which served as standardized prognostic scales.

Clinical and Laboratory Parameters

Clinical parameters included presence of jaundice, ascites, hepatic encephalopathy, variceal bleeding, and pedal edema. Laboratory parameters assessed were serum bilirubin, AST, ALT, serum albumin, international normalized ratio (INR), and platelet count.
Data Analysis: SPSS software was used to examine the data. For continuous variables, descriptive statistics were shown as mean ± standard deviation, and for categorical variables, they were shown as frequencies with percentages. The Chi-square test was used to look at the links between disease severity and outcomes. We used multivariate logistic regression analysis to find independent factors that could predict death. A p-value of less than 0.05 was deemed statistically significant.

RESULTS

This cross-sectional study comprised 180 patients with a diagnosis of Chronic Liver Disease (CLD). Using the proper descriptive and inferential statistics, the clinical presentation, biochemical profile, severity scores, complications, and predictors of unfavorable outcomes were examined.

Table 1. Demographic and Etiological Profile of CLD Patients (n = 180).

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	<40	26	14.4
	40–59	88	48.9
	≥60	66	36.7
Gender	Male	126	70.0
	Female	54	30.0
Etiology	Alcohol-related	78	43.3
	Viral hepatitis	46	25.6
	NAFLD/NASH	34	18.9
	Others	22	12.2

The demographic and etiological characteristics of the 180 individuals with chronic liver disease are compiled in Table 1. The majority of patients were middle-aged, with nearly half (48.9%) falling into the 40–59 age range, followed by those over 60 (36.7%). Due to their greater exposure to risk factors, men made up the majority (70%). There was a mixed etiological pattern in the study population, with alcohol-related liver disease being the most common cause (43.3%), followed by viral hepatitis (25.6%) and NAFLD/NASH (18.9%).

Table 2. Clinical Presentation of Patients with CLD.

Clinical Feature	Number (n)	Percentage (%)
Jaundice	118	65.6
Ascites	104	57.8
Pedal edema	86	47.8
Hepatic encephalopathy	42	23.3
Upper GI bleeding	38	21.1
Splenomegaly	76	42.2

The clinical spectrum of CLD at presentation is shown in Table 2. The most prevalent symptoms were ascites (57.8%) and jaundice (65.6%), indicating advanced hepatic dysfunction in a significant number of patients. Splenomegaly (42.2%) and pedal edema (47.8%) were also common, and nearly one-fourth of cases had significant sequelae like upper gastrointestinal hemorrhage (21.1%) and hepatic encephalopathy (23.3%).

Table 3. Biochemical and Hematological Parameters.

Parameter	Mean ± SD	Reference Range
Serum Bilirubin (mg/dL)	3.8 ± 2.6	<1.2
AST (U/L)	92.4 ± 48.7	<40
ALT (U/L)	78.6 ± 41.2	<40
Serum Albumin (g/dL)	2.8 ± 0.6	3.5–5.0
INR	1.6 ± 0.4	0.9–1.2
Platelet Count ($\times 10^5/\mu L$)	1.12 ± 0.48	1.5–4.0

Table 3 shows the biochemical and hematological profiles of the patients, which show that their livers are not working well. The mean serum bilirubin and transaminase levels were significantly increased, indicating continuing hepatic damage. Hypoalbuminemia and delayed INR indicated impaired synthetic liver function, whereas diminished platelet counts indicated portal hypertension and hypersplenism. In general, these lab results support the idea that the study group has moderate to severe chronic liver disease.

Table 4. Disease Severity Based on Child–Pugh and MELD Scores.

Severity Score	Category	Frequency (n)	Percentage (%)
Child–Pugh	Class A	42	23.3
	Class B	68	37.8
	Class C	70	38.9
MELD Score	<15	56	31.1
	15–24	74	41.1
	≥25	50	27.8

Table 4 shows how severe the disease was in patients with chronic liver disease using the Child–Pugh and MELD scoring systems. A large number of patients had advanced disease, with almost two-fifths (38.9%) classified as Child–Pugh Class C and 37.8% classified as Class B, which means that most of them had moderate to severe hepatic dysfunction. Only 23.3% of patients were in Child–Pugh Class A, which means that their liver function was relatively preserved. MELD scores showed a similar trend toward advanced disease severity. Most patients had MELD scores between 15 and 24 (41.1%), followed by those with scores ≥25 (27.8%), which are linked to poor prognosis and a higher risk of death. Patients with MELD scores <15 made up 31.1% of the cohort. Overall, both scoring systems consistently show that a large number of patients had clinically significant and advanced chronic liver disease.

Table 5. Complications and Short-Term Clinical Outcomes.

Outcome Variable	Number (n)	Percentage (%)
Recurrent ascites	76	42.2
Variceal bleed	38	21.1
Hepatorenal syndrome	24	13.3
Spontaneous bacterial peritonitis	20	11.1
In-hospital mortality	22	12.2

Table 5 shows that the most common consequence was recurrent ascites (42.2%). Serious events such variceal hemorrhage (21.1%), hepatorenal syndrome (13.3%), and spontaneous bacterial peritonitis (11.1%) were also seen. The death rate in the hospital was 12.2%, which shows that there was a lot of short-term illness and risk.

Table 6. Association Between Disease Severity and Mortality.

Severity Indicator	Mortality (n)	Survival (n)	Total	p-value
Child–Pugh A	2	40	42	
Child–Pugh B	6	62	68	
Child–Pugh C	14	56	70	**0.003***

Note: Chi-square test applied; p < 0.05 statistically significant.

Table 6 indicates a clear link between how bad a person's chronic liver disease is and how likely they are to die. As the Child–Pugh class got worse, the number of deaths went up. The most deaths were in patients in Child–Pugh Class C. Conversely, patients in Class A exhibited the lowest mortality rate. The correlation was statistically significant (p = 0.003), suggesting that heightened liver disease severity is closely associated with an elevated mortality risk.

Table 7. Multivariate Logistic Regression Analysis for Predictors of Mortality.

Predictor	Adjusted OR	95% CI	p-value
MELD ≥25	4.62	2.01–10.63	<0.001
Serum albumin <2.5 g/dL	3.18	1.41–7.14	0.005
Presence of encephalopathy	2.76	1.19–6.38	0.018
INR >1.8	2.43	1.06–5.55	0.036

Table 7 shows the findings of the multivariate logistic regression study that found independent factors that could predict death in people with chronic liver disease. A MELD score of 25 or above was the best predictor of death, raising the risk by more than four times. Severe hypoalbuminemia (serum albumin <2.5 g/dL) was a significant predictor, indicating poor hepatic synthetic function. The presence of hepatic encephalopathy independently elevated the mortality risk, indicating advanced illness and neurological involvement. An increased INR (>1.8), indicative of coagulopathy, was substantially correlated with death.

DISCUSSION

The current cross-sectional study offers an extensive analysis of the demographic characteristics, etiological distribution, clinical spectrum, disease severity, sequelae, and prognostic indicators among patients with chronic liver disease (CLD). The results align predominantly with earlier Indian and international investigations, underscoring the changing epidemiology and clinical impact of CLD. In the present investigation, most of the patients were middle-aged (40–59 years), and there was a clear male preponderance (70%). This demographic trend has been regularly documented in several hospital-based research from India and other developing nations, indicating that chronic liver disease mostly impacts economically productive age groups, therefore resulting in substantial socioeconomic consequences [7]. The male preponderance is mostly

ascribed to increased exposure to alcohol use and occupational risk factors, alongside gender-specific disparities in healthcare-seeking behavior.

Alcohol-related liver disease was the predominant etiology (43.3%), succeeded by viral hepatitis (25.6%) and NAFLD/NASH (18.9%). Recent studies in India have shown similar patterns in the causes of chronic liver disease (CLD), showing a shift from viral hepatitis to alcohol-related and metabolic liver illnesses [8,9]. The increasing prevalence of NAFLD/NASH in this cohort underscores the escalating burden of metabolic syndrome and lifestyle-related illnesses, even within hospital-based populations. Clinically, jaundice and ascites were the predominant presenting characteristics, noted in over half of the patients, indicating that many individuals were at a decompensated state. This late presentation is a recurrent observation in resource-limited settings and has been documented in various research from tertiary care institutions [10,11]. The significant occurrence of comorbidities including hepatic encephalopathy and upper gastrointestinal hemorrhage further corroborates the advanced illness status of the research cohort. The high rates of ascites and splenomegaly are signs of portal hypertension, which is a sign of severe cirrhosis. Prior research has similarly identified ascites as the predominant consequence and a significant factor influencing the diminished quality of life and prognosis in patients with chronic liver disease (CLD) [10]. The laboratory results from this investigation showed very high levels of bilirubin and transaminases, as well as low levels of albumin, a lengthy INR, and low levels of platelets. These anomalies are widely acknowledged as signs of compromised hepatic function, diminished synthetic capability, and portal hypertension. Similar biochemical abnormalities have been reported in previous investigations and are significantly correlated with disease severity and death [12,13]. Hypoalbuminemia and coagulopathy, specifically, have been demonstrated to independently forecast negative outcomes in cirrhotic patients. The Child–Pugh and MELD scores were used to figure out how bad the patients' conditions were. Most of them were in Child–Pugh Classes B and C, and a large number of them had MELD values of 15 or higher. These results are similar to those from earlier studies done in tertiary care settings, when patients often show up with advanced disease [13]. The agreement between Child–Pugh and MELD scores in detecting severe disease underscores their ongoing clinical significance in standard practice. The most common problems were recurrent ascites, variceal hemorrhage, and hepatorenal syndrome. The death rate in the hospital was 12.2%. Earlier Indian investigations of hospitalized patients with chronic liver disease (CLD), especially those with decompensated cirrhosis, have revealed similar death rates [14]. The strong link between higher Child-Pugh class and death found in this study is in line with what is already known: that a worsening of hepatic reserve greatly raises the risk of death in the short term. Multivariate study revealed that a MELD score of ≥25 is the most robust independent predictor of mortality, succeeded by hypoalbuminemia, hepatic encephalopathy, and an elevated INR. These results are consistent with previous research that has confirmed MELD as a reliable predictor of short-term survival in chronic liver disease (CLD) [13,12]. The correlation between encephalopathy, coagulation disorders, and mortality illustrates the multifaceted etiology of adverse outcomes and emphasizes the necessity for prompt identification and rigorous therapy of high-risk patients. This study supports previous findings that patients with chronic liver disease in tertiary care facilities frequently have advanced illness, considerable comorbidities, and elevated short-term mortality risk.

CONCLUSION

This study shows that chronic liver disease is very common, and most of the patients were already very sick when they came in. Alcohol-related etiology was predominant, accompanied by notable metabolic and viral factors. Decompensating characteristics were prevalent, indicating a delayed presentation. The Child–Pugh and MELD scores did a good job of separating risk, with higher scores being substantially connected to death in the hospital. A MELD score of 25 or higher, low levels of albumin, coagulopathy, and hepatic encephalopathy were all strong signs of bad outcomes. This shows how important it is to find these individuals early, regularly check their severity, and give them special care.

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