

FREQUENCY OF PATTERN OF ADMISSIONS IN PATIENTS WITH DECOMPENSATED LIVER DISEASE

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ABSTRACT

Background: Decompensated liver disease is a critical stage of chronic liver disease, characterized by complications such as ascites, variceal bleeding, and hepatic encephalopathy. Understanding these patients' admission patterns can help optimize management strategies and improve clinical outcomes. **Objective:** To determine the frequency of admission patterns in patients with decompensated liver disease. **Study Design:** Cross-sectional study. **Setting:** Hospital-based study. **Duration of Study:** August 11, 2024 – February 11, 2025. **Methods:** A total of 143 patients diagnosed with decompensated liver disease were enrolled using consecutive non-probability sampling. The diagnosis was confirmed based on ultrasound findings of irregular liver margins, altered parenchymal echogenicity, and serum albumin levels <3.5 g/dL. Patients aged 18–70 years were included, while those with chronic kidney disease, diabetes, hypertension, or pregnancy/lactation were excluded. Clinical assessments were conducted under the supervision of an experienced consultant. Ascites were identified through CT imaging and symptoms of abdominal distension, variceal bleeding via endoscopic confirmation, and hepatic encephalopathy based on clinical signs such as asterixis and altered mental status. Data on demographics and admission patterns were collected using a structured proforma and analyzed using SPSS version 25. **Results:** Ascites were the most common reason for hospital admission, affecting 45.5% of patients, followed by variceal bleeding (14%) and hepatic encephalopathy (7.7%). The mean age of participants was 44.5 years, with a male-to-female ratio of 54.5% to 45.5%. Most patients belonged to middle-income socioeconomic backgrounds (55.2%), and 59.4% were uneducated. Urban residents constituted 56.6% of the cohort, while 43.4% were from rural areas. **Conclusion:** The study highlights ascites as the predominant reason for hospitalization among patients with decompensated liver disease, followed by variceal bleeding and hepatic encephalopathy. These findings emphasize the need for early intervention strategies, improved outpatient management, and targeted healthcare policies to reduce hospital admissions and improve patient outcomes.

Keywords: Decompensated Liver Disease, Ascites, Variceal Bleeding, Hepatic Encephalopathy, Admission Patterns, Cross-Sectional Study

INTRODUCTION

Acutely decompensated cirrhosis is marked by the onset of complications associated with cirrhosis, including fluid retention, hepatic encephalopathy, and bacterial infections. Approximately 30% of patients may advance to extrahepatic organ failures as well as acute-on-chronic liver failure. Mortality rates after 90 days are notably elevated, varying from 14% in cases of acute decompensation to 50% in chronic liver failure, primarily due to a lack of effective treatments to halt the progression of the disease. Acute decompensation frequently arises from triggers that set off a series of pathological mechanisms; however, in about 40% of cases, the initial cause remains elusive (1,2). The unpredictable onset of this disease, along with the variability in its dynamics—from a swift resolution of a simple acute decompensation to a rapid decline into multi-organ failure and chronic liver failure highlights the intricate nature of the condition, especially considering the diverse types of extrahepatic organ dysfunction in patients with chronic liver failure (3-5). Despite years of investigation, many of these findings still lack adequate clarification. The mechanisms underlying diseases are typically complex, and the surge in research efforts has led to a significant volume of publications that necessitate thorough evaluation and understanding. Conventional pathophysiological insights outline portal hypertension characterized by splanchnic, systemic vasodilation, and hyperdynamic circulation as essential processes in acute decompensation (6).

A significant portion of this illness and death can be linked to the deterioration of liver function, leading to issues like fluid accumulation in the abdomen, bleeding to varices, as well as brain dysfunction related to liver failure. The emergence of these complications results in a diminished quality of life due to frequent hospital visits, and escalating healthcare expenses, and signifies the

beginning of a deteriorated outlook (7, 8). Liver transplantation, the sole effective remedy for cirrhosis, faces significant barriers because of a global scarcity of donor livers, challenges in transplant program logistics, and the steep expenses associated with the surgical process (9). A study indicated the occurrence rates of various conditions among individuals who have decompensated liver disease: ascites at 62%, variceal bleeding at 15%, and hepatic encephalopathy at 3% (10). Addressing and handling these complications has thus been fundamental to the care of individuals with cirrhosis (10).

Liver disease, characterized by progressive deterioration of liver function, represents a significant global health burden, with decompensated liver disease being a critical stage associated with increased morbidity and mortality. Due to the paucity of literature on this subject, the goal of this study is to determine the frequency of the pattern of admissions in patients with decompensated liver disease at our health setup. Understanding the pattern of admissions by our clinicians can facilitate the development and implementation of targeted interventions aimed at reducing hospitalizations, improving outcomes, and ultimately, alleviating the socioeconomic burden associated with decompensated liver disease.

METHODOLOGY

The study adopted a cross-sectional design conducted at the Department of Medicine, Qazi Hussain Ahmed Hospital, Nowshera from 11 August 2024 to 11 February 2025 following the ethical approval. A consecutive non-probability sampling technique was employed to enroll participants, with the sample size determined using the WHO sample size calculator. This calculation assumed an anticipated hepatic encephalopathy frequency of 3% in

decompensated liver disease (10), a 95% confidence level, and an absolute precision of 2.8%, yielding a required sample of 143 patients. Eligibility criteria included adults aged 18–70 years diagnosed with decompensated liver disease, confirmed through ultrasound findings of irregular liver margins, altered parenchymal echogenicity, and serum albumin levels below 3.5g/dL. Exclusion criteria encompassed pregnant or lactating women, individuals with chronic kidney disease, and those with comorbid diabetes or hypertension. Data collection commenced after obtaining approval from the hospital's ethical review board and CPSP Karachi. Written informed consent was secured from all participants, with assurances of confidentiality and voluntary participation. A structured proforma facilitated the recording of demographic variables such as age, gender, BMI, socioeconomic status, education, occupation, and residential location. Clinical assessments for ascites, variceal bleeding, and hepatic encephalopathy were conducted according to predefined operational definitions and supervised by a consultant with over five years of post-fellowship experience. Ascite diagnosis required CT evidence of abdominal fluid alongside symptoms like bloating or pain, while variceal bleeding confirmation relied on endoscopic visualization of active or recent bleeding. Hepatic encephalopathy was identified through clinical signs such as asterixis, altered mental status, and neurological abnormalities. Data analysis utilized SPSS-20 software, with categorical variables like admission patterns and demographics expressed as frequencies and percentages. Numerical data, including age and BMI, were summarized as mean \pm SD or median (IQR) after normality testing via the Shapiro-Wilk test. Stratification by demographic factors enabled the exploration of potential effect modifiers, with Chi-square or Fisher's exact tests applied to assess associations, considering p-values <0.05 statistically significant.

RESULTS

The study involved 143 patients, with a mean age of 44.55 ± 15.48 years, and a Body Mass Index (BMI) ranging from 21.71 to 29.71 kg/m^2 , with a mean of $25.81 \pm 1.94 \text{ kg/m}^2$ (Table 1). The age distribution of the participants was as follows: 47 individuals (32.9%) were between 18 and 35 years of age, 35 participants (24.5%) fell into the 36 to 50 years category, and the majority, 61 individuals (42.7%), were between 51 and 70 years old (Figure 1). Regarding gender, 78 patients (54.5%) were male, while 65 (45.5%) were female. Regarding socioeconomic status, 39 individuals (27.3%) were poor, earning less than 50,000 Rs per month. The middle class, earning between 50,000 to 100,000 Rs per month, comprised the largest group with 79 patients (55.2%). The rich category, earning more than 100,000 Rs per month, comprised 25 participants (17.5%). Educational status showed that 58 individuals (40.6%) were educated, while 85 (59.4%) were uneducated. Employment status indicated that 68 individuals (47.6%) were employed, while 75 (52.4%) were unemployed. The majority of patients, 81 individuals (56.6%), resided in urban areas, while 62 (43.4%) lived in rural areas (Table 2). As for the admission pattern, 65 patients (45.5%) had ascites, while 78 (54.5%) did not. Variceal bleeding was present in 20 patients (14.0%), and 123 patients (86.0%) did not experience it. Hepatic encephalopathy was found in 11 patients (7.7%), while 132 (92.3%) did not have this condition (Table 3). We found no notable association between the admission pattern and the demographic variables ($P > 0.05$).

Table 1: Descriptive statistics

Descriptive variables	Mean	Std. Deviation
Age (Years)	44.55	15.480
BMI (Kg/m2)	25.8124	1.93866

Figure 1: Age distribution (Years)

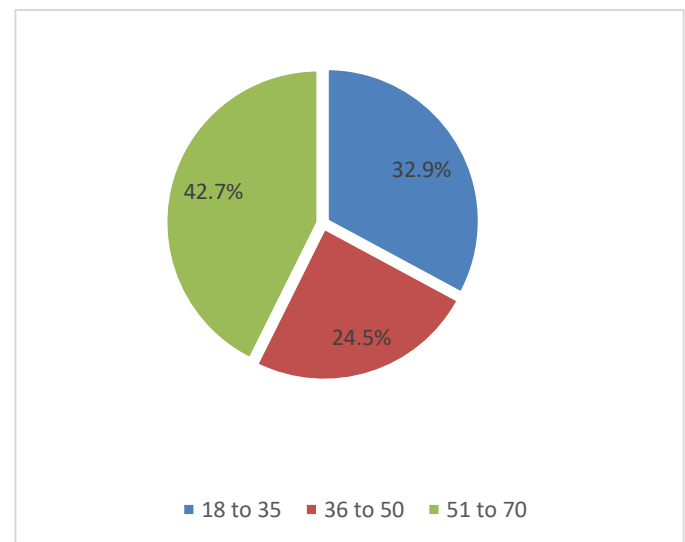


Table 2: Demographics

Demographics		Frequency	%
Gender	Male	78	54.5%
	Female	65	45.5%
Socioeconomic status	Poor (< 50K Rs/Month)	39	27.3%
	Middle class (50K to 100K Rs/Month)	79	55.2%
	Rich (> 100K Rs/Month)	25	17.5%
Education status	Educated	58	40.6%
	Un-educated	85	59.4%
Occupation status	Employed	68	47.6%
	Unemployed	75	52.4%
Residence area	Rural	62	43.4%
	Urban	81	56.6%

Table 3: Pattern of admission

Pattern of admission		Frequency	Percentage
Ascites	Yes	65	45.5%
	No	78	54.5%
Variceal bleeding	Yes	20	14.0%
	No	123	86.0%
Hepatic encephalopathy	Yes	11	7.7%
	No	132	92.3%

DISCUSSION

In our study, the age of participants ranged widely, with a mean of 44.55 years. The most significant proportion (42.7%) of participants were aged between 51 and 70 years, followed by individuals aged 18 to 35 years (32.9%) and 36 to 50 years (24.5%). This distribution suggests that decompensated liver disease affects individuals across a broad spectrum of ages, though the most common age group appears to be between 51 and 70 years. This age-related finding aligns with the results of a study that reported a higher prevalence of liver diseases among older adults. Notably, age is often correlated with a higher incidence of comorbidities, which can complicate the management of liver disease (11). Regarding gender, our study showed a higher proportion of male patients (54.5%) compared to females (45.5%).

Gender distribution in liver disease has been a topic of debate, as several studies have shown a predominance of males in the development of cirrhosis and liver decompensation, potentially due to alcohol consumption, a common risk factor (11).

Clinically, ascites emerged as the most frequent decompensation event (45.5%), consistent with its role as a hallmark of portal hypertension. This aligns with Romano et al., where ascites resolved in 29% of HCV patients post-antiviral therapy, underscoring the reversibility of complications when underlying etiologies are addressed. Kashani et al reported that ascites in approximately 50% of their patients within 10 years of their diagnosis of cirrhosis (12). De Wit et al., found that the incidence of ascites in their patients was 62% (10).

Only 14% of patients experienced variceal bleeding—lower than the 30% reported by Garcia-Tsao et al., potentially reflecting the successful implementation of beta-blockers and endoscopic surveillance (13). Their study contrasts with de Wit et al., where variceal bleeding accounted for 15% of initial decompensation events, suggesting regional differences in prophylactic practices. Our findings align with de Wit et al. (10).

The prevalence of hepatic encephalopathy (HE) in the current study (7.7%) contrasts with de Wit et al., where HE occurred in 3% of patients at initial decompensation but rose to 29% during follow-up (10). This divergence likely reflects differences in cohort characteristics and management: de Wit's cohort had a higher burden of alcoholic cirrhosis (71% in decompensated patients), a known risk factor for recurrent HE, and more advanced disease (median MELD 15). de Wit's findings emphasize the challenge of HE in alcohol-related cirrhosis, where ongoing alcohol use and higher disease severity drive recurrence (10). Both studies underscore HE's modifiability through etiology-specific strategies and early intervention.

While demographic and etiological profiles vary, decompensation patterns and management challenges show remarkable global consistency. Our cohort's reduced encephalopathy and variceal bleeding rates suggest that proactive management can alter disease trajectories, even in resource-constrained settings. Future efforts should prioritize etiology-specific treatments, medication stewardship, and equitable access to HCC screening to bridge outcome disparities.

CONCLUSION

The study revealed distinct frequencies of decompensation events: ascites (45.5%), variceal bleeding (14%), and hepatic encephalopathy (7.7%). Ascites emerged as the predominant complication, underscoring its role as a key marker of disease progression. The relatively low hepatic encephalopathy rate suggests effective management of precipitating factors. To optimize outcomes, prioritize ascites control through sodium restriction and diuretic therapy while maintaining vigilance for variceal bleeding risks via beta-blocker prophylaxis. Continued adherence to encephalopathy prevention protocols remains critical. Routine surveillance for these patterns can guide tailored interventions in decompensated cirrhosis.

DECLARATIONS

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-QMHAC-02/24)

Consent for publication

Approved

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Not applicable

CONFLICT OF INTEREST

The authors declared the absence of a conflict of interest.

AUTHOR CONTRIBUTION

YASIR (Trainee Medical Officer)

Conception of Study, Date Collection, Development of Research Methodology Design, Study Design, Review of Literature, and final approval of manuscript.

MUHAMMAD KHALID (Professor)

Study Design, Conception of Study, and Final approval of the manuscript.

SHEHZAD (Trainee Registrar)

Manuscript Review.

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