Journal of Rare Cardiovascular Diseases
ISSN: 2299-3711 (Print) | e-ISSN: 2300-5505 (Online)
www.jrcd.eu

RESEARCH ARTICLE

# Predicting Outcomes in Patients with Cirrhosis: A study from a tertiary hospital in India

**Devansh Bajaj[1], (Maj) Aradya HV[2], Deepak Suvarna[3], Nandeesh HP[4], Abhishek Kabra[5]**

[1] Senior resident, Department of Medical gastroenterology, JSS medical college and hospital, JSS AHER, Mysuru. ORCID ID: 0009-0001-9919-468X
[2] Associate professor department of Medical gastroenterology, JSS medical college and hospital, JSS AHER, Mysuru.
[3] Professor and head, department of Medical gastroenterology, JSS medical college and hospital, JSS AHER, Mysuru. ORCID ID : 0000-0001-5151-0631
[4] Professor, department of Medical gastroenterology, JSS medical college and hospital, JSS AHER, Mysuru.
[5] Senior resident, Department of Medical gastroenterology, JSS medical college and hospital, JSS AHER, Mysuru. ORCID ID : 0009-0001-1397-

*Corresponding Author
Dr (Maj) Aradya HV
(aryandr@rediffmail.com)

Article History
**Received:** 19.07.2025
**Revised:** 25.08.2025
**Accepted:** 09.09.2025
**Published:** 29.09.2025

Abstract: ***Introduction:*** Liver disease has a high short term morbidity and mortality. The rate of hospital readmissions and mortality within a three-month period is utilized as a pivotal quality metric for evaluating the standard of care in patients with cirrhosis undergoing inpatient treatment. The aim of this study is to elucidate the predictors of hospital readmissions and mortality within a three-month period among individuals with decompensated cirrhosis, focusing specifically on hepatic function metrics and other relevant clinical variables. ***Material and methods:*** This longitudinal study was conducted at the department of gastroenterology, JSS hospital Mysore for a period of one year among 60 patients of decompensated cirrhosis. Demographic, laboratory and risk factors were recorded for readmissions and mortality. Results were analyzed using SPSS version 25.0. ***Results-*** Among the 60 patients admitted with cirrhosis and complications, 24 (40%) were readmitted within three months, and 20 (33.3%) had readmission within one month.8 patients (13.3%) died during the follow-up period. Hepatorenal syndrome was observed more commonly in the readmission group as compared to no readmission group(36.3%versus 8%),as did hepatic hydrothorax(21.6% versus 2.7%) and portal vein thrombosis (40% versus15%).Readmission risks were increased by higher Model for End-Stage Liver Disease scores (Odd 's ratio of 1.73), and Child-Turcotte-Pugh class C (Odd 's ratio 17.3) and P value was <0.05 for both the variables, denoting statistical significance. Higher MELD scores significantly increased the likelihood of mortality with an odd's ratio of 1.114.***Conclusion*** – In patients with cirrhosis, MELD score and CTP class, along with complications including hydrothorax, hepatorenal syndrome (HRS), and portal vein thrombosis (PVT), are the most reliable predictors of readmission and mortality within three months post-discharge.

Keywords: Cirrhosis, liver, one month, predictor, readmission, three month, early mortality

## INTRODUCTION

Cirrhosis is a prevalent condition globally, contributing significantly to morbidity and mortality.(1) It results from chronic inflammation and hepatic fibrosis, leading to liver failure.(2) Cirrhosis is the 11th leading cause of death and, along with liver cancer, accounts for 3.5% of global deaths.(3) Hospital readmissions following discharge pose medical, economic, and psychosocial challenges, with costs exceeding $2 billion annually in the U.S. alone.(4)

From 2004 to 2013, chronic liver disease hospitalizations in Texas increased by 92%, surpassing rates for chronic obstructive pulmonary disease (48.8%) and congestive heart failure (6.7%).(5) Cirrhosis-related hospitalizations are costlier due to complex care needs, extended stays, and specialized interventions.(6) A study in China found a 43% readmission rate within three months for cirrhotic patients.(7) Readmissions are also an independent predictor of mortality.(8)

In the U.S., a study of 303,346 cirrhotic patients reported a 30-day readmission rate of 31.4%, influenced by insurance coverage, weekend admissions, nonalcoholic causes, hepatic encephalopathy, and ascites.(9) Another cohort study found readmission rates of 12.9% at 30 days and 21.2% at 90 days, with higher rates in patients with ≥3 complications and hepatic encephalopathy as the strongest predictor.(10) Among 654 patients, the most common reasons for readmission were hepatic encephalopathy (22%), gastrointestinal bleeding (13%), acute kidney injury (13%), and ascites (6%).(11) A study of 57,305 patients with decompensated cirrhosis identified leaving against medical advice, ascites, and acute kidney injury as key predictors of readmission.(12)

Traditional mortality prediction tools like the Child–Pugh (CP) score have limitations due to a reliance on few variables. Initially developed for surgical risk in variceal bleeding, the CP score was refined by Pugh et al. to include prothrombin time, replacing nutritional status.(13,14) Newer tools like the MELD score, initially for TIPS outcomes, provide more accurate mortality predictions and guide liver transplantation prioritization.(15)

While some readmissions are preventable, not all can be avoided. A U.S. study found only 12% of cirrhosis-related readmissions were preventable.(11)

This study aims to identify demographic, clinical, and laboratory predictors of readmission and mortality in cirrhotic patients to develop risk stratification models and improve outcomes.

# MATERIAL AND METHOD

**Study Design and Setting**

This study was conducted in the Department of Medical Gastroenterology, JSS Hospital, Mysore, over one year, involving 60 patients with chronic liver disease selected through convenient sampling based on inclusion and exclusion criteria.

**Inclusion Criteria**

1. Patients admitted with decompensated cirrhosis and its complications.
2. Diagnosis confirmed through clinical features, laboratory tests (e.g., reduced platelet count, liver function profile), radiological findings (e.g., coarse nodular liver, splenomegaly, portal hypertension), and endoscopic evidence of varices or portal hypertensive gastropathy.

**Exclusion Criteria**

1. Patients hospitalized for non-cirrhosis-related procedures.
2. Patients who did not provide consent.

Data Collection

Baseline demographic data (name, age, gender, etiology of cirrhosis) and comprehensive biochemical parameters (complete blood count, liver and renal function tests, prothrombin time, INR) were recorded. Clinical complications, including gastrointestinal bleeding, hepatic encephalopathy, hepatorenal syndrome, and hepatic hydrothorax, were noted. MELD and Child-Turcotte-Pugh scores were calculated.

Follow-Up and Outcome Measures

Patients were monitored for three months via phone calls, medical records, and outpatient follow-ups. Outcomes included:

(A) Readmission within one and three months.

(B) Mortality.

**Statistical Analysis**

Readmission rates were calculated, and patients readmitted within one month were compared to those without readmission. Categorical variables were analyzed using Pearson's chi-square test, and continuous variables were assessed with an independent samples t-test. Significant variables in univariate analysis were included in multivariate logistic regression. Model fit was assessed with the Hosmer-Lemeshow test, and adjusted odds ratios (ORs) with cutoff values, sensitivity, and specificity were calculated. Statistical analysis was conducted using SPSS version 25.0, with a significance level of 0.05.

# RESULT:

In the present study 20 out of 60 patients (33.3%) were readmitted within a month, and 24 (40%) within three months. 8 patients (13.3%) died during follow-up. As described in table 1, the study involved 60 patients with an average age of 45-50 years, of which 81.6% were male (49) and 18.3% female (11). There was no significant difference in demographic characteristics between patients readmitted within 3 months and those not readmitted. Alcohol was the leading etiology of cirrhosis in 70% of patients. The etiology and incidence of gastrointestinal bleeding did not differ significantly between the readmission and non-readmission groups, with bleeding rates of 30.3% and 36.2%, respectively. Grade I varices were most common in both groups (P = 0.250).

However, hepatic encephalopathy (HE) was more common in the readmission group (45.3%) than the non-readmission group (17.2%). Hepatic hydrothorax was significantly more frequent in the readmission group (21.6%, P < 0.001), as was hepatorenal syndrome (36.3% vs. 8.0%, P < 0.001). Portal vein thrombosis occurred more in the readmission group (40% vs. 15%, P < 0.001). Hepatocellular carcinoma was more common in the readmission group (15% vs. 2%, P = 0.001).

**Table 1: Baseline characteristics of patients with readmission within 3 months**

| Parameters | | Readmission within 3 months | | |
|---|---|---|---|---|
| | | No (n =36) | Yes (n =24) | p value |
| Age in years | (mean + SD) | 48.85+12.49 | 48.21 +12.11 | 0.701 |
| Sex [no. (%)] | Female | 22.1 | 14.4 | 0.106 |
| | Male | 77.9 | 85.6 | |
| Etiology [no. (%)] | Alcohol | 64.2 | 78.5 | 0.213 |
| | EHPVO | 1.9 | 0 | |

| | | | | |
|---|---|---|---|---|
| | HBV | 8.4 | 3.5 | |
| | HBV + HCV | 0.8 | 0 | |
| | HCV | 4.4 | 2.5 | |
| | HIV + HBV | 0 | 2.1 | |
| | NAFLD | 17.8 | 6.8 | |
| | NCPF | 2.5 | 5.5 | |
| GI bleed [no. (%)] | No | 63.8 | 69.7 | 0.321 |
| | Yes | 36.2 | 30.3 | |
| Grade of varices [no. (%)] | I | 54.7 | 45.3 | 0.250 |
| | II | 26.5 | 32.5 | |
| | III | 18.8 | 22.2 | |
| Hepatic encephalopathy [no. (%)) | No | 82.8 | 53.7 | <0.0001* |
| | Yes | 17.2 | 45.3 | |
| Hydrothorax [no. (%)] | No | 97.3 | 78.4 | <0.0001* |
| | Yes | 2.7 | 21.6 | |
| HRS (no. (%)) | No | 92.0 | 63.7 | <0.0001* |
| | Yes | 8.0 | 36.3 | |
| PVT (no. (%) | No | 85.0 | 60.0 | <0.0001* |
| | Yes | 15.0 | 40 | |
| HCC [no. (%)] | No | 98 | 85 | 0.001* |
| | Yes | 2 | 15 | |

As described in table 2, mortality was 13.3%, with no significant demographic differences between those who died and those who did not. Hepatic encephalopathy occurred more frequently in those who died (46.6%) compared to survivors (19%, P < 0.001). Hepatorenal syndrome was also more prevalent in the deceased group (22% vs. 3%, P < 0.001). Only 28% of deaths were due to GI bleed-related outcomes, despite GI bleed being a common cause of readmission (30.3%).

**Table 2: Baseline characteristics of patients with mortality in 3 months**

| Parameters | | Mortality | | |
|---|---|---|---|---|
| | | No (n=52 ) | Yes (n=8) | P value |
| Age in years | (mean + SD) | 48.54+12.5 | 48.11 +10.9 | 0.723 |
| Sex [no. (%)] | Female | 21.3 | 15.5 | 0.103 |
| | Male | 78.7 | 84.5 | |
| Etiology | Alcohol | 63.1 | 80 | 0.287 |

| | | | | |
|---|---|---|---|---|
| [no. (%)] | EHPVO | 0.9 | 0 | |
| | HBV | 8.2 | 2.5 | |
| | HBV + HCV | 1.0 | 0 | |
| | HCV | 4.3 | 4.5 | |
| | HIV + HBV | 0 | 2.0 | |
| | NAFLD | 16.9 | 8.2 | |
| | NCPF | 3.5 | 2.8 | |
| GI bleed [no. (%)] | No | 64 | 72 | 0.273 |
| | Yes | 36 | 28 | |
| Grade of varices [no. (%)] | I | 53.1 | 49.1 | 0.243 |
| | II | 24.3 | 28.2 | |
| | III | 22.6 | 22.7 | |
| Hepatic encephalopathy [no. (%)) | No | 81 | 53.4 | <0.0001* |
| | Yes | 19 | 46.6 | |
| Hydrothorax [no. (%)] | No | 97 | 78 | <0.0001* |
| | Yes | 3 | 22 | |
| HRS (no. (%)) | No | 91 | 63 | <0.0001* |
| | Yes | 7 | 37 | |
| PVT (no. (%) | No | 86 | 68.6 | <0.0001* |
| | Yes | 14 | 31.4 | |
| HCC [no. (%)] | No | 97 | 84 | 0.002* |
| | Yes | 3 | 16 | |

As shown in table 3, in the readmission group, average total blood cell counts, total and direct bilirubin were significantly higher ($P < 0.05$), while platelet count was notably lower ($P = 0.003$). The AST to ALT ratio was also significantly higher ($P < 0.0001$). Additionally, the readmission group had higher mean values of PT, INR, urea, creatinine, and MELD ($P < 0.05$).The Child-Turcotte-Pugh (CTP) classification showed a significant difference between the groups ($P < 0.0001$), with 73% of readmitted patients in CTP category C compared to 9.1% in the non-readmission group.
When examining mortality, the parameters that differed significantly between deceased and surviving patients were similar to those for readmission, except for AST/ALT, albumin, and sodium.

**Table 3: Various parameters of patients with readmission within 3 months and mortality**

| Parameters | Readmission within 3 months | | p value | Mortality | | P value |
|---|---|---|---|---|---|---|
| | No (n=36) | Yes (n=24) | | No (n=52) | Yes (n=8) | |
| Hb | 9.12 ± 1.44 | 9.34 ± 2.21 | 0.601 | 9.14 ± 2.72 | 9.24 ± 2.31 | 0.598 |

| | | | | | | |
|---|---|---|---|---|---|---|
| TLC | 8442.24 ± 4357.7 | 13314.17 ± 7758.5 | <0.0001* | 8671.13 ± 4147.7 | 13325.17 ± 6479.5 | <0.0001* |
| Neutrophils | 74.80 ± 12.1 | 76.54 ± 15.34 | 0.003* | 72.54 ± 10.2 | 77.23 ± 10.23 | 0.003* |
| Platelets | 1.61 ± 0.98 | 1.13 0.81 | 0.003* | 1.51 ± 0.99 | 1.14 0.81 | 0.002* |
| Total bilirubin | 3.15 ± 2.13 | 11.52 ± 7.51 | <0.0001* | 3.24 ± 5.23 | 11.56 ± 7.33 | <0.0001* |
| Direct bilirubin | 2.94 ± 4.16 | 7.93 ± 6.23 | <0.0001* | 3.92 ± 5.16 | 6.83 ± 7.20 | <0.0001* |
| AST | 136.08 ± 757.46 | 271.46 ± 314.08 | 0.826 | 138.04 ± 632.46 | 171.34 ± 332.08 | 0.817 |
| ALT | 79.67 ± 243.18 | 103.78 ± 251.3 | 0.487 | 79.54 ± 221.69 | 101.96 ± 283.5 | 0.494 |
| AST: ALT Ratio | 1.58 ± 0.74 | 2.07 ± 0.84 | <0.0001* | 1.53 ± 0.98 | 3.01 ± 0.35 | <0.0001* |
| ALP | 336.28 ± 326.18 | 332.20± 173 | 0.456 | 356.38 ± 316.88 | 319.14±127 | 0.431 |
| Total Protein | 5.23 ± 0.86 | 7.20 ± 0.4 | 0.643 | 7.10 ± 0.23 | 6.25 ± 0.4 | 0.432 |
| Albumin | 3.21 ± 0.35 | 2.80 ± 0.68 | 0.002* | 4.18 ± 0.87 | 2.14 ± 0.43 | 0.003* |
| PT | 20.12 ± 2.21 | 41.28 ± 11.22 | <0.0001* | 20.12 ± 2.36 | 32.48 ± 11.20 | <0.0001* |
| INR | 1.30 ± 0.12 | 4.14 ± 1.30 | <0.0001* | 1.50 ± 0.21 | 2.52 ± 1.31 | <0.0001* |
| Urea | 37.90 ± 22.03 | 49.21 ± 35.62 | 0.004* | 36.32 ± 22.40 | 50.84 ± 37.83 | 0.003* |
| Creatinine | 1.01 ± 0.24 | 1.45 ± 1.21 | <0.0001* | 1.03 ± 0.25 | 1.32 ± 1.12 | <0.0001* |
| Na+ | 134.21 ± 5.28 | 121.92 ± 8.31 | 0.019* | 141.51 ± 6.63 | 130.19 ± 5.37 | 0.017 |
| K+ | 5.12 ± 0.31 | 4.12 ± 1.03 | 0.853 | 5.14 ± 0.28 | 5.13 ± 1.22 | 0.963 |
| MELD | 15.21 ± 4.42 | 25.21 ± 7.0 | <0.0001* | 13.25 ± 4.32 | 27.41 ± 7.0 | <0.0001* |
| CTP (no.(%)) A | 43.2 | 3.4 | <0.0001* | 42.0 | 5.4 | <0.0001* |
| B | 47.7 | 23.6 | | 48.7 | 24.6 | |
| C | 9.1 | 73 | | 9.3 | 70.0 | |

The likelihood of readmission within 3 months was strongly associated with hydrothorax (OR = 17.234), hepatorenal syndrome (OR = 23.456), and portal vein thrombosis (OR = 5.349). A one-unit increase in MELD score raised the readmission likelihood by a factor of 1.321. Additionally, Class C patients had a significantly higher risk of readmission (OR = 17.342) compared to Class A as described in table 4

**Table 4: Risk of readmission associated with significant factors among patients readmitted within 3 months**

| Risk factors | Readmission within 3 months | |
|---|---|---|
| | Odds ratio | p value |
| Hydrothorax | 17.234 | 0.01* |

| | | |
|---|---|---|
| HRS | 23.456 | 0.001* |
| PVT | 5.349 | 0.03* |
| MELD | 1.321 | 0.03* |
| CTP (c) | 17.342 | 0.022* |

The presence of hepatorenal syndrome significantly increased mortality risk compared to those without it. Additionally, a one-unit increase in MELD score raised the mortality probability by 1.114 times.

**Table 5: Risk of readmission associated with significant factors among patients who died**

| Risk factors | Readmission within 3 months | |
|---|---|---|
| | Odds ratio | p value |
| HRS (Yes) | 8.234 | 0.005* |
| MELD | 1.114 | 0.02* |

As shown in table 6, serum bilirubin, alanine aminotransferase, aspartate aminotransferase, INR, and serum sodium were significantly associated with 1-month readmission. The severity of liver disease, as indicated by MELD and Child-Pugh scores, also correlated significantly with early readmissions.

**Table 6: Various parameters of patients with readmission within 1 month**

| Parameter | Readmission at 1 month | | p value |
|---|---|---|---|
| | Yes | No | |
| Age (years) | 49.62+10.32 | 49.11 +12.01 | 0.273 |
| Haemoglobin (g/dL) | 8.98±1.23 | 9.09±1.62 | 0.702 |
| WBC (/mm$^{3)}$ | 6779±3489 | 6498±3320 | 0.431 |
| Platelet (/mm$^3$) | 123980±81234 | 120934±84289 | 0.929 |
| Bilirubin (mg/dL) | 4.90±5.12 | 2.39±3.20 | <0.001* |
| AST (IU/L) | 103.45±120.3 | 69.21±55.37 | 0.001* |
| ALT (IU/L) | 98.34±166.34 | 62.38±61.23 | 0.023* |
| Protein (mg/dL) | 6.77±0.38 | 6.77±0.88 | 0.987 |
| Albumin (mg/dL) | 2.48±0.20 | 2.60±0.21 | 0.172 |
| INR | 1.55±0.38 | 1.31±0.21 | <0.001* |
| BUN(mg/dL) | 14.28±6.50 | 16.29±8.23 | 0.318 |
| Creatinine (mg/dL) | 1.13±0.29 | 1.13±0.20 | 0.921 |
| Na+ (mEq/L) | 134.38±5.29 | 136.29±4.10 | 0.001* |
| K+ (mEq/L) | 3.67±0.50 | 3.57±0.36 | 0.232 |

| | | | |
|---|---|---|---|
| CTP score | 9.23±1.24 | 8.10±1.31 | <0.001* |
| MELD score | 16.78±3.21 | 13.12±3.01 | <0.001* |
| Length of stay (days) | 9.01 ±5.12 | 8.51±3.12 | 0.020* |

# DISCUSSION

In our prospective cohort study, patients with cirrhosis were monitored for three months post-hospitalization. Primary endpoints included readmission and mortality rates. We observed high rates of early readmissions (33.3% at 1 month, 40% at 3 months) and mortality (13.3%) within three months.

An Indian study by Patel et al. reported 1- and 3-month readmission rates of 27.8% and 42.3%, respectively, though 3-month mortality data was unavailable.([16]) Daswani et al. reported a 3-month mortality rate of 44% among patients with severe alcoholic hepatitis.([17]) In contrast, U.S. studies showed lower 3-month readmission rates (12–22%).([18]) An Indonesian study noted a 90-day mortality rate of 42.2%.([19]) The mean age of cirrhotics in our cohort (48 years) was comparable to an Indian study (46 ± 13 years).([20])

A 1999 Spanish study on cirrhotic patients with GI bleeds found a 7.4% mortality rate within 48 hours and 24% within six weeks.([21]) Our study noted no significant difference in GI bleed outcomes among readmitted, non-readmitted, and deceased patients, likely reflecting advancements in GI bleed management.

A 2023 Italian study found hepatic encephalopathy (HE) accounted for 13.9% of readmissions and was a major predictor of mortality.([22]) Similarly, a U.S. study identified HE as the cause of 43% of readmissions, second only to ascites-related complications.([23]) In our cohort, HE was significantly higher in readmitted patients (45.3%) compared to non- readmitted ones (17.2%). HE, a key component of the Child-Pugh score and a predictor of short-term outcomes, has become a focal point of cirrhosis treatment due to its reversibility.([25]) However, some studies report a weaker association between HE and short-term mortality, potentially due to improved management practices.([16])
Hydrothorax, though less common, is a known predictor of readmission. A U.S. study reported 2.4% of readmissions due to hepatic hydrothorax,([29]) while another found it accounted for 29%.([26]) In our study, hydrothorax was significantly associated with 3-month readmission (OR = 17.23) but not with mortality, consistent with existing data.

Hepatorenal syndrome (HRS) emerged as the most significant predictor of both readmission (OR = 23.4) and mortality (OR = 8.2), accounting for 44% of cases in our cohort. A 2023 U.S. study highlighted the increased readmission, mortality, and healthcare burden associated with HRS and AKI in cirrhosis.([27]) Another study found HRS led to a longer hospital stay and higher mortality (32% with HRS vs. 7% without).([28]) Population-based data identified HRS as the complication with the highest odds of admission (OR = 1.72), followed by ascites (OR = 1.53).([30])

Portal vein thrombosis (PVT) was less impactful, with an OR of 5.3 for readmission, lower than hydrothorax and HRS. An Indian study reported PVT in 40% of readmitted cases, with an OR of 5.([31]) Meta-analyses have linked PVT to higher mortality (OR = 1.62) and an increased risk of ascites (OR = 2.52).([32])

Among scoring systems, the MELD score (OR = 1.3) and CTP class C (OR = 17.3) were significant predictors of readmission. Only the MELD score showed a significant association with mortality. The MELD score's inclusion of hepatic and renal function makes it a robust predictor of readmission and mortality in cirrhotic patients, particularly in cases involving sepsis, variceal bleeding, fulminant hepatic failure, and alcoholic hepatitis.([33])

While risk factors like HRS, PVT, and hydrothorax are largely unmodifiable, the MELD score offers a valuable tool for identifying high-risk patients who may benefit from targeted interventions. Enhanced discharge planning and follow-up for those with elevated MELD scores can potentially improve outcomes.

In our analysis, demographic variables (age, gender, etiology of cirrhosis) and individual Child-Pugh score components (encephalopathy, ascites, bilirubin, albumin, PT) did not predict 3-month readmission or mortality. However, the MELD score, along with complications such as hydrothorax, HRS, and PVT, emerged as key predictors of outcomes.

While etiology was not identified as a predictor of readmission, its role in cirrhosis progression is well-established. A limitation of this study is the lack of data on cirrhosis duration and treatment adherence, which could provide further insights into readmission and mortality risks. By focusing on predictive factors and implementing tailored strategies, the burden of readmissions and mortality in cirrhotic patients can be reduced.

# CONCLUSION

The present study found that the MELD score, and complications such as hydrothorax, HRS, and PVT are the most reliable predictors of cirrhosis complications. These indicators accurately predict the likelihood of readmission and mortality within 3 months

**ABBREVIATIONS**

HRS: Hepatorenal syndrome
PVT: Portal vein thrombosis
MELD: Model for end stage liver disease
CTP: Child Turcotte Pugh
HE: Hepatic encephalopathy

Acknowledgements: None

Disclosure statement: Nothing to disclose

Funding statement: No funding

Ethical approval: Obtained from IEC

Consent to participate: Present

Human ethics: Followed

Consent to publication: Yes

Competing interests: None

# REFERENCES

1. Sepanlou SG, Safiri S, Bisignano C, et al. The global, regional,and national burden of cirrhosis by cause in 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet Gastroenterol Hepatol 2020;5: 245–66.
2. Pellicoro A, Ramachandran P, Iredale JP, Fallowfield JA. Liver fibrosis and repair: immune regulation of wound healing in a solid organ. Nat Rev Immunol 2014; 14: 181–94
3. Asrani SK, Devarbhavi H, Eaton J, Kamath PS. Burden of liver diseases in the world. J Hepatol 2019; 70: 151–71.
4. Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: global burden of disease study. Lancet 1997;349(9064):1498–1504.
5. Asrani SK, Kouznetsova M, Ogola G, et al. Increasing Health Care Burden of Chronic Liver Disease Compared With Other Chronic Diseases, 2004-2013. Gastroenterology 2018;155:719-29.e4.
6. Di Pascoli M, Ceranto E, De Nardi P, et al. Hospitalizations Due to Cirrhosis: Clinical Aspects in a Large Cohort of Italian Patients and Cost Analysis Report. Dig Dis 2017;35:433-8.
7. Li N, Xu M, Liu S-Y, Yu M-Q, Ruan C-F. Risk factors for hospital readmission among patients with cirrhosis and ascites in China: a retrospective observational study. Journal of International Medical Research. 2024;52(1). doi:10.1177/03000605231223087
8. Morales BP, Planas R, Bartoli R, et al. Early hospital readmission in decompensated cirrhosis: Incidence, impact on mortality, and predictive factors. Dig Liver Dis 2017;49:903-9.
9. Garg, S.K. et al. (2021) 'Incidence and predictors of 30-day hospital readmissions for liver cirrhosis: Insights from the United States National Readmissions Database', Annals of Translational Medicine, 9(13), pp. 1052–1052. doi:10.21037/atm-20-1762.
10. Tapper, E.B., Halbert, B. and Mellinger, J. (2016) 'Rates of and reasons for hospital readmissions in patients with cirrhosis: A multistate population-based Cohort Study', Clinical Gastroenterology and Hepatology, 14(8). doi:10.1016/j.cgh.2016.04.009.
11. Orman, Eric S. MD, MSCR1; Desai, Archita P. MD1; Ghabril, Marwan S. MD1; Nephew, Lauren D. MD1; Patidar, Kavish R. DO2; Holden, Thirty-Day Readmissions Are Largely Not Preventable in Patients With Cirrhosis. The American Journal of Gastroenterology 119(2):p 287-296, February 2024. | DOI: 10.14309/ajg.0000000000002455
12. Gajendran M, Umapathy C, Perisetti A, et alNationwide analysis of incidence and predictors of 30-day readmissions in patients with decompensated cirrhosisFrontline Gastroenterology 2022;13:295-302
13. Child CG, Turcotte JG. Surgery and portal hypertension. In: Child CG, editor. The liver and portal hypertension. Philadelphia: W. B. Saunders Co., 1964; 50
14. Pugh RN, Murray-Lyon IM, Dawson JL, Pietroni MC, Williams R. Transection of the oesophagus for bleeding oesophageal varices. Br J Surg 1973;60:646–649.
15. Malinchoc M, Kamath PS, Gordon FD, Peine CJ, Rank J, ter Borg PC. A model to predict poor survival in patients undergoing transjugular intrahepatic portosystemic shunts. Hepatology. 2000 Apr;31(4):864-71. doi: 10.1053/he.2000.5852. PMID: 10733541.
16. Patel R, Lotlikar MS. Predictors of 1-month and 3-months hospital readmissions in decompensated cirrhosis in India. J Clin Exp Hepatol. 2017;7(1):S53. doi:10.1016/j.jceh.2017.05.100
17. Daswani R, Kumar A, Anikhindi SA, et al. Predictors of 90-day mortality in patients with severe alcoholic hepatitis: experience with 183 patients at a tertiary care center from India. Indian J Gastroenterol. 2018;37(2):141–152. doi: 10.1007/s12664-018-0842-0.
18. Kartoun U, Corey KE, Simon TG, et al. The MELD-plus: a generalizable prediction risk score in cirrhosis. PLoS One. 2017;12(10):e0186301. doi: 10.1371/journal.pone.0186301. DOI:

19. Hasan, I., Nababan, S.H.H., Handayu, A.D. et al. Scoring system for predicting 90-day mortality of in-hospital liver cirrhosis patients at Cipto Mangunkusumo Hospital. BMC Gastroenterol 23, 190 (2023). https://doi.org/10.1186/s12876-023-02813-4
20. Mishra D, Dash KR, Khatua C, Panigrahi S, Parida PK, Behera SK, Barik RK, Pradhan S, Sahu SK, Thakur B, Singh SP. A Study on the Temporal Trends in the Etiology of Cirrhosis of Liver in Coastal Eastern Odisha. Euroasian J Hepatogastroenterol. 2020 Jan-Jun;10(1):1-6. doi: 10.5005/jp-journals-10018-1312. PMID: 32742964; PMCID: PMC7376596.
21. del Olmo JA, Peña A, Serra MA, Wassel AH, Benages A, Rodrigo JM. Predictors of morbidity and mortality after the first episode of upper gastrointestinal bleeding in liver cirrhosis. Journal of hepatology. 2000 Jan 1;32(1):19-24.
22. (22)Riggio O, Celsa C, Calvaruso V, Merli M, Caraceni P, Montagnese S, Mora V, Milana M, Saracco GM, Raimondo G, Benedetti A. Hepatic encephalopathy increases the risk for mortality and hospital readmission in decompensated cirrhotic patients: a prospective multicenter study. Frontiers in medicine. 2023 May 25;10:1184860.
23. Patel H, Balar B, Irigela M, Vootla V, Chandrala C, Hashmi H, Abdulsamad M, Makker J. Risk Factors for Liver Cirrhosis-Related Readmissions in the Largest Ethnic Minority in United States. Gastroenterology Research. 2020 Feb;13(1):11.
24. Saffouri E, Lim ES, Kim SW, et al. Short-term changes in liver tests predict long-term mortality. Frontline Gastroenterol. 2016;7(4):234–239. doi: 10.1136/flgastro-2015-100669.
25. Durand F, Valla D. Assessment of the prognosis of cirrhosis: Child-Pugh versus MELD. J Hepatol. 2005;42(Suppl 1:):S100–S107. doi: 10.1016/j.jhep.2004.11.015.
26. Vaz K, Tan K, Chew M, Crawford J, Ma R, Grace J, Gow P, Sinclair M, Testro A. Rate of early hospital readmission amongst cirrhotic patients is high in Australia: experience from a single liver transplant centre. Internal Medicine Journal. 2022 Dec;52(12):2086-95.
27. Patel A, Zhang C, Minacapelli CD, Gupta K, Catalano C, Li Y, Rustgi VK. Outcomes, Mortality, and Cost Burden of Acute Kidney Injury and Hepatorenal Syndrome in Patients with Cirrhosis. Journal of Gastrointestinal & Liver Diseases. 2023 Mar 1;32(1).
28. Pant C, Jani BS, Desai M, Deshpande A, Pandya P, Taylor R, Gilroy R, Olyaee M. Hepatorenal syndrome in hospitalized patients with chronic liver disease: results from the Nationwide Inpatient Sample 2002–2012. Journal of Investigative Medicine. 2016 Jan;64(1):33-8.
29. Bajaj JS, Reddy KR, Tandon P, et al. The 3-month readmission rate remains unacceptably high in a large North American cohort of patients with cirrhosis. Hepatology. 2016;64(1):200–208. doi: 10.1002/hep.28414.
30. Umapathy C, Loganathan P, Dodoo C, Gajendran M. Predictors for Early Readmission in Cirrhosis in the United States-A Nationwide Population-based Study: 831. Official journal of the American College of Gastroenterology| ACG. 2018 Oct 1;113:S460-1.
31. Lavekar A, Raje D, Sadar A, et al. Predictors of Three-month Hospital Readmissions and Mortality in Patients with Cirrhosis of Liver. Euroasian J Hepato-Gastroenterol 2019;9(2):71–77.
32. Stine JG, Shah PM, Cornella SL, et al. Portal vein thrombosis, mortality and hepatic decompensation in patients with cirrhosis: a meta-analysis. World J Hepatol. 2015;7(27):2774–2780. doi: 10.4254/wjh.v7.i27.2774.
33. Peng Y, Qi X, Guo X. Child–Pugh versus MELD score for the assessment of prognosis in liver cirrhosis: a systematic review and meta-analysis of observational studies. Medicine (Baltimore) 2016;95(8):e2877. doi: 10.1097/MD.0000000000002877.