Prescribing Pattern of Drugs Used in Adult Chronic Liver Disease Patients with Co-morbid Conditions and Assessment of Severity using MELD Score: A Cross-Sectional Study in A Tertiary Care Hospital in Mandya

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ABSTRACT

Chronic liver disease (CLD) causes the liver's function to gradually deteriorate. Although comorbidities are neither causes nor effects of CLD, they may have an impact on mortality, making them clinically relevant. The most frequently prescribed medication for CLD can be found by identifying prescribing trends, which aids in finding the ideal treatment plan. The evaluation of the disease's severity contributes to the development of methods for halting disease progression and avoiding new consequences. Our aim is to describe the prescribing pattern of drugs used in adult chronic liver disease patients with co-morbid conditions and also to describe the severity of these patients using the Model for End-Stage Liver Disease (MELD) Score. A cross-sectional study on 132 cases of chronic liver disease was conducted at the Department of General Medicine, MIMS Mandya. All the data related to this study was collected from the case sheet, lab reports, treatment chart, and interviews with the patient or patient caretaker using a pretested, semi-structured proforma. The final result was determined using basic statistical analysis. Among the study population of 132 patients, 85% were male and 15% were female. The most common aetiology of the disease was alcoholism (91%). The most affected age group was 38–47 years old. Anaemia, hypertension, and diabetes mellitus were the most commonly observed comorbidities in CLD patients, which demands a multidisciplinary approach to ensure the best possible outcomes for patients. Most prescribed drugs were hepatoprotective, antibiotics, vitamin supplements, and diuretics. The MELD score of the majority of the population was between 20 and 29 and had a mortality probability of 19.6%. In our study, we assessed drug usage patterns, co-morbidity patterns, and the severity of disease in CLD patients with comorbid conditions. Through our research and analysis, several key findings have emerged. (a). Polypharmacy: Patients with CLD and comorbid conditions often require multiple medications to manage their health. The complexity of drug regimens can lead to challenges in adherence and potential drug-drug interactions. (b). Medication selection: Prescribing decisions in this patient's population must carefully consider the potential impact of drugs on liver disease. It requires a delicate balance between managing co-morbidities and minimising hepatotoxicity. (c). Individualised treatment: There is no one-size-fits-all approach to drug prescribing for CLD patients with comorbidities. Tailoring treatment to each patient's specific condition, liver function, and co-existing diseases is essential. (d). MELD scores can enable healthcare providers to identify patients at higher risk of adverse outcomes, facilitating early intervention.

KEY WORDS: Chronic liver disease, Co-morbidities, MELD score, Prognosis, Mortality.

INTRODUCTION:

A persistent drop-in liver activity over a period of more than six months defines chronic liver disease (CLD). CLD, a long-term process of inflammation, liver parenchymal destruction, and regeneration, causes cirrhosis and fibrosis. There are several different aetiologies for chronic liver disease, including toxins, heavy alcohol use, infections, autoimmune diseases, genetic anomalies, and metabolic issues. The architecture of the liver is disturbed, multiple nodules appear, the blood arteries are reorganised, neo-angiogenesis occurs, and an extracellular matrix is deposited in the final stage of chronic liver disease, known as cirrhosis. [1] Around the world, cirrhosis is one of the main causes of mortality and morbidity. In 2016, it was the 11th greatest cause of mortality and the 15th leading cause of morbidity, resulting in 2.2% of fatalities and 1.5% of years with a disability adjusted for age. [2]

Comorbidities

Even though comorbidities are neither the causes of CLD nor its effects, they might increase mortality, making them clinically relevant. They are a substantial source of confounding in epidemiological research as well. Hypertension, coronary artery disease, stroke, diabetes, tuberculosis, and chronic obstructive pulmonary disease are the most typical comorbidities associated with CLD. [3]

Treatment

The goal of treatment is to stop the illness's progression and its complications, which necessitates a comprehensive approach. Elimination of underlying causes, control of portal hypertension, and personalised treatment for each disease are the three main management tenets. [1]

One clinical problem is the connection of chronic liver disease with other como

rbidities and the formulation of appropriate therapeutic management. Both the quality of life and the life expectancy of these people may suffer as a result of these disorders.

Prognosis

Prognostic models are helpful for determining the severity of an illness and survival rates. In terms of patient care, it can be a useful medical decision-making tool. The Model for End-Stage Liver Disease (MELD) score system, a numerical scale, was employed to evaluate a patient's prognosis. A patient's serum bilirubin, serum creatinine, serum sodium, and international normalized ratio (INR) for prothrombin time laboratory results are used by the MELD, a prospectively established and validated chronic liver disease severity rating system, to predict 3 months of survival. A higher MELD score in cirrhotic patients is linked to more severe hepatic dysfunction and a higher probability of three-month mortality. [4]

MATERIAL AND METHOD:

Study site: The present study was conducted at the MIMS Teaching Hospital. It is a 500-bed tertiary care teaching hospital with different specialties like medicine, surgery, orthopaedics, paediatrics, obstetrics, and gynaecology. This hospital provides specialized health care services to people in and around Mandya city and nearby villages.

Study design: A cross-sectional study conducted in the general medicine department of MIMS Mandya

Study period: 6 months after getting approval, May to October 2023 (4 months of data collection and 2 months for analysis and write-up).

Study population: adult patients who are admitted to medicine wards, MIMS, or Mandya and diagnosed with adult chronic liver disease with co-morbid conditions

Sample size: 132

Calculated using formula $n = 4pq/d^2$,

Where p=The prevalence of Chronic Liver Disease in India =9% [5], q=100-p and d= 5% (absolute error)

$4 \times 9(91)/5^2 = 131.04 = 132$

Sampling method: convenience sampling

Study criteria:

a) Inclusion criteria:

1. Adult (>18 years) admitted to the medicine wards of MIMS Mandya; diagnosed with adult chronic liver disease patients
2. Patients who give informed consent to participate in the study

b) Exclusion Criteria:

1. Pregnant and lactating patients.

Method of data collection:

The chronic liver disease patients were recruited as per the inclusion and exclusion criteria. All the data related to this study was collected from the case sheets, lab reports, treatment chart, and interviews with the patients or their caretakers using a pretested, semi-structured proforma. It consists of two parts.

- The first part regarding the demographics, details on co-morbidities, and treatment of CLD
- The second part is regarding the assessment of severity using the MELD Scale.

Analysis: The obtained cases were thoroughly analysed, evaluated for the pattern of co-morbid conditions in CLD patients with drug use patterns, and assessed for severity using the MELD score. The final result was determined using basic statistical analysis.

RESULT:

Patients Demographics and Characteristics

Table 1: Patients Demographics and Characteristics

Characters	No. of Patients
Age (Mean±SD)	48.3±12.5
Gender Male Female	 112 20
Social History Smokers Alcoholic Smoker and alcoholic Others	 0 43 77 0

Gender-based patient distribution

Over the course of six months, data on 132 patients were gathered from MIMS Hospital. There were 132 patients in all, with 112 (85%) men and 20 (15%) women.
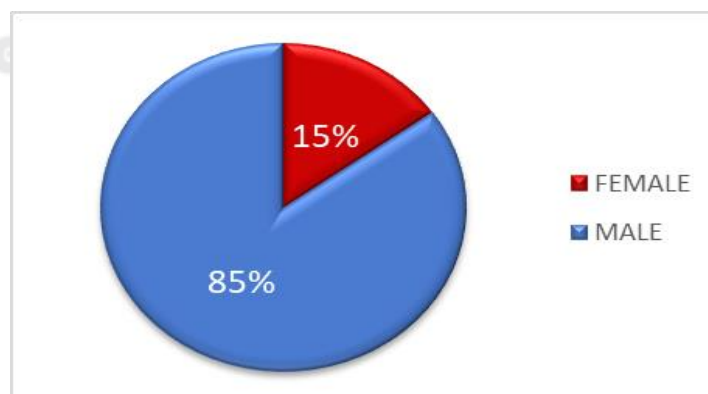
Figure 1: Gender-based patient distribution

Patient distribution according to age group

The 132 patients who took part in the study were split up into eight groups according to their ages. The age range of 38 to 47 had the most patients, whereas the ranges of 18 to 27 years, 78 to 87 years, and 88 to 97 years had the fewest.
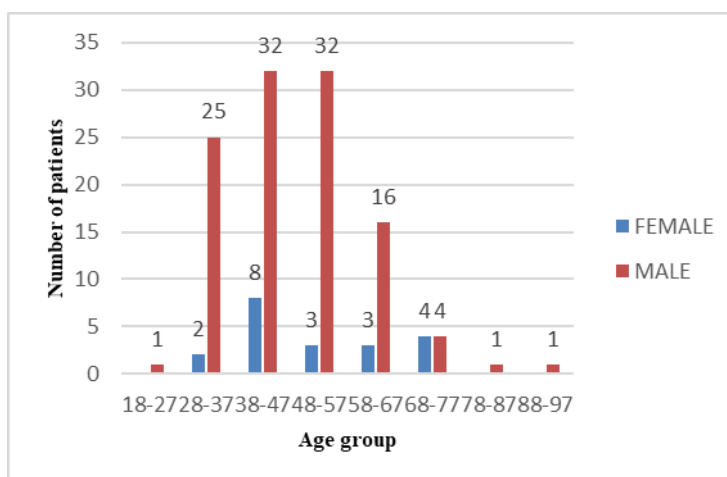

Figure 2: Patient distribution according to age group

Distribution of patients based on comorbid conditions in CLD patients.

Among the study population of 132 patients, 37 patients had anaemia, 32 patients had hypertension, 11 patients had diabetes, 3 patients had chronic obstructive pulmonary disease, 2 patients had congestive cardiac failure, and 8 patients had other comorbidities. In the study population, 7 patients had both anaemia and thrombocytopenia; 6 patients had both hypertension and diabetes; 4 patients had both hypertension and chronic obstructive pulmonary disease; 4 patients had both anaemia and other comorbidities; 4 patients had both diabetes and other comorbidities; 3 patients had both alcohol dependency syndrome and anaemia; 3 patients had both diabetes and anaemia; 2 patients had both hepatocellular carcinoma and anaemia; 2 patients had both hypertension and cerebral vascular accident; 2 patients had both hypertension and anaemia.

Table 2: Distribution patients based on comorbidities.

Comorbidities	Number of comorbidities	Percentage
Anaemia	37	28.03%
HTN	32	24.24%
DM	11	8.33%
Others	8	6.06%
Anaemia + Thrombocytopenia	7	5.30%
HTN + DM	6	4.55%
Anaemia + Other	6	4.55%
HTN + COPD	4	3.03%
DM + Other	4	3.03%
COPD	3	2.27%
ADS + Anaemia	3	2.27%
DM + Anaemia	3	2.27%
HCC + Anaemia	2	1.51%
HTN + CVA	2	1.51%
CCF	2	1.51%
HTN + Anaemia	2	1.51%

Distribution of patient based on MELD Score.

A total of 132 patients in the research population, and of those, 9 had a MELD score below 10, 37 had a score between 10 and 19, 57 had a score between 20 and 29, and 29 had a score between 30 and 40.
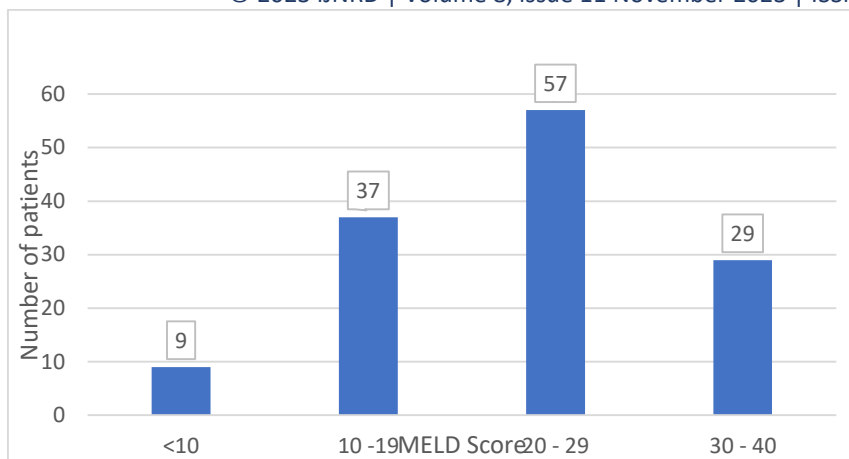
Figure 3: Distribution of patients based on MELD score

Prescribing patterns of drugs among study population.

A total of 1046 drugs were administered to 132 patients evaluated in the study. For simplification, we have divided all the drugs that were prescribed into 24 categories. Among 1046 drugs 248 drugs were Hepatoprotective drugs, 112 drugs were Anti-diuretics, 26 drugs were Beta blockers, 186 drugs were Anti-biotics, 27 were Anti-hypertensive drugs, 24 were Anti-diabetic drugs, 9 were corticosteroids, 89 were Gastroprotective drugs, 3 were benzo diazepam drug, 33 drugs were Iron supplements, 154 drugs were Vitamin supplements, 4 drugs were Amino acid supplements, 2 were Oxygen supplements, 20 were blood transfusion, 16 were Non-steroidal anti-inflammatory drugs, 15 were Anti-emetics drugs, 34 were Intra venous fluids, 10 were Nebulization, 2 were probiotics drugs, 2 were Anti-cancer drugs, 2 were Anti-coagulant drugs, 2 were Anti-platelet drugs, 9 were Mineral supplement drugs, 16 were other drugs.

Table 3: Prescribing patterns of drugs among study population.

Class of Drugs	Drugs	Number of drugs	Total numbers	Total Percentage
1. Hepatoprotective drugs	Ursodeoxycholic acid	118	210	20.08%%
	Liveril forte	92		
2. Diuretics	Furosemide	51	112	10.71%
	Furosemide + Spironolactone	25		
	Spironolactone	31		
	Torsemide + Spironolactone	3		
	Metolazone	2		
3. Beta blockers	Propranolol	26	26	2.49%
4. Anti- biotics	Cephalosporins	74	186	17.78%
	Rifaximin	88		
	Metronidazole	10		
	Doxycycline	2		
	Ciprofloxacin	3		
	Piperacillin + Tazobactam	5		
	Amikacin	2		
	Meropenem	1		
	Azithromycin	1		
5. Anti-hypertensive drugs	Enalapril	22	27	2.58%
	Amlodipine	4		
	Telmisartan	1		

6. Anti-diabetics	Human insulin	11	24	2.29%
	Metformin	10		
	Glimepiride + Metformin	3		
7. Corticosteroids	Hydrocortisone	2	9	0.86%
	Prednisolone	4		
	Dexamethasone	3		
8. Gastroprotective	Ranitidine	56	89	8.51%
	Pantoprazole	33		
9. Benzodiazepines	Lorazepam	2	3	0.29%
	Clonazepam	1		
10. Iron supplements	Iron sucrose	17	33	3.15%
	Ferrous ascorbate + Folic acid	16		
11. Vitamins supplements	Vitamin B complex	40	154	14.72%
	Thiamine	46		
	Phyto menadione	68		
12. Amino acids supplements	Albumin	2	4	0.38%
	L-ornithine L-aspartate	2		
13. oxygen supplementation	Oxygen supplementation	2	2	0.19%
14. Blood transfusion	Packed Red Blood Cells	13	20	1.91%
	Fresh Frozen Plasma	7		
15. non-steroidal anti-inflammatory drugs	Acetaminophen	15	16	1.53%
	Diclofenac	1		
16. Anti- emetics	Ondansetron	15	15	1.43%
17. Intra venous fluids	Normal Saline	25	34	3.25%
	Dextrose	7		
	Ringer lactate	2		
18. Nebulization	Salbutamol	2	10	0.96%
	Salbutamol + Budesonide	8		
19. Probiotics	Sporlac	2	2	0.19%
20. Anti-cancer drugs	Sorafenib	1	2	
	Deoxycytidine	1		
21. Anti-coagulant	Low molecular weight heparin	1	2	0.19%
	Dabigatran	1		
22. Anti-platelet	Aspirin	3	3	0.29%
23. Mineral supplement	Potassium supplement	9	9	0.86%
24. laxative	Lactulose	38	39	3.73%%
	Liquid paraffin	1		
25. Others	Albendazole	1	15	1.43%
	Octreotide	4		
	Nor- adrenaline	1		
	Chloroquine	1		
	Phenytoin	1		
	Trihexyphenidyl	1		

Sildenafil	1		
Tramadol	1		

DISCUSSION:

The study had 132 patients in total who met the inclusion requirements; 112 (85%) of them were men, and twenty (15%) were women. Alcoholism accounted for 91% of all illness aetiologies.

Anaemia, hypertension, and diabetes with CLD were the three most prevalent co-morbid conditions discovered in our study, whereas Huma Samreen et al. (2020) [6] conducted a study in which cellulitis, upper gastrointestinal haemorrhage, hypertension, and diabetes were the four most common co-morbid conditions found.

The evaluation of 1046 prescribed medications revealed that hepatoprotectives were the most frequently prescribed class, followed by antibiotics, vitamin supplements, diuretics, gastroprotective, laxatives, intravenous fluids, iron supplements, antihypertensive medications, beta blockers, anti-diabetics, blood transfusions, NSAIDs, anti-emetics, and so forth. This finding was consistent with the findings of the study conducted by **Natish Belbase et al. (2021) [7].**

In the 132 individuals who made up the study group, 6.8% had MELD scores below 10, 28% had scores between 10 and 19, 43% had ranges between 20 and 29, and 21% had scores between 30 and 29. The majority of people had MELD scores between 20 and 29, and the mortality rate was 19.6%. While a study by **Dhanya Nair et al. (2016) [3]** found that 8% of the patients had MELD scores above 40 and that 46% of the patients had predicted MELD scores between 20 and 29. Only a few of the study's patients had severe conditions.

CONFLICT OF INTEREST:

There are no conflicts of interest among the authors.

ACKNOWLEDGMENTS:

ETHICAL APPROVAL:

Study approval was obtained from the "Ethics Committee" of MIMS Teaching Hospital, Mandya.

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