Research Article

An Observational Study on Drugs Used for Hepatoprotection in Chronic Liver Disease

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ABSTRACT

Chronic liver disease (CLD) is a significant global health concern, with its progression largely influenced by underlying etiological factors. Effective management requires a multifaceted approach that includes pharmacological therapies to manage disease progression with public health interventions focused on prevention and early detection to mitigate the burden of CLD. This study explores the usage trends and therapeutic impact of hepatoprotective drugs in treating CLD, focusing on the therapeutic impact of commonly prescribed hepatoprotective drugs. A 6-month prospective observational study was conducted at a tertiary care hospital, involving 126 patients with CLD, predominantly males (112) aged 36-50 years, with alcoholism being the leading cause. Commonly prescribed drugs included UDCA, SAMe, glutathione, and LOLA. Patients were monitored for changes in serum enzyme levels over two weeks of treatment, and the results indicated a significant reduction in serum transaminases and bilirubin levels, with a greater normalization observed in AST and bilirubin compared to ALT. These findings highlight the therapeutic benefits of appropriate hepatoprotective therapy in improving liver function. The study also emphasizes the importance of combining pharmacological treatment with addressing societal factors and promoting healthier lifestyles to improve liver health outcomes.

Keywords: Chronic liver disease, serum transaminases, hepatoprotective drugs, societal factors.

INTRODUCTION

Chronic liver injury refers to the progressive deterioration of liver functions accompanied by chronic inflammation as a result of repeated damage to the liver.[1] Over the past decade, cirrhosis and its complications have been substantial, changing with the contribution of viral hepatitis, NAFLD, and ALD to the burden of CLD.[2] Several causes can lead to chronic liver disease (CLD), including viral infections (Hepatitis B, C, D), alcohol-related and metabolic-associated fatty liver disease (MAFLD), genetic factors (e.g. Wilson disease), autoimmune conditions, and drug-induced liver injury.[3]

Persons suffering from CLD may initially show non-definitive clinical features such as fatigue, anorexia, jaundice, and weight loss.[4] Alternatively, their clinical manifestation may be marked by the presence of complications such as portal HTN, esophageal varices, ascites, hepatic encephalopathy, coagulopathy, spontaneous bacterial peritonitis, variceal bleeding, and hepatorenal syndrome.[5]

Given that cirrhosis and hepatocellular carcinoma (HCC) are significant complications of chronic liver disease (CLD) that lead to liver-related morbidity and mortality, it is essential to manage patients with CLD effectively to alleviate the future burden of the disease and associated healthcare costs.[6]

Effective pharmacological interventions, such as hepatoprotective drugs, are essential for protecting the liver from damage and supporting its function. These agents work through antioxidant mechanisms, reducing inflammation, preventing liver fibrosis, and enhancing liver cell regeneration. Ursodeoxycholic acid, S-Adenosyl L-Methionine, L-Ornithine L-Aspartate, Pentoxifylline, Glutathione, N-acetyl cysteine, Silymarin are some of the common hepatoprotectives employed for various types of liver diseases.[7-12] Given the complex etiology of CLD, managing it requires both public health interventions and pharmacological treatment to reduce the disease burden and improve liver function.

METHODS

An observational study was conducted in Gandhi Hospital, Secunderabad, in the Department of General Medicine and Gastroenterology. The study was approved by the Institutional Ethics Committee [CMRCP/IEC/2023-2024/07] and was conducted for six months.

A total of 126 patients were monitored with the patient's case sheets and information about their alcohol addiction, previous health problems, and past medication history were used to collect data. Age, gender, illness prevalence, liver function index, and medication treatment care offered to patients, particularly hepatoprotective drug use, have been deemed significant for this research. The information obtained was organized into spreadsheets for evaluation and interpretation.

This research includes patients of both genders who have had a history of liver disease for more than 6 months, and those who presented with chronic liver disease and are above the age of 20. Patients under the age of 20, pediatric patients, pregnant & lactating women, and those who refuse to comply are excluded from the study.

RESULTS

A total of 126 individuals were evaluated during the study period.

Table 1: Age-wise Distribution of Patients with CLD

Age (years)	No.of patients	Percentage (%)
20-35	28	22.22
36-50	73	57.93
51-65	21	16.66
66-80	4	3.17
Total	126	100

The findings reveal that the major age group affected by CLD was 36-50 years (57.93%), While those least impacted were within the 66-80 age category (3.17%).

Table 2: Gender-wise distribution of Patients with CLD

Gender	No.of patients	Percentage (%)
Male	112	89
Female	14	11
Total	126	100

The study involved the examination of 126 patients, with 88.88% men, and 11.11 % women. consequently, the findings suggest a significant male predominance over females in our study.

Table 3: Causative Factors associated with CLD

Etiology	No.of patients	Percentage (%)
Alcoholic	89	70.63
Viral	10	7.93
Vascular	4	3.17
Drug-induced	5	3.96
NAFLD/NASH	2	1.58
Others/unknown	18	14.28
Total	126	100

The highest percentage of cases is attributed to alcohol consumption (70.63%), followed by viral causes (7.93%), and drug-induced diseases (3.96%).

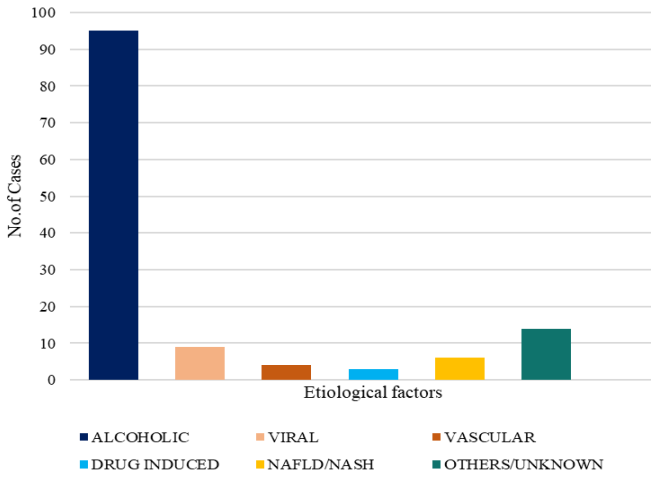

Figure 1: Causative Factors associated with CLD

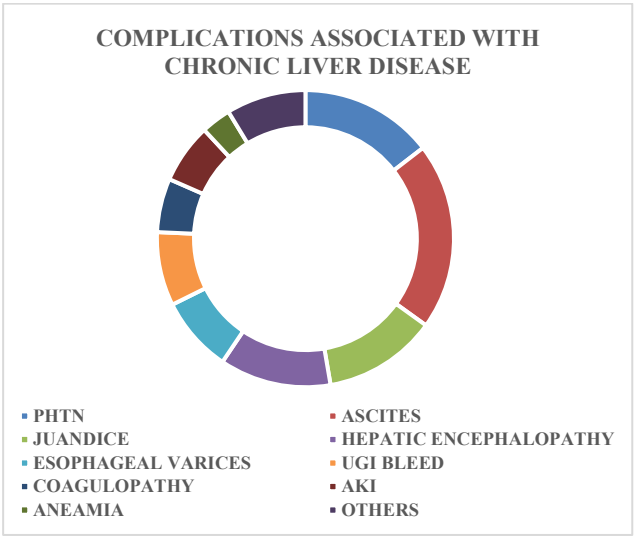

Figure 2: Distribution of Complications

The most frequently noted complications were ascites (22.32%) and portal hypertension (15.91%). Coagulopathy (6.41%) and anemia (3.56%) were the least commonly reported complications.

Table 4: Drug-wise Distribution of Hepatoprotective Drugs

Drugs	Frequency	Percentage (%)
UDCA	119	51.07
SAMe	79	33.90
LOLA	8	3.43
Glutathione	17	7.29
NAC	3	1.28
Pentoxifylline	6	2.57
Silymarin	1	0.42
Total	233	100

The most prescribed hepatoprotective drug in chronic liver diseases is ursodeoxycholic acid (84.07%). Other drugs include S-adenosyl methionine (62.6%), L-ornithine L-aspartate (6.3%), Glutathione (13.4%), N-acetyl cysteine (2.3%), Pentoxifylline (4.76%), and Silymarin (0.7%).

Table 5: Distribution of Complications in CLD Patients

Complications	Frequency	Percentage (%)
Portal HTN	67	15.91
Ascites	94	22.32
Jaundice	57	13.53
Hepatic encephalopathy	56	13.30
Esophageal varices	38	9.02
UGI bleed	37	8.78
Coagulopathy	27	6.41
AKI	30	7.12
Anaemia	15	3.56
Others	40	9.50
Total	461	100

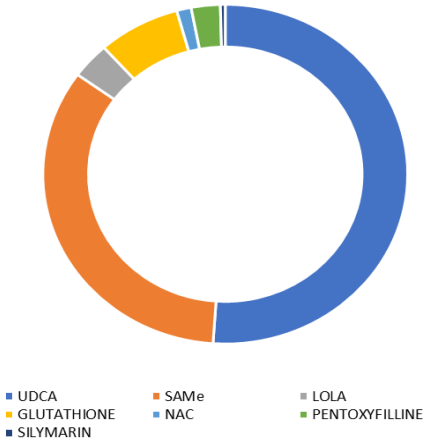

Figure 3: Drug-Wise Distribution of Hepatoprotective Drugs

As indicated by the table 6, UDCA and SAMe were conventionally prescribed among patients with cirrhosis (n=67 and 43) and hepatitis (n=43 and 29). Silymarin was exclusively prescribed in ACLF, making it the least frequently prescribed drug.

Effects of hepatoprotectives on serum bilirubin, Aspartate transaminase [AST], and Alanine transaminase [ALT].

In this study, individuals receiving hepatoprotective medications had a 53 % reduction in serum bilirubin, a 44 % drop in aspartate transaminase, and a 49 % drop in alanine transaminase over two weeks of treatment administration.

Table 6: Disease-Based Drug Distribution of Hepatoprotective Agents

Drug	Disease			
	Cirrhosis	Hepatitis	ACLF	NAFLD/NASH
Ursodeoxycholic acid	67	43	7	2
S-Adenosyl L-methionine	43	29	7	0
L-ornithine L-aspartate	7	1	0	0
Pentoxifylline	4	1	1	0
N-acetylcysteine	1	2	0	0
Glutathione	6	7	4	0
Silymarin	0	0	1	0

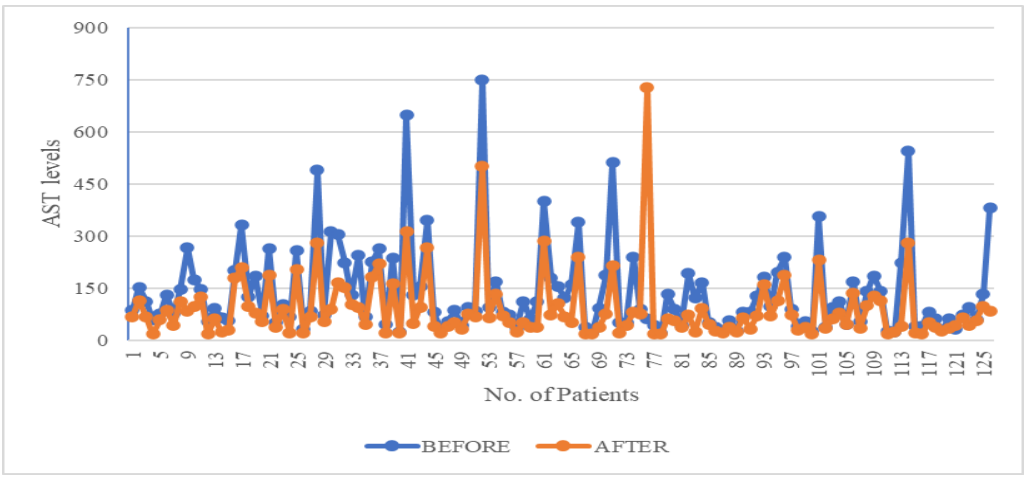

Figure 4: Effect of Hepatoprotective Drugs on AST levels

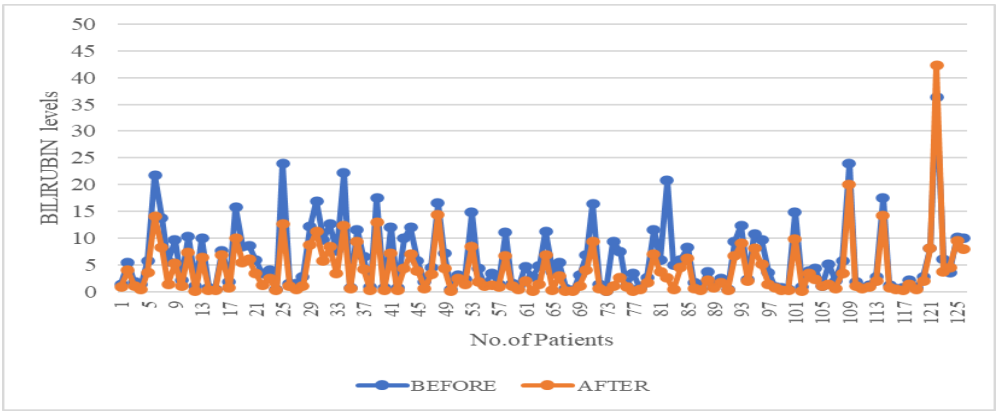

Figure 5: Effect of Hepatoprotective Drugs on Serum Bilirubin levels

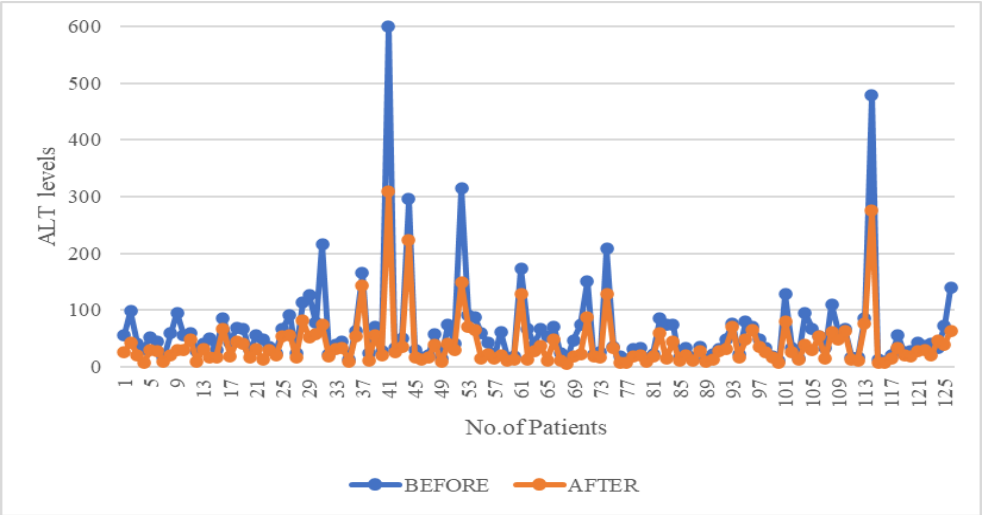

Figure 6: Effect of Hepatoprotective Drugs on ALT levels

Table 7: Statistical Analysis of Serum Aminotransferases and Bilirubin Levels Before and After Administration of Hepatoprotective Drugs

Liver Function Index	Before treatment	After treatment	*p* value
Serum Bilirubin(mg/dL)	7.32 ± 5.23	3.13 ± 2.55	<0.005
AST(U/L)	158.96 ± 100.63	89.53 ± 65.48	<0.001
ALT (U/L)	88.78 ± 54.49	39.07 ± 28.42	<0.001

Numbers and percentages were used to represent categorical data. To demonstrate the efficacy of the hepatoprotective drugs, the data collected were examined using the statistical techniques mean, standard deviation, and paired *t*-test, and the findings were presented.

This study identifies that the patients demonstrated higher AST, ALT, and bilirubin levels before treatment, but a notable decrease was observed after treatment, suggesting that hepatoprotective drugs in the treatment of chronic liver disease can effectively enhance hepatic function. The *p*-values less than 0.005 for bilirubin and less than 0.001 for aminotransferases suggest that there is a strong and significant difference in terms of statistics between liver function values before and after the intervention.

Public Health Interventions in CLD Management: A Theoretical Framework

This research presents a theoretical model demonstrating the significant impact of public health interventions in preventing and managing chronic liver disease.

Early diagnosis enables timely antiviral treatment, reducing progression to cirrhosis or liver cancer. Targeted screening for hepatitis C and vaccination campaigns, particularly for hepatitis B, have proven to reduce CLD incidence. The systematic implementation of these interventions can prevent viral hepatitis-related liver disease and reduce the risk of liver cancer and cirrhosis.

Hypothesis: Implementing a global hepatitis screening and vaccination strategy could reduce the global CLD burden by 20-30% over a decade.[13]

Alcoholic liver disease (ALD) accounts for a substantial portion of CLD cases. Public health interventions such as alcohol taxation and implementing educational campaigns have shown promising results in reducing alcohol consumption and, consequently, the incidence of ALD. For instance, the introduction of minimum alcohol pricing in Scotland led to a 10% decrease in alcohol-related deaths within five years.

Hypothesis: Policies restricting alcohol sales and increasing awareness about the risks of excessive consumption will lead to a 15% decrease in ALD cases over the next decade.[14]

Non-alcoholic fatty liver disease (NAFLD) is closely associated with metabolic syndrome, obesity, and type 2 diabetes. Public health interventions aimed at promoting healthy diets, increasing physical activity, and reducing obesity could play a central role in the prevention and management of NAFLD.

Hypothesis: Large-scale public health campaigns focused on weight reduction, healthy eating, and physical activity could prevent the progression of NAFLD to more severe forms by 30-40% in at-risk populations.[15]

DISCUSSION

The goal of the study was to assess the etiological factors associated with chronic liver illness, as well as the use and efficacy of hepatoprotective drugs among patients with chronic liver disease. The research, with a sample size of 126, is an observational study conducted within the In-patient units of the Department of General Medicine at a tertiary care Hospital. The study employs patient case sheets and interrogation of the medical status of the subjects.

According to the findings, the most prevalent category of chronic liver disease is alcohol-related liver disease (70.63%), which is primarily attributed to excessive alcohol use and stands out as the leading cause of heightened mortality. Additionally, we observed that that individuals who are habituated to being alcoholic (75.59%) and non-alcoholics (24.4%) such as people who experience infections and hepatitis viruses that infect the liver and drug-induced liver injury; are more prone to chronic liver disease.

It is also shown that most patients experiencing chronic liver diseases are in the age group 20-80 years. In our study, we observed that males (89.76%) exhibit a higher prevalence of CLD than females (10.23%), which is similar to the study reported by Shashank Banait *et al.*[16]

Setiawan *et al*., conducted a study on the prevalence of chronic liver disease by underlying cause in understudied ethnic groups and concluded that alcoholic liver disease was the predominant cause of CLD after NAFLD. Similarly, the most frequently observed cause of CLD in our study was alcohol-related disease followed by viral infections.[17]

Nickovic *et al.* studied the complications of alcohol-related disease and reported its related consequences such as fatty liver, cirrhosis, hepatic encephalopathy, portal HTN, spontaneous bacterial infection, hepatopulmonary syndrome, and hepatorenal syndrome. Ascites (22.32%), portal HTN (15.91%), hepatic encephalopathy (13.3%), jaundice (13.5%), UGI bleed (8.78%), coagulopathy (6.41%), esophageal varices (9.02%), are the most commonly observed complications in our study. Anaemia (3.56%) and spontaneous bacterial peritonitis (3.12%) are the least frequent complications.[18]

Haritha *et al.* conducted a study exploring the usage of antimicrobials and hepatoprotective agents in treating liver diseases. Among hepatoprotective drugs, UDCA is the most often recommended drug, according to the study's findings, followed by

UDCA (94.07%) and SAMe (61.9%) were the most widely prescribed medications in our study, followed by glutathione (13.4%), LOLA (6.43%), pentoxifylline (4.7%), NAC (2.38%) and Silymarin (0.7%) being the least commonly prescribed drug.[19]

Saito *et al.,* evaluated the function of hepatoprotective drugs in DILI induced by anti-TB drugs. The average time to normalization of aminotransferases was longer in the subgroup with mild DILI treated with hepatoprotective drugs in their study. In our study, the proportion of patients who achieved normal levels of liver function index within two weeks of treatment was found to be slightly higher in cirrhosis patients than those with other phenotypes of CLD.[20]

CONCLUSION

Understanding the etiological trends of disease would help strategize the management facets of CLD in tertiary care settings to reduce further damage or prevent the underlying factors for liver disease. Management of disease or prevention of disease progression relies on abstinence from alcohol and a change of lifestyle, besides pharmacological treatment. The study demonstrates the therapeutic benefits of hepatoprotective agents in improving liver function, while the theoretical framework highlights the importance of public health measures to address alcohol misuse and promote healthy lifestyles in preventing disease progression. A comprehensive approach is required to reduce the burden of chronic liver diseases globally.

The data were only assessed using the limited resources available at the study site due to the research population's exclusivity. Patients received simultaneous treatment with multiple hepatoprotective drugs, making it challenging to measure the impact of each drug independently. The limited availability of data and cases, coupled with time constraints, resulted in a sample size of 126 for this study. Despite these limitations, we are certain that our research-based conclusions will provide a groundwork for further exploration of this subject.

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