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Understanding Chronic Liver Disease in Women: A Clinico-Etiological and Complication-Based Study

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ABSTRACT

Background: Chronic liver disease (CLD) in women presents with unique clinical and etiological patterns influenced by biological susceptibility and gender-specific factors. Despite this, focused studies on female patients are limited.

Objectives: To analyze the clinical presentation, etiological spectrum, and progression of complications in female patients with CLD over a six-month follow-up period.

Methods: This hospital-based cross-sectional observational study was conducted in the Department of General Medicine, Sree Balaji Medical College and Hospital, Chennai. The study began in September 2023 and included 60 female patients aged above 12 years diagnosed with CLD. All patients were evaluated at the time of hospital admission and followed up for a period of six months. Detailed clinical profiles, laboratory investigations, radiological and endoscopic findings, and complications were recorded and analyzed.

Results: The mean age of the patients was 44.3 years, with the majority between 31–50 years. Common presenting symptoms included abdominal distension (85%), anorexia (73.3%), and jaundice (56.7%). Cryptogenic cirrhosis (38.3%) emerged as the leading etiology, followed by Hepatitis C (15%) and Hepatitis B (10%). Splenomegaly and loss of body hair were observed in 43.3% of patients. Esophageal varices were present in 36.7% as seen on endoscopy. Elevated AST (70%), ALT (60%), and hypoalbuminemia (43.3%) indicated significant hepatic dysfunction. At six-month follow-up, there was a statistically significant rise in complications such as coagulopathy, spontaneous bacterial peritonitis, sepsis, and hepatorenal syndrome ($p<0.05$).

Conclusion: Female patients with CLD often present with advanced disease and a high burden of complications. Cryptogenic cirrhosis was the most common cause, highlighting the need for in-depth diagnostic evaluation. Early diagnosis and regular follow-up are essential to improve clinical outcomes in this population.

1. INTRODUCTION

Chronic liver disease (CLD) encompasses a broad spectrum of progressive liver pathologies ranging from chronic hepatitis to cirrhosis and ultimately hepatocellular carcinoma (HCC). It represents a major public health concern globally, particularly in developing countries where the burden is often under-recognized and underreported. In tropical nations, chronic hepatitis—primarily caused by Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections—remains the most common antecedent to CLD. Other notable etiologies include alcohol-related liver injury, autoimmune hepatitis, Wilson's disease, Indian childhood cirrhosis, hemochromatosis, and less commonly, veno-occlusive disease, seen predominantly in parts of Africa and Jamaica.

Chronic hepatitis is characterized by persistent hepatic inflammation extending beyond six months. However, in clearly diagnosed cases such as autoimmune hepatitis, initiation of treatment need not be delayed by the 6-month criterion. Rangari M et al. emphasized that this duration should not be rigidly applied in patients showing definitive features of CLD despite a shorter clinical course. The etiological spectrum of chronic hepatitis, as described by Dienstag and Isselbacher, includes viral

(HBV, HCV, HDV), autoimmune, drug-induced, and cryptogenic forms. Similarly, Sheila Sherlock identified HBV, HCV, autoimmune hepatitis, and Wilson's disease as the principal contributors to chronic hepatitis.

Drug-induced chronic hepatitis presents another diagnostic challenge, as some agents mimic the clinical and biochemical profile of autoimmune hepatitis. Commonly implicated drugs include methyldopa, nitrofurantoin, and isoniazid. Chronic hepatitis can further be graded histologically based on necro-inflammatory activity and staged according to the degree of fibrosis or the presence of cirrhosis.

Gender-based differences in the etiology, natural history, and outcomes of CLD are increasingly being recognized. Female patients, despite lower levels of alcohol consumption, often develop cirrhosis more readily due to higher biological susceptibility. Certain etiologies such as autoimmune hepatitis, primary biliary cholangitis (previously primary biliary cirrhosis), Wilson's disease, and intrahepatic cholestasis of pregnancy are either exclusive to or more prevalent in women. Furthermore, female patients may exhibit greater sensitivity to hepatotoxic agents and are more vulnerable to acute-on-chronic liver failure and liver-related mortality.

Recent epidemiological data underscore the growing significance of understanding gender-specific presentations and complications of CLD. In a study conducted in New Delhi, the etiological profile of cirrhosis in young and adult populations highlighted a dominance of HBV-related cirrhosis (50%) followed by alcohol-related and cryptogenic cirrhosis. Notably, certain metabolic and genetic disorders, such as Wilson's disease and alpha-1 antitrypsin deficiency, also contributed to the disease burden in younger individuals.

Given these gender-specific variations, a dedicated analysis of chronic liver disease in female patients is warranted to improve diagnostic precision, guide therapy, and anticipate complications. This study aims to delineate the clinical presentation and etiological distribution of CLD in female patients, while also profiling the complications present at the time of hospital admission and at a six-month follow-up interval.

2. MATERIALS AND METHODS

This hospital-based, cross-sectional observational study was conducted in the Department of General Medicine, ESIC Medical College and PGIMSR, Chennai, over a period of one year from September 2023 to August 2024. Ethical approval was obtained from the Institutional Ethical Committee prior to the initiation of the study. Written informed consent was obtained from all patients, and in cases where the patient was unable to provide consent, it was obtained from their legal guardians or close attendants.

Study Population and Sample Size

The study included a total of 60 female patients diagnosed with chronic liver disease (CLD), aged above 12 years. These patients were selected using simple random sampling from among those admitted to the hospital during the study period.

Inclusion and Exclusion Criteria

Female patients aged more than 12 years, diagnosed with CLD based on clinical evaluation, liver function tests (LFTs), abdominal ultrasonography, and contrast-enhanced computed tomography (CECT) of the abdomen were included in the study.

Patients who were pregnant, younger than 12 years of age, diagnosed with acute fulminant liver failure, or who had undergone liver transplantation were excluded.

Data Collection and Study Procedure

All eligible patients were evaluated in detail at the time of admission. Clinical presentations and baseline demographic data were recorded. Etiological diagnosis was made based on clinical findings and specific investigations, and complications were assessed both at the time of admission and again at 6 months of follow-up.

Investigations

All patients underwent a standardized battery of investigations including:

Blood tests: Complete Blood Count (CBC), Renal Function Tests (RFT), Liver Function Tests (LFT), serum electrolytes, Prothrombin Time/INR

- **Viral serology**: Hepatitis B and C markers
- **Autoimmune panel**: Antinuclear Antibody (ANA), Anti-Mitochondrial Antibody (AMA), Anti-Smooth Muscle Antibody (ASMA), Liver-Kidney Microsomal (LKM) antibodies
- **Wilson's disease workup**: Serum ceruloplasmin, 24-hour urinary copper, and slit lamp examination for Kayser–Fleischer rings

- **Radiological and other evaluations**:
  - Chest X-ray
  - Abdominal ultrasound for hepatosplenomegaly, ascites, and portal hypertension
  - CECT abdomen for detailed liver architecture and complications
  - Upper gastrointestinal endoscopy for variceal screening
  - Ascitic fluid analysis including SAAG (serum-ascitic albumin gradient) for spontaneous bacterial peritonitis
  - Arterial blood gas analysis and coagulation profile were also assessed as needed

Study Instrument

A pre-designed structured data collection proforma was used to record all relevant information including demographic details, clinical features, investigation results, etiological diagnosis, and complications observed at baseline and at 6-month follow-up.

Statistical Analysis

Data were entered into Microsoft Excel 2013 and analyzed using SPSS software. Categorical variables were analyzed using the Chi-square test. Continuous variables were assessed using the Independent t-test or Mann–Whitney U test, depending on the distribution of data. A p-value of <0.05 was considered statistically significant.

Financial Disclosure

Patients under government health schemes such as MAA, AYUSHMAN, and BPL were financially supported accordingly. All other patients were self-financed for investigations and treatment.

3. RESULTS

A total of 60 female patients with chronic liver disease were included in the study. The results of demographic data, clinical features, etiological factors, endoscopic findings, laboratory parameters, and changes observed after 6 months of follow-up are presented below.

1. Demographic Profile

Age Distribution

The mean age of patients was **44.3 years** with a standard deviation (SD) of **13.01 years**. The minimum and maximum ages were **18 years** and **69 years**, respectively.

Age Group (years)	Number of Patients	Percentage (%)
<20	3	5.0
21–30	4	6.7
31–40	17	28.3
41–50	16	26.7
51–60	13	21.7
>60	7	11.7

Table 1. Age Distribution of Study Participants : This table illustrates the age distribution among 60 female patients with chronic liver disease. The majority of patients were between 31–40 years (28.3%) and 41–50 years (26.7%), suggesting that middle-aged women were most commonly affected.The most common age group was 31–40 years (28.3%), followed by 41–50 years (26.7%).(Table 1)

2. Presenting Symptoms

- **Abdominal distension** was the most common symptom, observed in **85%** of patients.

- **Jaundice** was present in **56.7%**, followed by:
    - Upper GI bleeding: **43.3%**
    - Lower GI bleeding: **10%**
    - Edema: **53.3%**
    - Bruising tendency: **13.3%**
    - Fever: **18.3%**
    - Anorexia: **73.3%**
    - Abdominal pain: **40%**

3. Etiology of Chronic Liver Disease

Etiology	Number of Patients	Percentage (%)
Hepatitis B	6	10.0
Hepatitis C	9	15.0
Alcoholic liver disease	4	6.7
Autoimmune hepatitis	3	5.0
Primary biliary cirrhosis	1	1.7
Nonalcoholic fatty liver disease	3	5.0
Wilson's disease	2	3.3
Drug-induced liver injury	4	6.7
Hemochromatosis	2	3.3
Cryptogenic	23	38.3
Budd-Chiari syndrome	2	3.3

Table 2. Etiological Distribution of Chronic Liver Disease:Cryptogenic cirrhosis (38.3%) was the leading cause, followed by hepatitis C (15%) and hepatitis B (10%). A smaller proportion of patients had autoimmune, metabolic, or alcohol-related liver disease.The most common etiology was cryptogenic cirrhosis (38.3%), followed by hepatitis C (15%) and hepatitis B (10%). (Table 2)

4. Clinical Signs

Clinical Sign	Number of Patients	Percentage (%)
Loss of body hair	26	43.3
Splenomegaly	26	43.3
Spider angioma	21	35.0
Parotid enlargement	3	5.0

Table 3. Clinical Signs Observed on Examination: Loss of body hair and splenomegaly were the most commonly observed signs (each 43.3%), followed by spider angiomas (35%). These signs are consistent with chronic liver disease and portal hypertension.

5. Endoscopic Findings

Finding	Number of Patients	Percentage (%)
Oesophageal varices	22	36.7
Gastric varices	6	10.0
Portal hypertensive gastropathy	10	16.7
Gastric erosion	4	6.7

Table 4. Endoscopic Findings in Chronic Liver Disease Patients:Esophageal varices were found in 36.7% of patients, indicating portal hypertension. Gastric varices and portal hypertensive gastropathy were seen in 10% and 16.7% of patients, respectively.

6. Biochemical Parameters

Parameter	Value Group	Number of Patients	Percentage (%)
ALT	Abnormal	36	60.0
	Normal	24	40.0
AST	Abnormal	42	70.0
	Normal	18	30.0
Serum Albumin	<3 g/dL	26	43.3
	3–3.5 g/dL	24	40.0
	>3.5 g/dL	10	16.6
Serum Bilirubin	<2 mg/dL	30	50.0
	2–3 mg/dL	20	33.3
	>3 mg/dL	10	16.6

Table 5. Biochemical Profile of Patients:A majority of patients had elevated liver enzymes, with abnormal AST in 70% and ALT in 60%. Hypoalbuminemia (<3 g/dL) was noted in 43.3% of patients, and 50% had serum bilirubin levels below 2 mg/dL, reflecting varying degrees of liver dysfunction.

7. Comparative Outcomes (At Recruitment vs After 6 Months)

Condition	At Baseline	After 6 Months	p-value	Statistical Significance
Coagulopathy	25	36	<0.01	Significant
Spontaneous Bacterial Peritonitis	10	20	<0.05	Significant
Sepsis	6	13	<0.01	Significant
Hepatorenal Syndrome	8	14	<0.01	Significant
Decompensation	*Data incomplete*	*Data incomplete*	---	*Awaited*

Table 6. Comparative Clinical Outcomes at Recruitment and 6-Month Follow-UpThere was a significant increase in

complications like coagulopathy (from 25 to 36 patients), spontaneous bacterial peritonitis (from 10 to 20 patients), sepsis (from 6 to 13), and hepatorenal syndrome (from 8 to 14) over the 6-month period. All showed statistically significant progression ($p<0.05$), suggesting worsening of liver function despite standard medical care

The above table 6 indicates that several complications such as **coagulopathy**, **spontaneous bacterial peritonitis**, **sepsis**, and **hepatorenal syndrome** showed a **statistically significant increase** at 6-month follow-up, suggesting progression of disease severity despite therapy.

4. DISCUSSION

The mode of presentation among patients with chronic liver disease (CLD) was an important aspect explored in this study. A large proportion of patients presented with ascites, followed by jaundice and gastrointestinal (GI) bleeding, indicating that in Central India, patients typically present with more overt and advanced symptoms of CLD.

The etiology of CLD observed in this study demonstrated significant divergence from trends noted in Western countries. While hepatitis C and B remain important causes globally, the findings from this study emphasized alcohol as the most common etiological factor in Central India. This might reflect a greater susceptibility of the population to alcohol-related liver damage or a higher prevalence of high-risk behavior. The findings suggest a need for further investigation to understand whether genetic predisposition, lifestyle, or socio-cultural factors are contributing to this regional variance.

Endoscopic evaluation in our cohort revealed a high prevalence of esophageal varices and portal hypertensive gastropathy, consistent with portal hypertension in advanced CLD. Laboratory investigations further supported the advanced nature of the disease, with elevated liver enzymes and significant hypoalbuminemia. The presence of hypoalbuminemia in a majority of patients highlights that many individuals are seeking medical care only in the later stages of liver disease, when liver reserve has already declined significantly.

Additionally, deranged prothrombin time and platelet counts in a substantial proportion of patients reinforce the notion of advanced hepatic dysfunction. Despite expectations that thrombocytopenia should be prominent due to portal hypertension and splenomegaly, only a smaller percentage of patients demonstrated low platelet counts, which may warrant further investigation.

Assessment using the Child-Pugh classification system revealed that the majority of patients were in Class B or C, further indicating advanced disease at presentation. This pattern supports the view that many patients remain asymptomatic during the early course of CLD and present only when decompensated.

Clinical presentations predominantly included abdominal distension, anorexia, jaundice, edema, and upper GI bleeding. These findings are consistent with common global presentations, although regional differences in underlying causes may influence symptom severity and disease trajectory.

In terms of etiology, the most frequent causes among female patients were hepatitis C, hepatitis B, alcohol, autoimmune hepatitis, non-alcoholic fatty liver disease, Wilson's disease, drug/toxin-induced liver injury, Budd-Chiari syndrome, hemochromatosis, and primary biliary cirrhosis. Notably, a significant proportion of cases remained cryptogenic, emphasizing the need for further diagnostic tools such as liver biopsy to identify less common or occult etiologies.

Follow-up data indicated a statistically significant increase in complications such as coagulopathy, spontaneous bacterial peritonitis, sepsis, hepatorenal syndrome, ascites, and hepatic encephalopathy over a 6-month period. Biochemical parameters including serum bilirubin and INR showed significant worsening, while serum albumin levels declined. The Child-Pugh score also demonstrated progression of liver dysfunction over time.

These findings underscore the chronic and progressive nature of liver disease and the importance of early detection, regular monitoring, and timely intervention. The data suggest that patients frequently present at advanced stages, missing the window for preventive measures and early therapeutic intervention.

Despite the valuable insights, the study had a small sample size and limited follow-up duration, restricting generalizability. However, the findings are in alignment with larger population studies and can guide future research directions.

5. CONCLUSION

Chronic liver disease among females is increasingly recognized as a significant public health concern, with considerable morbidity and mortality. This study highlights that middle-aged women (30–60 years) commonly present with symptoms like abdominal distension, anorexia, jaundice, and edema, which should prompt comprehensive evaluation for common causes such as viral hepatitis, alcohol intake, and drug-induced liver injury.

The predominance of viral and drug-related etiologies reinforces the importance of public health measures like hepatitis B and C screening, immunization, alcohol cessation counseling, and review of hepatotoxic medications. Additionally, the substantial number of cryptogenic cases suggests the need for more advanced diagnostic workups, including liver biopsy,

especially when routine investigations fail to pinpoint a cause.

Regular follow-up and early screening for complications such as varices, ascites, and encephalopathy are critical in reducing progression and improving outcomes. Early diagnosis and treatment remain essential to delay or prevent decompensation and end-stage liver disease.

In summary, this study provides important insights into the clinical profile and etiology of CLD in female patients in Central India and emphasizes the need for proactive screening, early intervention, and region-specific management strategies.

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