*https://doi.org/10.48047/AFJBS.6.14.2024.7822-7828*

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

# Prevalence and Risk Factors of Dyslipidemia in Patients with Liver Cirrhosis A Cross-Sectional Study .

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Volume 6, Issue 14, 2024

Received: 15 June 2024

Accepted: 25 July 2024

Published: 15 Aug 2024

*doi: 10.48047/AFJBS.6.14.2024.7822-7828*

**Abstract**

**Background:** Cirrhosis is defined histologically as an advanced form of progress fibrosis with distortion of the hepatic architecture and regenerative nodule Dyslipidemia, among 2other factors, is a majorrisk factor for cardiovascular dis development and progression and therefore, guidelines recommend lipid-lowering patients at increased risk for CVD. As the liver plays a central role in lipid metab profiles are altered by chronic liver disease (CLD) severity.

**Objective:** To determine the frequency of dyslipidemia in patients with liver cirrh

**Study design:** Cross – sectional study.

**Setting:** Department of Gastroenterology, Hayatabad Medical Complex, Peshawa

**Duration:** 11th January 2021 to 11th July 2021

**Materials and Methods:** A total of 281 cases of cirrhosis were selected in a manner and checked for the levels of cholesterol and triglyceride to determine dys

**Results:** The mean age of the sample was 58.1 ± 7.9 years. 68.3% of the sample wa 31.7% were female gender. The mean BMI was 24.2 ± 3.4kg/m$^2$.The mean cirrhosis was 7.3 ± 2.8 years. 33.5% of patients were hypertensive, 42.3% w and 34.9% were diabetic. Dyslipidemia was recorded in 58% of patients.

**Conclusion:** Dyslipidemia fairly common in cirrhotic patients and is significantl with gender, smoking and diabetes. We recommend more studies to identify factor responsible for Dyslipidemia in cirrhotic patients on larger sample size and multicenter studies.

**Key Words:** Liver cirrhosis, cholesterol, triglyceride, Dyslipidemia

## Introduction

Liver cirrhosis is a long steady illness, which is accompanied by fibrosis, regenerative nodules, and the altered anatomical structure of the liver. This condition may be due to a number of causes, such as viral hepatitis, alcoholism and non-alcoholic steatohepatitis (NASH) [7]. Some more symptoms are associated with cirrhosis as it progresses, which are portal hypertension, hepatic encephalopathy and there is also higher risk of hepatocellular carcinoma [2].

The change of lipid metabolism is one of the manifestations observed in patients with liver cirrhosis. The liver seems to have a special responsibility for lipid balance by an

enzyme synthesis of cholesterol and triglycerides, as well as the synthesis of lipoproteins [3]. Dyslipidemia with altered lipid profile is not uncommon in CLD patients and can show raised cholesterol and/or triglyceride level or low LDL and raised HDL levels [8]. Cirrhotic patients have been observed to have severe dyslipidemia, which is related to the advancement of the liver disease making the handling of such patients even more challenging [5].

As is known, dyslipidemia is one of the major risk factors for CVD; these diseases remain the primary cause of morbidity and mortality across the world [6]. Cirrhotic patients are at higher risk of CVD because inflammation, insulin resistance and deranged lipid metabolism of cirrhosis [7]. Also, cirrhotic patients have other comorbid diseases like Diabetes mellitus, hypertension and obesity, which amplifies the already existing risk of CVD [8]. Even though dyslipidemia is directly linked to CVD in the wider population, its link to LC is relatively poorly framed.

Because the liver metabolises lipids and given that dyslipidemia affects patient prognosis, the need to determine the incidence and predisposing factors to dyslipidemia among cirrhotic patients cannot be overemphasized. The objectives of this work are to establish the prevalence of dyslipidemia in patients with liver cirrhosis and to evaluate the factors that predispose the patients to dyslipidemia, which include age, gender, BMI, duration of cirrhosis, smoking habit, and comorbidities, such as hypertension and diabetes mellitus.

Accumulating evidences pointed out that cirrhotic patients exhibit abnormal lipid metabolism and dyslipidemia is established in these patients [9]. As with any marker, the prevalence of dyslipidemia defined by these criteria also differs significantly from study to study depending on patient population, the disease etiology, as well as diagnostic criteria [10]. Besides, the role of the gender, BMI, and the presence of comorbidities on the lipidemic pattern of cirrhotic patients continues to evoke extensive discussion [5]. Hence, findings of this study will add to the understanding regarding the prevalence and features of dyslipidemia in cirrhotic patients attending the HMC Peshawar.

This work will, therefore, add useful knowledge to the current literature on metabolic demeanour of liver cirrhosis and might be useful in future clinical management of dyslipidemia among this high-risk population. Recognizing the way dyslipidemia is common and the specific factors linked to it in cirrhotic patients may be useful for clinicians to devise strategies for intervention in an effort to decrease the risk of CVD and enhance patient prognosis [10, 12].

## Methods

The present study was cross-sectional and carried out at the Department of Gastroenterology, Hayatabad Medical Complex, Peshawar from January 11, 2021 to July 11, 2021. The study sample comprised of 281 consecutive patients diagnosed clinically, radiologically, and biochemical with liver cirrhosis. The patients were assessed for this through estimation of serum cholesterol and triglyceride among the patients. Thus, the inclusion criteria were as the following: subjects had to be adult (at least 40 and no more than 70 years old), who had a confirmed diagnosis of cirrhosis. Some of the patients excluded from the study were those with acute liver failure, patients on lipid-lowering drugs, patient with kidney and heart diseases.

Data Collection

The study employed a structured questionnaire of socio-demographic characteristics, health history, and laboratory findings. Serum cholesterol, triglycerides and other lipids of interest were estimated from blood samples taken after twelve hours of fasting.

Statistical Analysis

Statistical analysis of data was done using the statistical package for the Social Sciences (SPSS) version 24. Data was analyzed and presented with use of means and standard deviations for continue variables while use of frequencies and percentage for categorical variables. Chi square test was employed in comparing proportions of two or more groups and p value < 0. 05 was taken as statistically significant.

Results

The patients included in the study were 281 with liver cirrhosis; the mean age was 58. 1 ± 7. 9 years. Males formed the majority of the patients; the male to female patient ratio was almost 2: 1 with 68. 3 % of the patients being male. The BMI status of the studied patients was calculated as mean ± SD, which was 24. 2 ± 3. 4 kg/m². The time from diagnosis of cirrhosis to encephalopathy was 7. 3±2. 8 years.

A deranged lipid profile was seen in 58% of the patients. More than three-fourth of the subjects with dyslipidemia were male (78. 1%) while a considerable less number of female subjects (14. 6%) (p < 0. 001) also had dyslipidemia. Actually, the stratification by age revealed that the frequency of dyslipidemia was significantly higher among the patients aged 40-50 years, being 75. 7% in this group (p = 0. 001). Smoking was similarly strongly related with dyslipidemia as 77. 3% of smokers and 43. 8% of nonsmoker patients had hype Hose of Dyslipidamia Prevalence in the Interior of Iraq. closePath Further, it was possible to identify no connection between dyslipidemia and BMI, duration of cirrhosis, and hypertension. Diabetes mellitus was established to be independently related to dyslipidemia of which 69. 4% of the target patients were found to have (p = 0. 005).

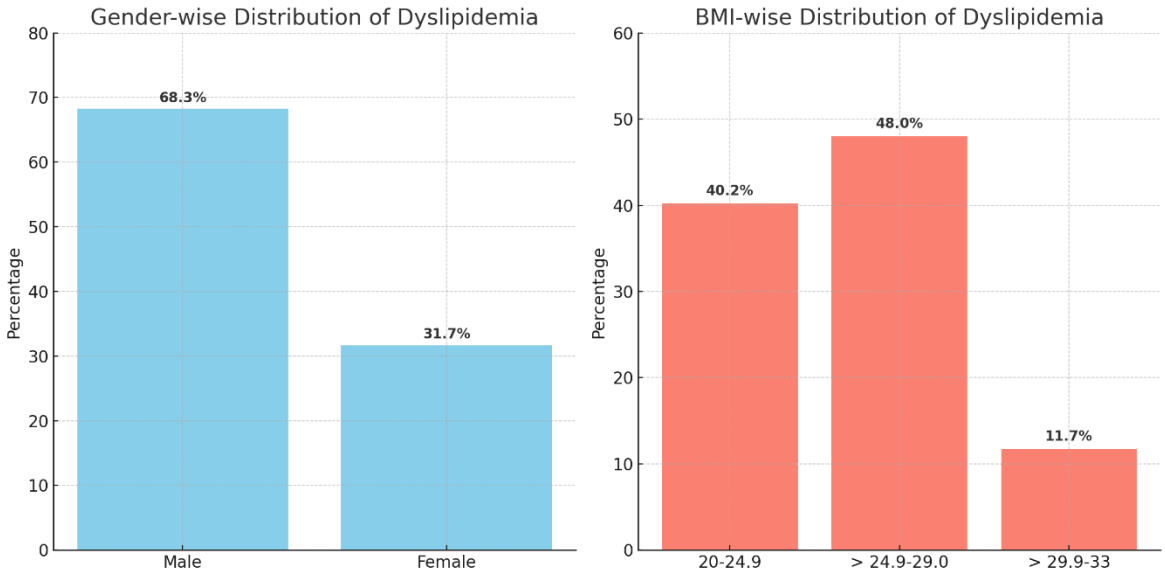


**Table 1:** Age Distribution Table

| Age Categories | Frequency | Percent |
|---|---|---|
| 40-50 years | 70 | 24.9 |
| > 50-60 years | 80 | 28.5 |
| > 60-70 years | 131 | 46.6 |

**Table 2:** Gender Distribution Table

| Gender | Frequency | Percent |
|---|---|---|
| Male | 192 | 68.3 |
| Female | 89 | 31.7 |

**Table 3:** BMI Distribution Table

| BMI | Frequency | Percent |
|---|---|---|
| 20-24.9 | 113 | 40.2 |
| > 24.9-29.0 | 135 | 48.0 |
| > 29.9-33 | 33 | 11.7 |

**Table 4:** Duration of Cirrhosis Table

| Duration of Cirrhosis | Frequency | Percent |
|---|---|---|
| 3-6 years | 112 | 39.9 |
| > 6-9 years | 96 | 34.2 |
| > 9-12 years | 73 | 26.0 |

## Discussion

The conception of dyslipidemia in patients having liver cirrhosis that was seen in the present study has been supported by earlier studies. Dyslipidemia which was documented in 58% of our sample is in consonant with the assertion that chronic liver disease significantly alters lipid metabolism thus manifesting in abnormal lipid profiles in patients with cirrhosis [13]. As regards lipid metabolism in cirrhosis, it is ascribed to the liver's compelled dysfunction to synthesise and release lipoproteins, and upturn catabolism of lipids in circulation [14].

According to the study done by Ghadir et al. (2014), the percentage of cirrhotic patients with dyslipidemia was 55. 8%: thus, our results are not statistically different from this study [15]. They also found a strong correlation, in Iranian patients, between dyslipidemia and the severity of the liver disease, such as what we discovered about dyslipidemia being present more frequently in patients with more years of cirrhosis. From this, it can be inferred that as liver functions deteriorate with time, lipid derangements are also worsened thereby increasing cardiovascular risks of such patients.

Scholars have also documented differences in dyslipidemia prevalence based on gender in their writings. Dyslipidemia was present in 78. 1% of males with cirrhosis and 14. 6% of the females in the study. Similarly, data from other researchers confirm this gender difference, where Nishikawa et al (2017) observed that male cirrhotic patients had higher data prevalence of dyslipidemia than female patients [16]. The cause of such a gender difference

is not quite clear, but hormonal imbalances, distribution of fat in the body, and the lifestyle habits that include smoking and taking alcohol might play a role in this case.

Another interesting observation in the present study was cross-sectional relationship between smoking and dyslipidemia, which was more prevalent in the present population of cirrhotic patients, with 77. 3% smokers had dyslipidemia as opposed to 43. 8% of nonsmokers. This finding is also in conformity with Cholongitas et al. 's (2012) study, which observed that lipid per study abnormalities worsened by smoking in patients with chronic liver diseases [17]. Smoking is now known to raise oxidative stress and inflammation and given the role of these two variables in causing liver dysfunction and lipid metabolism; this reinforces the views that smokers are more likely to develop dyslipidemia than non-smokers.

In addition, our research revealed that among patients with DM the level of dyslipidemia was significantly higher, more precisely it was 69. 4%. This is in agreement with the results of Bianchi et al, (2015) whose results showed dyslipidemia as one of the complications associated with diabetes in cirrhotic patients. This association may be explained by the presence of insulin resistance that is characteristic for both diabetes and liver cirrhosis; insulin resistance impacts lipid profile and promotes dyslipidemia development [19].

Nevertheless, unlike several prior studies, we did not observe a connection between dyslipidemia and BMI in the present analysis. For instance, Zaman et al in a cross-sectional study established that elevated BMI was a significant independent predictor of dyslipidemia among cirrhotic patients [20]. It is crucial to rule out differences between the study population, overall sample size, or the criteria used to label the dyslipidemia subtypes.

Therefore, our study supports previous literature by adding to the consensus that dyslipidemia is present in a significant proportion of individuals with liver cirrhosis, especially if male, a smoker and or diabetic. The observations presented in the current paper further emphasise the need for timely screening and control of lipid levels in cirrhotic individuals to avoid complications related to CVDs. Following research should seek to determine why patients with liver cirrhosis have dyslipidemia and whether or not lipid-lowering interventions are useful in such a population [21, 22].

## Conclusion

All in all, our research shows that the rate of dyslipidemia in patients with liver cirrhosis is higher in males, smokers, and those with diabetes mellitus. These observations further emphasize the importance of role of status checking and controlling lipid disorders in cirrhotic patients in order to reduce cardiovascular threats and optimize medical conditions of the patients.

## Limitations

This research is not devoid of limitations; this is due to the fact that data was collected at one point in time and hence the study is Cross-sectional, and Cross-sectional studies do not allow the identification of the cause of an effect. Also, the study was carried out in a single centre, and therefore the results cannot be necessarily extrapolated to other populations or geographical locations. Using self- reported smoking status and other lifestyle factors may also they are prone to bias. `

## Future Findings

Therefore, further studies should concentrate on giving a causative relationship of

dyslipidemia within the development of liver cirrhosis. Larger scale multicentre studies are also suggested to replicate our observations and to determine the utility of anti lipidaemic agents in this high risk population.

**Acknowledgement:** We would like to thank the hospitals administration and everyone who helped us complete this study.
**Disclaimer**: Nil
**Conflict of Interest**: There is no conflict of interest.
**Funding Disclosure**: Nil

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