

Prevalence of Non-Alcoholic Fatty Liver in Type 2 Diabetes Mellitus Patients: A Cross-sectional Study

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Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) is often overlooked in clinical practice, despite its significant clinical implications in Type 2 diabetes mellitus. Finding the prevalence of NAFLD in individuals with diabetes mellitus was the aim of this investigation.

Methods: From June 2025 to November 2025, this cross-sectional, non-interventional study was carried out at the Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar. This study comprised 150 participants with Type 2 diabetes mellitus.

Results: The prevalence of NAFLD was 51.3%; it was higher in patients with central obesity and dyslipidemia as well as among females (42.6%).

Conclusion: NAFLD has frequently been correlated with diabetes mellitus and raises the risk of problems for patients, therefore early detection is crucial for putting preventative measures into place.

Keywords: Non Alcoholic Fatty Liver, Type 2 Diabetes Mellitus, Central Obesity, Hypertriglyceridemia.

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Introduction

NAFLD is one of the most common causes of chronic liver disease. Obesity and diabetes mellitus rates have risen in tandem with the frequency of nonalcoholic fatty liver disease. Since most NAFLD patients have no symptoms, the prevalence is underreported. NAFLD affects 34–94% of individuals with type 2 diabetes globally. [1] Non-alcoholic fatty liver disease (NAFLD) is becoming more common among obese adults; in developed countries, its prevalence ranges from 34 to 46%. [2] The diagnosis is made by liver imaging, liver biopsies, and liver function tests. The bulk of data indicates that NAFLD is more common in men and increases in women as they age. [3]

NAFLD has been classified as the hepatic component of metabolic syndrome, which comprises raised fasting plasma glucose, decreased HDL levels, abdominal obesity, hypertension, and hypertriglyceridemia. Another aspect is ethnicity. It is more common in Hispanics. [4] This is because

they eat a lot of meals that are high in carbs. Sedentary lifestyles and increased usage of syrups including soda are also contributing reasons. Single nucleotide polymorphisms in some genes, such as palatin linked phospholipase domain containing protein-3, raise the risk of non-alcoholic fatty liver disease (NAFLD). This gene has been associated with the control of triacylglycerol synthesis.

A characteristic of non-alcoholic fatty liver disease (NAFLD) is the accumulation of macrovesicular fat in over 5% of hepatocytes. Cirrhosis, hepatocellular cancer, steatohepatitis (NASH), and simple steatosis are among the many disorders that fall under the umbrella of nonalcoholic fatty liver disease (NAFLD). Hepatic steatosis without fibrosis or necrosis is present in most NAFLD patients. Non-alcoholic fatty liver disease is characterized by the ballooning degeneration of hepatocytes, the infiltration of inflammatory cells into lobules, Mallory bodies, periodic acid Schiff

diastase resistant kupffer cells, and vacuolated nuclei. [5] Triglyceride accumulation in the liver, insulin resistance, and hypertriglyceridemia are the causes of nonalcoholic fatty liver disease. [6,7] Complete parental feeding, rapid weight loss, or hunger can also result in NAFLD. Bariatric surgery, jejunoileal bypass surgery, and small bowel resection can also result in hepatic steatosis. This study was carried out to ascertain the prevalence of NAFLD in individuals with diabetes mellitus.

Material and Methods

150 patients, both inpatients and outpatients, were seen at the Sri Krishna Medical College and Hospital in Muzaffarpur, Bihar, between June and November of 2025. Patients with Type 2 diabetes mellitus who had been taking medication for more than six months were included in the study, both male and female. This study excluded patients with chronic liver disease, drug-induced hepatitis, cancer, congenital liver diseases, and alcohol use above 20 grams daily. The study involved 150 participants with Type 2 diabetes during a six

months period. The study group consisted of 58 male and 92 female. Patients gave their informed consent before a thorough history and physical examination were carried out. Age, sex, BMI, waist-to-hip ratio, liver function test, serum cholesterol, triglycerides, and USG abdomen were among the information collected. After HCV and HBsAg screening, the results were negative. These individuals had abdominal ultrasonography, a lipid profile, a liver function test, a waist-to-hip ratio, and a BMI assessment. Ultrasound evidence of hepatic steatosis was looked for Grade-1: slightly increased liver echogenicity with normal vessels and absence of posterior attenuation. Grade-2: moderate increase in liver echoes with partial dimming of vessels and early posterior attenuation. Grade-3: diffuse increase in echogenicity and absence of visible vessels and increased posterior attenuation.

Results

Out of the 150 patients that were enrolled in the trial, 58 (38.67%) were male and 92 (61.33%) were female (Table 1).

Table 1: Sex Distribution

Gender	No. of patients	Percentage
Male	58	38.67%
Female	92	61.33%
Total	150	100%

The patients' ages ranged from 30 to 82 years old. The age range of 51 to 60 years old comprised the majority of the patients (Table 2).

Table 2: Age Distribution

Age Group in years	No. of patients	Percentage
<30 yrs	1	0.66%
31-40 yrs	29	19.33%
41-50 yrs	39	26.0%
51-60 yrs	46	30.67%
61-70 yrs	25	16.67%
71-80 yrs	9	6.0%
>80 yrs	1	0.66%

77 individuals (51.3%) had hepatic steatosis according to USG (Table 3). Thirteen males (8.6%) out of the 58 males had fatty livers. 64 female patients (62.2%) out of 92 female patients had fatty liver (Table 4). The age distribution of the 77 patients with hepatic steatosis revealed that 30.8% of them were between the ages of 41 and 50 (Table 5).

Table 3: Number of patients with fatty liver

	No. of patients	Percentage
With Fatty Liver	77	51.3%
Without Fatty Liver	73	48.7%
Total	150	100%

Table 4: Sex distribution of patients with fatty liver

Gender	No. of patients Present	No. of patients Absent
Male	13	45
Female	64	28
Total	77	73

Figure 5: Age distribution among patients with fatty liver

Age Group in years	No. of patients
<30 yrs	0
31-40 yrs	16
41-50 yrs	27
51-60 yrs	23
61-70 yrs	11
71-80 yrs	0
>80 yrs	0

Table 6 shows that 66 patients (44%) with fatty liver also had an elevated weight-hip ratio. Of them, 56 females (72.8%) had a greater prevalence. And it was 10(12.9%) in men. Eight males (10.4%) and fifty-four females (70.1%) make up the 62

patients (80.5%) with BMIs more than 25 (Table 7). Nine male (11.7%) and fifty-nine females (77.6%) out of the seventy-seven patients with fatty liver (89.3%) exhibited hypertriglyceridemia (Table 8).

Table 6: Number of patients with fatty liver who had central obesity

Gender	Fatty Liver with central obesity	Fatty Liver without central obesity
Male	10	3
Female	56	11
Total	66	14

Table 7: Number of patients with fatty liver who were over weight

Gender	Fatty Liver with BMI	Fatty Liver without BMI
Male	8	5
Female	54	10
Total	62	15

Figure 8: No. of patients with fatty liver who had hypertriglyceridemia

Gender	Fatty Liver with High TGL	Fatty Liver without TGL
Male	9	4
Female	59	5
Total	68	9

Transaminases were slightly elevated in all patients with fatty liver detected by ultrasonography. The albumin globulin ratio and serum protein levels were unchanged.

Discussion

The prevalence of NAFLD is rising worldwide. Numerous studies have found a favorable correlation between central obesity, hypertriglyceridemia, abnormal glucose tolerance, and non-alcoholic fatty liver disease (NAFLD). 51. In our investigation, NAFLD was present in 33 percent of individuals with Type 2 diabetes mellitus. Among those with type 2 diabetes, the prevalence of non-alcoholic fatty liver disease (NAFLD) has dramatically increased.

This finding highlights the need of promptly diagnosing and treating NAFLD.

According to a study by Yi et al, men were more likely than women to have NAFLD. [8] According to our research, female patients with type 2 diabetes mellitus had a higher prevalence of NAFLD. Similar findings were made by S. Kalra et al., who found that women are more likely than

men to have NAFLD. [9]Obesity is one of the major variables linked to NAFLD. Eighty-five percent of the NAFLD patients in our study had higher BMIs. According to Bhatt, K. et al., patients with NAFLD had higher BMI than people without NAFLD [10]. The development of a fatty liver is correlated with BMI, a measure of obesity.

Many studies have demonstrated that the prevalence of non-alcoholic fatty liver disease (NAFLD) is rising among the elderly, with a greater number of patients falling within the 40–60 age range. The age group of 41–50 years old had the highest number of patients in our study, followed by the 51–60 year old age group.

One of the risk factors for the onset of NAFLD is dyslipidemia. Numerous investigations have demonstrated that 20–92% of individuals suffer from hyperlipidemia, elevated cholesterol, elevated triglycerides, or both.[11]89.3% of the participants in our study exhibited hypertriglyceridemia. Numerous investigations have discovered no relationship between transaminase levels and the frequency of NAFLD in individuals with type 2 diabetes mellitus. [11]According to a study by Lu

et al., patients with type 2 diabetes mellitus and NAFLD had elevated transaminase levels. [12] According to our study, patients with NAFLD had slightly increase in transaminase levels. Gupte et al. reported that 65%, 12.5%, and 92.5% of those with type 2 diabetes mellitus had mild, moderate, or severe NAFLD, respectively. [13] According to research by Banerjee et al., among individuals with type 2 diabetes mellitus, fatty alterations were seen in 43% of cases, cirrhosis in 20%, and NASH in 40%. [14]

Conclusion

The prevalence of NAFLD is increasing worldwide. It is linked to further elements of the metabolic syndrome. Our study's conclusion that patients with Type 2 diabetes mellitus had a greater incidence of NAFLD highlights the necessity for preventive measures.

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