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Original Research Article

# A Study of Prevalence of Non-Alcoholic Fatty Liver in Type 2 Diabetes Mellitus Patients

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**Conflict of interest: Nil**

**Abstract:**

**Background:** Despite the substantial clinical significance of non-alcoholic fatty liver disease (NAFLD) in Type 2 diabetes mellitus, it is frequently neglected in clinical practice. The purpose of this study was to determine the prevalence of NAFLD in people with diabetes mellitus.

**Methods:** This non-interventional and cross-sectional study was conducted at Department of Medicine, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from October 2022 to September 2023. 150 patients with Type 2 diabetes mellitus were included in this study.

**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:** Early identification is essential to implement preventative measures because NAFLD is frequently associated with diabetes mellitus and increases the risk of complications in patients.

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



## Introduction

One of the most frequent causes of chronic liver disease is NAFLD. The prevalence of non-alcoholic fatty liver disease has increased along with obesity and diabetes mellitus rates. The prevalence of NAFLD is underestimated as the majority of its patients are asymptomatic. Between 34 and 94% of people with type 2 diabetes worldwide have NAFLD. [1] In obese adult patients, the prevalence of non-alcoholic fatty liver disease (NAFLD) is on the rise and varies from 34 to 46% in developed nations. [2] Liver function tests, liver biopsies, and liver imaging are used to make the diagnosis. According to the majority of research, NAFLD is more common in men and becomes more prevalent in women as they age. [3] The hepatic component of metabolic syndrome, which includes hypertension, hypertriglyceridemia, abdominal obesity, decreased HDL levels, and elevated fasting plasma glucose levels, has been defined as NAFLD.

Ethnicity is another factor. Hispanics are more likely to have it. [4] Their consumption of foods heavy in carbohydrates is the reason behind this. Increased use of syrups containing soda and a sedentary lifestyle are also factors.

NAFLD risk is increased by genetic factors such as single nucleotide polymorphisms in particular genes, such as palatin linked phospholipase domain containing protein-3. Triacylglycerol production regulation has been linked to this gene.

More than 5% of hepatocytes have an accumulation of macrovesicular fat, which is a defining hallmark of NAFLD. NAFLD encompasses a wide range of conditions, including cirrhosis, hepatocellular carcinoma, steatohepatitis (NASH), and simple steatosis. The majority of NAFLD patients have hepatic steatosis without fibrosis or necrosis. The ballooning degeneration of hepatocytes and the infiltration of inflammatory cells into lobules, Mallory bodies, periodic acid Schiff diastase-resistant kupffer cells, and vacuolated nuclei are among the criteria for non-alcoholic fatty liver disease. [5] The causes of NAFLD include hypertriglyceridemia, triglyceride build-up in the liver, and insulin resistance. [6,7]

NAFLD can also be brought on by complete parental nourishment, fast weight loss, or starvation. Hepatic steatosis is also a consequence of small bowel resection, jejunoileal bypass surgery, and bariatric surgery.

To determine the prevalence of NAFLD in people with diabetes mellitus, this study was conducted.

## Material and Methods

From October 2022 to September 2023, 150 patients both inpatients and outpatients were visited at the Darbhanga Medical College and Hospital in Laheriasarai, Bihar. The study included both male and female patients with Type 2 diabetes mellitus who had been receiving medication for more than a year. Patients with congenital liver illnesses, malignancies, chronic liver disease, drug-induced hepatitis, and alcohol use over 20 grams per day were not included in this study. Over a period of a year, 150 patients with Type 2 diabetes were the subject of the study. There were 92 females and 58 males in the study group.

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 were male and 92 were female (Figure 1). 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 (Figure 2).

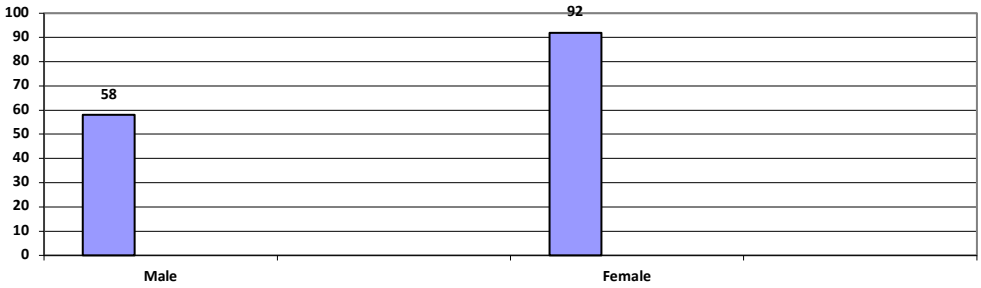


**Figure 1: Sex Distribution**

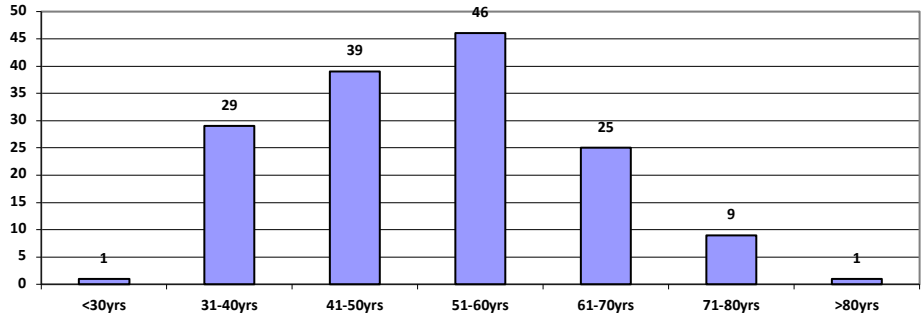


**Figure 2: Age Distribution**

77 individuals (51.3%) had hepatic steatosis according to USG (Figure 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 2). The age distribution of the 77 patients with hepatic steatosis revealed that 30.8% of them were between the ages of 41 and 50 (Figure 5).

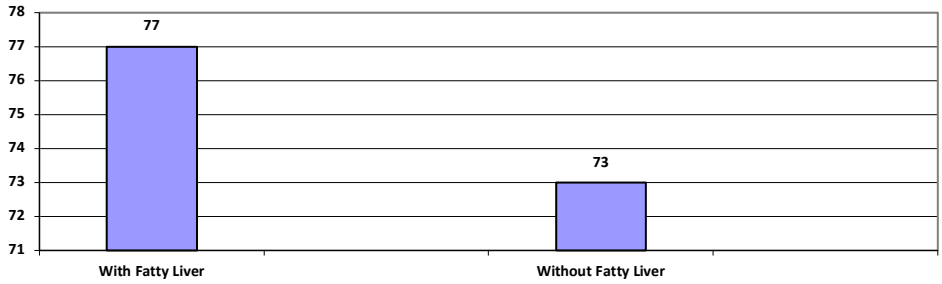


**Figure 3: Number of patients with fatty liver**

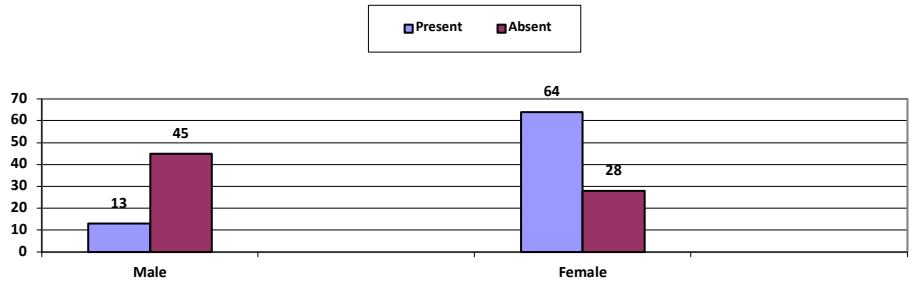


**Figure 4: Sex distribution of patients with fatty liver**

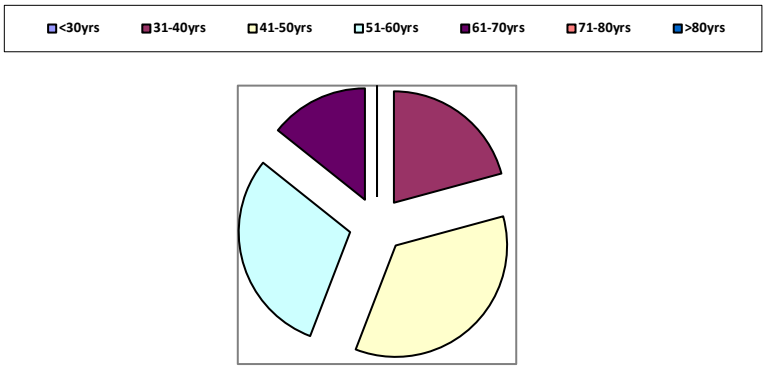


**Figure 5: Age distribution among patients with fatty liver**

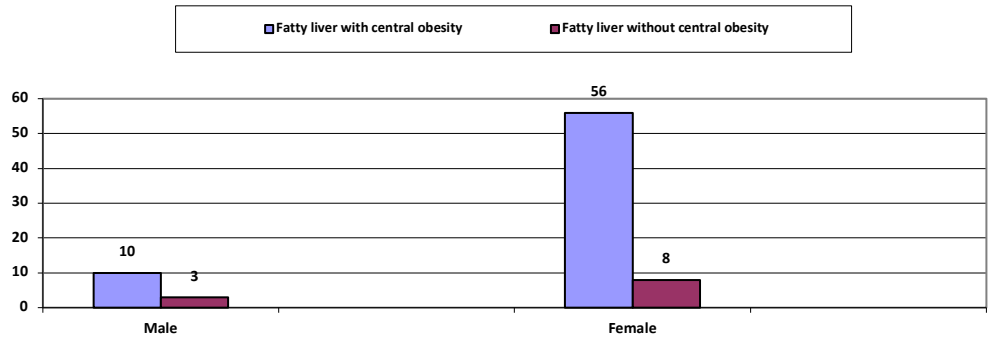


**Figure 6: No. of patients with fatty liver who had central obesity**

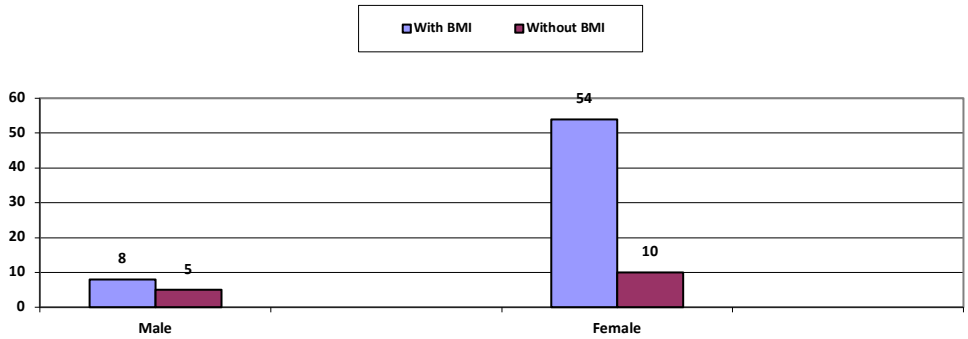


**Figure 7: No. of patients with fatty liver who were over weight**

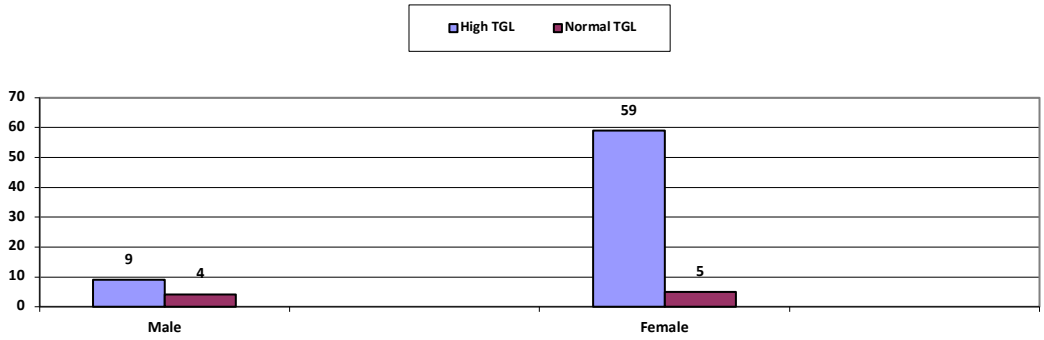


**Figure 8: No. of patients with fatty liver who had hypertriglyceridemia**

Figure 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 (Figure 7). Nine men (11.7%) and fifty-five females (77.6%) out of the seventy-seven patients with fatty liver (89.3%) exhibited hypertriglyceridemia (Figure 8).

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

**Discussion**

Globally, NAFLD is becoming more common. Abnormal glucose tolerance, hypertriglyceridemia, central obesity, and non-alcoholic fatty liver disease (NAFLD) have all been positively correlated in numerous studies. 51. 33% of people with Type 2 diabetes mellitus in our study had NAFLD. The frequency of non-alcoholic fatty liver disease (NAFLD) has significantly increased among those with type 2 diabetes.

This observation emphasizes how critical it is to assess and treat NAFLD as soon as possible. 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

Globally, the prevalence of NAFLD is rising. It is connected to further metabolic syndrome components. The need for preventive measures is highlighted by our study's finding that patients with Type 2 diabetes mellitus had a higher incidence of NAFLD.

## References


1. Angulo P. Nonalcoholic fatty liver disease. N Engl J Med 2002; 346:1221-31.
2. Banerjee S, Ghosh US, Dutta S. Clinico-pathological profile of hepatic involvement in type-2 diabetes mellitus and its significance. JAPI. 2008; 56:581-6.
3. Bhatt KN, Pranav V, Dipika Y, Dharmesh N, Radhika N, Arvind S. Prevalence of nonalcoholic fatty liver disease in type 2 diabetes mellitus and its relation with insulin resistance in South Gujarat Region. J Mahatma Gandhi Inst Med Sci 2017; 22:8.
4. Brunt EM, Janney CG, Di Bisceglie AM, et al. Nonalcoholic steatohepatitis: A proposal for grading and staging the histologic lesions. Am J Gastroenterol 1999; 94:2467-74.
5. Forlani G, Giorda C, Manti R, Mazzella N, De Cosmo S, Rossi MC, et al. The burden of NAFLD and its characteristics in a nationwide population with type 2 diabetes. J Diabetes Res 2016; 9:34-39.
6. Gupte P, Amarapurkar D, Agal S, Baijal R, Kulshrestha P, Pramanik S, et al. Non-alcoholic steatohepatitis in type 2 diabetes mellitus. J Gastroenterol Hepatol. 2004; 19:854-8.
7. Kalra S, Vithalani, M, Gulati G, Kulkarni CM, Kadam Y, Pallivathukkal J, et al. Study of prevalence of nonalcoholic fatty liver disease (NAFLD) in type 2 diabetes patients in India (SPRINT). J Assoc Physicians India. 2013; 61:448-53.
8. Lu H, Zeng L, Liang B, Shu X, Xie D. High prevalence of coronary heart disease in type 2 diabetic patients with non-alcoholic fatty liver disease. Arch Med Res 2009; 40:571-5.
9. Marchesini G, Brizi M, Bianchi G, Tomassetti S, Bugianesi E, Lenzi M, et al. Nonalcoholic fatty liver disease. Diabetes 2001; 50:1844-50.
10. Reid AE. Nonalcoholic steatohepatitis. Gastroenterology 2001; 121:710-23.
11. Torres DM, Williams CD, Harrison SA, Features, diagnosis and treatment of nonalcoholic fatty liver disease. Clin Gastro Hepatol 2012; 10:837-58
12. William CD, Stengel J, Asike MI, et al. Prevalence of nonalcoholic fatty liver disease and nonalcoholic steatophepatitis among a largely middle-aged population utilizing ultrasound and liver biopsy: A prospective study. Gastroenterology 2011; 140:124-31.
13. Williams CD, Stengel J, Asike MI, Torres DM, Shaw J, Contreras M, et al. Prevalence of nonalcoholic fatty liver disease and nonalcoholic steatohepatitis among a largely middle-aged population utilizing ultrasound and liver biopsy: a prospective study. Gastroenterology 2011; 140:124-31.
14. Yi M, Chen RP, Yang R, Chen H. Increased prevalence and risk of non-alcoholic fatty liver disease in overweight and obese patients with Type 2 diabetes in South China. Diabet Med 2017; 34:505-13.