**Original Research Article**

# To Study The Prevalence Of Non-Alcoholic Fatty Liver Disease In Type 2 Diabetes Mellitus Patients At A Tertiary Care Center:

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**ABSTRACT**:
**Background :** Diffuse accumulation of fat in hepatocytes, occurring in individuals without a significant history of alcohol consumption is termed as Non-Alcoholic Fatty liver disease (NAFLD). Nonalcoholic fatty liver disease is often associated with diabetes mellitus which is associated with a 60- 70% of frequency of Non-alcoholic fatty liver disease. epidemic increase in diabetes mellitus, hypertension, obesity and hyperlipidemia, the prevalence of NAFLD is increasing worldwide.

**Objective:** The aim of this study was designed to determine the prevalence of NAFLD in T2DM (type 2 diabetes mellitus) patients and also to study its risk factors.

**Materials and Methods:** The present cross sectional, prospective study was conducted at a tertiary care hospital, over a period of 2 Years. A total of 210 patients with Type 2 Diabetes mellitus that satisfied inclusion criteria were included in the study. All patients included in the study were subjected to ultrasonography and relevant history, thorough clinical examinations and biochemical tests were performed and recorded. Patients with NAFLD were compared with those with normal liver ultrasound findings. The risk factors of NAFLD were also evaluated in the study group

**Results:** Total 210 patients participated in the study. 85 (40.47%) presented with NAFLD, The highest prevalence of NAFLD was recorded in the age group of 51-60. (38.5%). The prevalence rate among females (62.2%) was higher than for males (37.8%). The most common ultrasonographic grade of NAFLD was grade I (mild) fatty liver disease.(24.4%)

**Conclusion:** Study revealed a higher prevalence of obesity, hypertension, hyperglycemia, hyperlipidemiaand hyperuricemia in the subjects with NAFLD. This liver disorder is another potential complication in T2DM patients that requires intervention in the associated factors and avoids the evolution of NAFLD to chronicity.

**Keywords:** Non-alcoholic fatty liver disease, Type 2 Diabetes mellitus, Prevalence.

## INTRODUCTION:

Non-alcoholic fatty liver disease (NAFLD) is the term for a range of conditions caused by a build-up of fat in the liver. It's usually seen in people who are overweight or obese. A healthy liver should contain little or no fat. Fatty liver changes from simple steatosis to steatohepatitis. NAFLD has emerged as the most common cause of liver disease worldwide[1]. The defining feature of non-alcoholic fatty liver disease is presence of accumulation of macrovesicular fat in more than 5% of hepatocytes in the absence of significant necroinflammation or fibrosis. Nonalcoholic fatty liver disease has emerged as the most common cause of chronic liver disease in western nations. T2DM (type 2 diabetes mellitus) patients appear to have an increased risk of developing NAFLD than nondiabetic subjects and certainly have higher risk of developing fibrosis and cirrhosis. Presence of NAFLD in T2DM may also be linked to increased cardiovascular disease risk[2]. NAFLD, and specifically non-alcoholic steatohepatitis, is often associated with diabetes mellitus, which is associated with a 60% to 76% frequency of non-alcoholic fatty liver disease and a 22% frequency of nonalcoholic steatohepatitis[3,4]. Non-alcoholic fatty liver disease is considered to be the hepatic manifestation of metabolic syndrome [5,6]. The central features of metabolic syndrome such as the peripheral insulin resistance, obesity, hyperinsulinemia, hypertriglyceridemia and hypertension are the predisposing factors for NAFLD[7]. With increase in T2DM (diabetes mellitus) rate it is to expect increase in incidence of NAFLD in India. Various studies conducted shows the prevalence rate of NAFLD to be around 9-32% in the general Indian population, with a higher incidence among the obese and diabetic individuals. Ultrasound is the most widely available most economical test performed[8]. The association of type 2 diabetes mellitus with non-alcoholic fatty liver disease as a major concern has been recently recognised. Hence the present study was conducted to determine the prevalence of nonalcoholic fatty liver disease in type 2 diabetes mellitus subjects

## MATERIALS AND METHODS

The study was conducted in Department of Medicine, at tertiary care center of western Maharashtra over two year period from January 2020, IEC approval sought prior to initiation of the study. cross sectional, prospective study included 210 patients with type 2 diabetes mellitus in the age group of 20-70 years, attending medical outpatient clinic. Demographic data like age, gender were obtained along with relevant history and recorded in predesigned and pretested proforma. A thorough clinical examination was performed and the findings were recorded. Anthropometric (waist circumference and body mass index) and metabolic parameters such as fasting and postprandial blood sugar, glycosylated hemoglobin (HbA1c), serum uric acid, blood urea,serum creatinine, fasti.ng lipid profile, serum bilirubin, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT) and serum alkaline phosphatase (SAP) were measured. alcohol consumption, chronic liver disease of any cause and intake of hepatotoxic drugs were excluded. All patients enrolled underwent ultrasonography to detect fatty changes in the liver, performed by single experienced radiologist. **Grade 1** - (Mild steatosis), **Grade 2** - (Moderate steatosis) and **Grade 3** - (severe steatosis).

fatty liver was defined as the features consistent with bright liver of increased echogenicity with ultrasonographic contrast between hepatic and renal parenchymal vessel blurring and narrowing of the lumen of hepatic vein in the absence of features suggestive of chronic liver disease.

Data documented and analysed using Statistical Package for Social Sciences [SPSS], Mean, standard deviation and statistics test were calculated for each variable.

## RESULTS:

Total 210 patients participated in the study. 85 (40.47%) diagnosed with NAFLD. 78 (37. 14%) were males and 132 (62.85%) were females.(Table 1). The highest prevalence of NAFLD was recorded in the age group of 51-60 years and it was more prevalent among females than males. Out of 210 Type 2 diabetes mellitus patients 15 were aged < 40 years, 59 patients were aged between 41-50 years, 84 were aged between 51-60 years and 52 were in the age group of 61-70

years.(Table2). Majority of the NAFLD patients showed Grade I fatty liver 60 (28.57%), followed subsequently by Grade II 18 (8.57%) and Grade III 7 (3.3%) of diabetic patients.(Table 3). Various different tests components observed in the present study were compared in the diabetic patients with and without fatty liver, a higher prevalence and significant association of fatty liver disease in diabetics, obese and dyslipidemic patients. The mean ALT and AST levels were 27±12.2 and 33±12.4 respectively in NAFLD patients. There was no significant difference found in the levels of ALT and AST in our study. The body mass index in NAFLD patients was above normal (30.54±1.65). triglyceride, total cholesterol and LDL level of (200.82±52.29), (199.74±25.18) and (112.43±26.57)

## DISCUSSION:

Non-alcoholic fatty liver disease (NAFLD) is a common disorder that was less diagnosed earlier due to low index of suspicion, but now its prevalence has been increasing globally. Fatty liver is a common finding among T2DM individuals. NAFLD and T2DM together have poorer prognosis in terms of higher frequency of cirrhosis and mortality[9]. In this study, the overall prevalence of T2DM patients, screened for the evidence of fatty liver by ultrasonography was 40.47%. Studies by Angulo P et al[10] reported that around 10-75% of NAFLD patients have T2DM and 21-72% of patients with diabetes are reported to have NAFLD. The prevalence rate of NAFLD was highest in the 51 to 60 years age group and prevalence of NAFLD in female patients. This similar trend was also reported by Sanjay Kalra et al[1], in which the frequency of the disease was more in female patients. The larger number of female subjects included in the study population may account for the female predilection seen in this study. Several studies have suggested the well-established relationship of the disease with these comorbid conditions. Obesity, Hypertension, and dyslipidemia are the elements in metabolic syndrome, and also serves as predisposing factors of NAFLD along with diabetes mellitus[11,12]. The diagnosis of NAFLD in our study was based on standard ultrasonography, which is by for the commonest way of diagnosing this increasingly recognized liver disorder in clinical practice. There was no significant difference found in the levels of ALT and AST in our study. The body mass index in NAFLD patients was above normal compared to that of patients without fatty liver. This study substantiates the need of early diagnosis and further intervention of non-alcoholic fatty liver disease in patients with type 2 diabetes mellitus.

## CONCLUSION:

NAFLD patients are at increased risk of developing cirrhosis, end stage liver failure and hepatocellular carcinoma, therefore early diagnosis of NAFLD patients and early institution of treatment is necessary. T2DM and NAFLD are rapidly increasing, reaching levels of a pandemic in countries like India. Prevalence of NAFLD has increased along with the multiple components of metabolic syndrome.

**Table-1: Showing Gender Distribution of NAFLD in T2DM Patients**

| Gender | T2DM patients | Fatty liver group | Non-fatty liver group |
|---|---|---|---|
| Male | 78 (37. 14%) | 25 (29.41%) | 53 (67.94%) |
| Female | 132 (62.85%) | 60 (70.58%) | 72 (54.54%) |
| Total | 210 | 85 (40.47%) | 125 (59.52%) |

**Table 2: Showing Age Distribution of NAFLD in T2D Patients**

| Age in years | T2DM patients | Fatty liver group | Non-fatty liver group |
|---|---|---|---|
| <40 | 15 | **05** | **10** |
| 41 – 50 | 59 | **15** | **44** |
| 51 – 60 | 84 | **45** | **39** |
| 61 – 70 | 52 | 20 | 32 |
| Total | 210 | 85 | 125 |

**Table – 3: Distribution of fatty liver disease in type 2 diabetes mellitus patients.**

| USG Liver | Male | Female | Total |
|---|---|---|---|
| Normal | 41 | **84** | 125 |
| grade I | 27 | **33** | 60 |
| grade II | 7 | **11** | 18 |
| grade III | 3 | 4 | 07 |
| Total | 78 | 132 | 210 |

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