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PREVALENCE OF NON-ALCOHOLIC FATTY LIVER DISEASE IN TYPE 2 DIABETES MELLITUS PATIENTS

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Abstract

Background: Nonalcoholic fatty liver disorder is more common in people with type 2 diabetes and the progression of this disease is significantly sped up by the presence of T2DM.

Objective: The aim of the study was to explore the Prevalence of non-alcoholic fatty liver disease in type 2 diabetes mellitus patients.

Methodology: The current study was carried out in medicine department at Ghulam Mohammad mahar medical college hospital sukkur from March 2022 to April 2023 after taking approval from the ethical committee of the institute**.** A total of 136 individuals with T2DM were included in the research. Complete clinical data were collected. The degree of hepatic steatosis was measured using the controlled attenuation parameter (CAP) test. Liver steatosis was indicated by CAP cutoff values, which varied from S0, which indicates no steatosis (S), to S3. For the diagnosis of fibrosis, the cutoff values were as follows: 5.5 for no fibrosis (fibrosis stage F0), 5.5−8.0 for mild fibrosis (F1), 8.0−10.0 for moderate fibrosis (F2), 11.0−16.0 for severe fibrosis (F3), and >16.0 for cirrhosis (F4).Data was analyzed through GraphPad InStat software.

Results; A total of 136 participants were included in this study. Out of which 75(55.1%) were male and 61 (44.8%) were females. According to our results based on the CAP cut-off values. 58(42.6%) of those with T2DM had no steatosis 20(14.7%) had mild (S1, 237.0−259.0 dB/m), 26(19.1%) had moderate, and 32(23.5%) had severe steatosis. Furthermore, based on the cutoff values, 58(42.6%) of the participants had no fibrosis, 34(25%) had mild, 20(14.7%) had moderate and 13(9.5%) had sever fibrosis, 14.5% and 11(8.5%) had cirrhosis. hence a total of 57% of individuals with T2DM have NAFLD. Males have a greater prevalence of NAFLD (55.1%) than females have (44.8%).

Conclusion Individuals having Type 2 diabetes mellitus had a greater frequency of NAFLD (57%), according to our study, emphasizing the need of preventative measures.

Key words: Prevalence; non-alcoholic fatty liver disease; Type 2 diabetes mellitus

Introduction

Nonalcoholic fatty liver disease (NAFLD) has become a significant public health concern in the world. NAFLD includes non-alcoholic steatohepatitis (NASH) and non-alcoholic fatty liver (NAFL). Because the majority of NAFLD patients have no symptoms, the prevalence of the disease is underreported. Globally, the overall incidence of NAFLD in people with diabetes with type 2 mellitus ranges from 34 to 94%.[1] According to studies, at the stage of diagnosis, 30–40% of people with NASH had advanced liver fibrosis, and 10–15% had developed cirrhosis.[2] The increasing prevalence of non-communicable diseases (NCDs) such obesity, diabetes, cancer, and cardiovascular disease is contributing to the rise in these medical conditions.[3] Therefore, T2DM has a significant role in determining the severity and presence of NAFLD. Individuals who have NASH and T2DM experience worse outcomes in terms of higher incidences of cirrhosis and death. Patients with diabetes have a mortality rate from cirrhosis that is more than twice that of the general population.[4] Since NASHA is typically an asymptomatic illness, its frequency in T2DM patients is yet mainly unclear. Though a biopsy of the liver is the sole way to identify NAFLD, it wouldn't need to be performed frequently until necessary. Therefore, the purpose of the present study was to determine the prevalence of NAFLD, and specifically NASH, in people with type 2 diabetes.

Methodology

The current study was carried out in medicine department at Ghulam Mohammad mahar medical college hospital sukkur from March 2022 to April 2023 after taking approval from the ethical committee of the institute**.** A total of 136 individuals with T2DM were included in the research. individuals having Diabetes types other than type 2 diabetes, such as secondary diabetes, the typical person drinks around 20 grams of alcohol every day ,Individuals taking drugs known to induce hepatic steatosis, those with history of viral hepatitis and untreated thyroid abnormalities were excluded from the study . Patients gave their informed consent before an in-depth physical examination and history were carried out. Age, sex, BMI, fasting and postprandial sugar levels, HbA1C, liver function tests [AST], [ALT], as well as alkaline phosphates), and serum lipid profile (total cholesterol, triglycerides, high-density lipoprotein cholesterol [HDL-C], and low-density lipoprotein cholesterol [LDL-C]) were among the data collected. After screening for HBsAg and HCV, the results were negative. Fibroscan investigation. With the TOUCH 502 Fibre Scanner, which was manufactured in France, and the M-probe, a skilled radiologist conducted transient elastography (TE) on every individual. Prior to the assessment, patients were given instructions to fast for a minimum of three hours. The automated probe selection tool (either M or XL probes) built into the device software was used to choose the right probe for each user based on the skin-to-liver capsule distance in real-time evaluation. The hepatic fibrosis measurements obtained from the fibro scan were expressed in kilopascals (kPa). The degree of hepatic steatosis was measured using the controlled attenuation parameter (CAP) test, with findings expressed in decibels/meter (dB/m). Liver steatosis was indicated by CAP cutoff values, which varied from S0, which indicates no steatosis (S), to S3.[5] which included nine studies with a total of 1297 individuals with NAFLD from various countries (USA, Asia, Europe).[6-16] In mild hepatic steatosis, the pooled sensitivity of the CAP was eighty-seven with a specificity of 91 percent and a diagnostic risk ratio (DOR) of 84.35; in moderate hepatic steatosis, the sensitivity was eighty-five percent with an accuracy of 74% and a DOR of 21.28; and in severe steatosis, the sensitivity was 76 percent with an accuracy of 58% and a DOR of 4.70 as per these studies. Thus, we established CAP values in this study with S0, zero steatosis (<237 dB/m), S≥1 ranging from 237.0 and 259.0 dB/m, S≥2 from 259.0 and 291.0 dB/m, and S≥3 between 291.0 to 400.0 dB/m.[15] For the diagnosis of fibrosis, the cutoff values were as follows: 5.5 for no fibrosis (fibrosis stage F0), 5.5−8.0 for mild fibrosis (F1), 8.0−10.0 for moderate fibrosis (F2), 11.0−16.0 for severe fibrosis (F3), and >16.0 for cirrhosis (F4). The f rating system is a quantitative 0–4 output of the fibroscan equipment on its own.[16]

Analysis of data

Data was analyzed through GraphPad InStat software (GraphPad InStat software, San Diego, CA). Numbers and percentages were used to represent definite variables, whereas means and standard deviations (SD) were used to represent continuous variables.

Results

A total of 136 participants were included in this study. Out of which 75(55.1%) were male and 61 (44.8%) were females. The age range was 22–75 years, with a mean of 49.03±12.79 years. The average HbA1c level was 7.3%1.52%, and the median duration of T2DM was six years.39 (28.6%) individuals had a high ALT (>40 IU/dl) and 37 (27.2%) had elevated AST (>40 IU/dl). Given that the mean BMI of the study sample was 27.43±5.24, a sizable fraction of them were obese. The study population's baseline clinical and biological data are displayed in **Table 1**.

Liver stiffness and CAP were determined using transient elastography and FibroScan. According to our results based on the CAP cut-off values. 58(42.6%) of those with T2DM had no steatosis (S0, <237 dB/m), 20(14.7%) had mild (S1, 237.0−259.0 dB/m), 26(19.1%) had moderate (S2, 259.0−291.0 dB/m), and 32(23.5%) had severe steatosis (S3, 291.0−400.0 dB/m) as presented in **figure 1**. Furthermore, based on the cutoff values, 58(42.6%) of the participants had no fibrosis (F0), 34(25%) had mild (F1), 20(14.7%) had moderate (F2) and 13(9.5%) had sever fibrosis (F4), 14.5% and 11(8.5%) had cirrhosis as shown in **figure 2**. hence a total of 57% of individuals with T2DM have NAFLD. Males have a greater prevalence of NAFLD (55.1%) than females have (44.8%)

Table 1.The study population's baseline clinical and biological data N=136	
Variables	Mean, Standard deviation, frequency (percentage)
Age in years	49.03±12.79
Gender	
Male	75(55.1%)
Female	61 (44.8%)
Basic metabolic rate (kg/m2)	27.43±5.24
HBa1C	7.3%1.52%,
ALT (IU/L)	42.16±18.43
AST (IU/L)	33.33±16.07
High density lipo protein	42.9±86.8
Low density lipo protein	100.33 ±41.62
Liver steatosis	
No	58(42.6%)
Mild	20(14.7%)
Moderate	26(19.1%)
Severe	32(23.5%)
Liver fibrosis	
No	58(42.6%)
Mild	34(25%)
Moderate	20(14.7%)
Sever	13(9.5%)
Cirrhosis	11(8.0%)

Fig no 1.Distribution of Liver steatosis among study participants

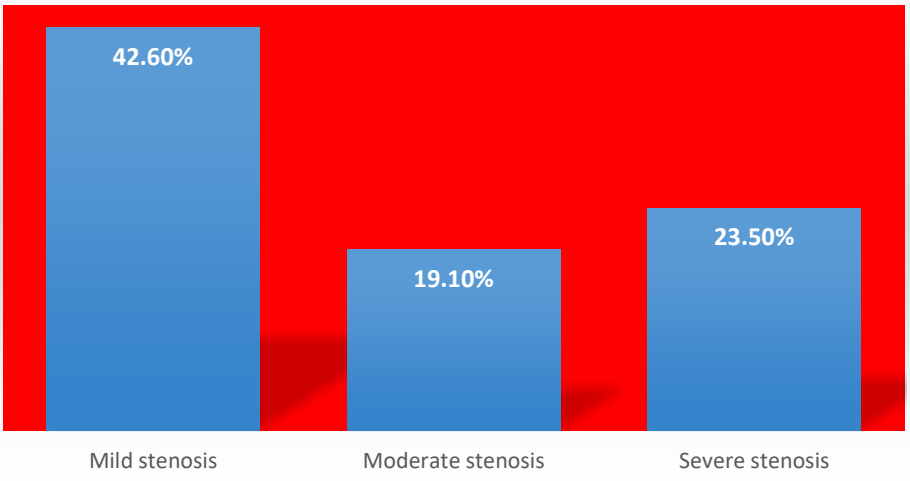
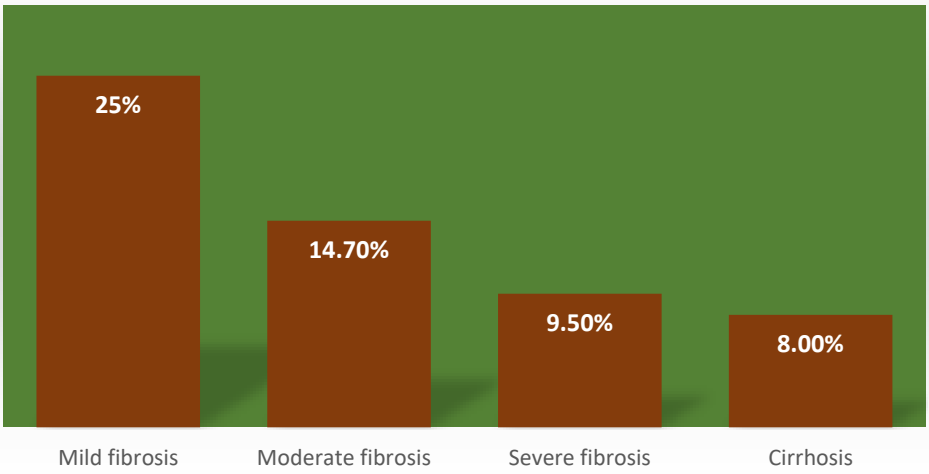


Fig 2. distribution of fibrosis among study participents



Discussion

Around the world, the number of cases of NAFLD is increasing rapidly in parallel with increasing instances of obesity & metabolic syndrome.[17] The prevalence of non-alcoholic fatty liver disease ranges from 15% to 40% in Western nations and from 9% to 40% in Asian countries.[18]As far as we know, this study was the first to reveal the prevalence of NFALD in Pakistan applying the CAP approach for detection. According to our results based on the CAP cut-off values 57% of individuals with T2DM have NAFLD. Out of them 42.6%) of those with T2DM had no steatosis, 14.7% had mild, 19.1% had moderate, and 23.5% had severe steatosis. According to our research, about 27.2% of people with NAFLD will progress to NASH, which raises the possibility of developing cirrhosis or advanced fibrosis of the liver. Thus, it is suggested that the Diabetes has a significant role in the development of NAFLD to NASH and cirrhosis. There is considerable variation in the frequency of fibrosis of the liver stages among T2DM patients with NAFLD across different studies because different cutoff values have been used to define fibrosis stages.[26-28] 14.7% of NAFLD patients in the current research showed moderate fibrosis, which was lower than many other studies that employed a lower cutoff value and higher than that documented by other studies using comparable cutoff values.[26-28] In diabetic NAFLD, ethnic variations are also a significant factor in the development of progressive fibrosis.[29-30] Unfortunately, because our study is limited to a specific area, we were unable to examine the frequency statistics of advanced fibrosis in individuals with T2DM from different ethnic backgrounds. While numerous studies demonstrated a

high correlation between age and the fibrosis score (kPa), the results of this research showed that age does not correlate with advanced fibrosis.[26,31]
However, a few of studies have found that individuals with T2DM have an elevated risk of liver fibrosis regardless of their age.[27-28] Similar to the results reported by Chen et al. and Tuonget al., this study revealed no correlation between sex and the severity of fibrosis.[26-28]

Conclusion

Individuals having Type 2 diabetes mellitus had a greater frequency of NAFLD, according to our study, emphasizing the need of preventative measures.

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