



A Cross Sectional Observational Study Emphasising the Prevalence of Fatty Liver Changes among Type 2 Diabetes mellitus patients

C.Kuttala vadivu ^{*1}, R.Menaka², N.Anbu³

^{*1}P.G Scholar, Department of Maruthuvam, Government Siddha Medical College, Arumbakkam, Chennai - 600 106, Tamil Nadu, India.

² Lecturer, Department of Maruthuvam, Government Siddha Medical College, Arumbakkam, Chennai - 600 106, Tamil Nadu, India.

³ Head, Department of Maruthuvam, Government Siddha Medical College, Arumbakkam, Chennai - 600 106, Tamil Nadu, India.

ABSTRACT

Fatty liver disease is one of the chronic liver conditions that affects the greatest number of people across the globe, regardless of age, gender, or ethnicity. In general it is defined by the deposition of fat in the liver, which can lead to a range of illnesses in individuals who do not consume an excessive amount of alcohol. These disorders include simple steatosis, steatohepatitis, cirrhosis, and hepatocellular carcinoma. Understanding the etiology and impact of comorbid prevalence could substantially help the healthcare providers in focussing on the treatment strategy. The main aim of the present cross sectional observation study comprises of 100 study participants is to explore the questionnaires' based survey with respect to the prevalence of fatty liver complications among Type 2 diabetic population. The questionnaire were tailored to cover the entire purpose of the study such as age, gender, anthropometric measurements, duration of diabetes and investigations on blood sugar level, habits of patients, associated diseases and complication of fatty liver disease. The results of the present investigation emphasise that greater proportion of the study population were observed to be overweight and they have been under combination therapy comprises of siddha and allopathic medicines. According to study 77% of the participants taking both Siddha and Allopathy medicine as noted with higher prevalence and 23% of rely of only allopathy medication. Data's obtained from the study also advocates that among the study population majority of the participants prevails to have smoking and alcohol consumption. An additional outcome of the study shows that the existence of hypertension found to be more in males (25%) than females (12%). In conclusion the datas of the study provided a new insight on the etiology and causative factors that contributes to the prevalence of fatty liver complications among Type 2 diabetic population.

KEY WORDS: *Fatty liver disease, Type 2 diabetes, Complications, BMI, Observation study, Siddha, Questionnaire*

Corresponding Author: C.Kuttala vadivu, Department of Maruthuvam, Government Siddha Medical College, Arumbakkam, Chennai 600 106, Tamil Nadu, India

1. Introduction

NAFLD, also known as nonalcoholic fatty liver disease, is a prevalent form of liver disease that is found all over the world and is becoming an increasingly serious public health concern. The term non-alcoholic fatty liver disease, or NAFLD, refers to a spectrum of liver disorders associated with hepatic steatosis that are not caused by significant alcohol consumption or other secondary causes of liver disease [1]. NAFLD is a condition given to the spectrum of liver disorders associated with hepatic steatosis. The histological spectrum of NAFLD ranges from steatosis to steatosis with evidence of hepatocellular inflammation and damage [2]. NASH is now assumed to be the cause of cirrhosis in the majority of people who were previously thought to have cryptogenic cirrhosis [3]. NAFLD is becoming increasingly recognized as a prevalent cause of liver disease. Insulin resistance and nonalcoholic fatty liver disease (NAFLD) have been shown to have an unbreakable link, and it is predicted that more than 90 percent of NAFLD patients also have insulin resistance or a component of metabolic syndrome [4]. It is important to note that in light of the growing incidence of diabetes, it is anticipated that nonalcoholic fatty liver disease (NAFLD) would soon take the top spot as the major cause of liver cirrhosis [5].

NAFLD is a spectrum of liver illnesses that ranges from fatty liver to non-alcoholic steatohepatitis (NASH), which is associated with inflammation [6]. Fatty liver is one of the diseases that falls under the umbrella of NAFLD. NAFLD is a known contributor to chronic liver disease (CLD), hepatocellular carcinoma, and the need for liver transplantation. It is also associated with an increased risk of type 2 diabetes, chronic renal disease, cardiovascular disease, and cancer [7]. Patients with NAFLD are found clinically to have elements of metabolic syndrome such as obesity, type 2 diabetes, high blood pressure, and high cholesterol, among which type 2 diabetes is a crucial risk factor for the occurrence of NAFLD and a significant predictor of unfavorable clinical outcomes [8]. This link between nonalcoholic fatty liver disease and type 2 diabetes may be explained by the existence of

insulin resistance as well as compensatory hyperinsulinemia [9].

The majority of people who have NAFLD do not have any symptoms, and the condition is normally diagnosed when abnormal liver tests are found during a regular laboratory examination. The levels of the enzymes alanine aminotransferase and aspartate aminotransferase in the liver are particularly increased. On the other hand, there is a possibility that these enzymes are not high in all instances of NAFLD, and the level of aminotransferases is not a reliable indicator of the severity of inflammation and cirrhosis [10]. Imaging techniques like as hepatic ultrasound or magnetic resonance imaging (MRI) can give insight into the amount to which the liver is involved in NAFLD. It appears that approximately 5-20% of persons in Asia may have NAFLD, based on the minimal data that is available; nevertheless, the prevalence of this condition varies greatly depending on geography, gender, race, and age [11]. Additionally, the majority of people who have NAFLD do not exhibit any symptoms or health warning signs, which makes identification and management of the condition more difficult [12,13]. The main aim of the present cross sectional observation study comprises of 100 study participants is to explore the questionnaires' based survey with respect to the prevalence of fatty liver complications among Type 2 diabetic population.

2. Materials and Methods

2.1. Study design

Cross sectional observation study comprises of 100 study participants to explore the questionnaires' based survey with respect to the prevalence of Fatty Liver changes among Type 2 Diabetic population. Institutional ethical committee clearance was obtained for this study (IEC NO: GSMC-CH-3401/ME-2/006/2019 and registered in Clinical Trial Registry of India (CTRI/2020/05/025020). Study proceeded for the period of three months at Siddha outpatient Department (OPD) of Arignar Anna Government Hospital of Indian Medicine, Arumbakkam, Chennai. Participants were explained about the purpose and objective of the study and also received consent to participate in this study. It

involved the collection of data on socio demographic, gender, education, marital status, occupation, anthropometric measurements, comorbidity and blood sugar investigations on fasting and post prandial, USG Abdomen findings. All the collected data's were dealt with the high level of anonymity and confidentiality

2.2. Questioner Pattern

The questionnaire was divided accordingly to cover the entire purpose of the study such as age, gender, anthropometric measurements, duration of diabetes and investigations on blood sugar level , habits of patients, associated diseases and complication of fatty liver disease. The treatments which were undertaken by the patients all recorded in the study by using a questionnaire.

2.3. Statistical Analysis

Data were entered and analyzed using SPSS statistics VERSION 26 in Siddha Central Research Institute, Chennai. The results were summarized as percentage and proportions.

3. Results

3.1. Gender prevalence and impact of BMI in Study population

It was observed from the study that the fatty liver is more prevalent in the age group of 50-59 years. Among them females have 17% and males have 18%. Further it was also observed that 57 out of 100 participants were overweight persons. Out of 57, females were 27, males were 30. As shown in Figure 1.

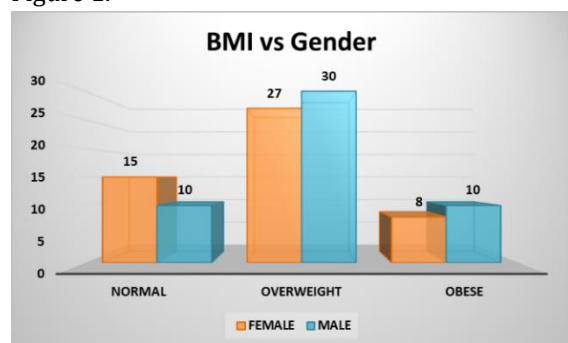


Figure 1: Gender prevalence and impact of BMI in Study population

3.2. Impact of Diabetes in the etiology of fatty liver disease

It was observed from the study that that 38% of patients with Diabetes more than five years having

more prevalence of Fatty Liver changes. More the duration , more the prevalence of complications of Diabetes such as Fatty Liver Disease. As shown in Figure 2.

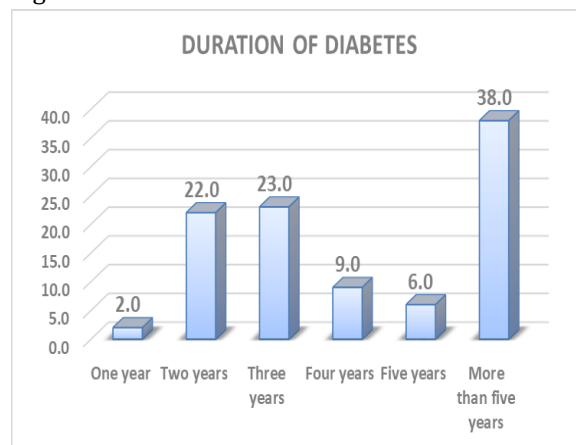


Figure 2: Impact of Diabetes in the etiology of fatty liver disease

3.3. History of contaminant therapy for diabetes in study population

According to study 77% of the participants taking both Siddha and Allopathy medicine as noted with higher prevalence and 23% of rely of only allopathy medication. As shown in Figure 3.

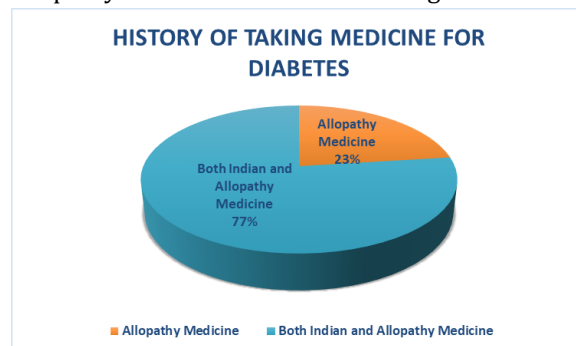


Figure 3: History of contaminant therapy for diabetes in study population

3.4. Impact of Diet in the prevalence of fatty liver among T2DM population

According to study participants taking Non vegetarian (81%), Vegetarian has (19%). Further it was also observed that participants taking non veg is more in males (41%), females (40%). As shown in Figure 4.

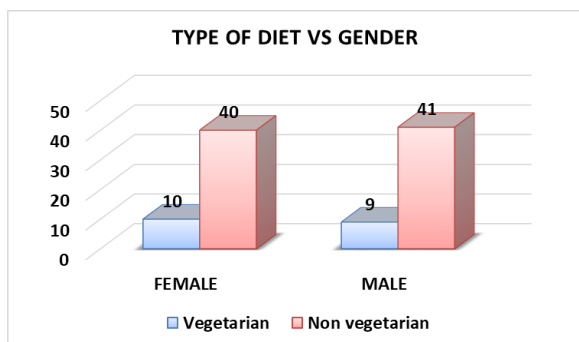


Figure 4 : Impact of Diet in the prevalence of fatty liver disease

3.5. Impact of Habit and co-morbidity in the prevalence of fatty liver disease among T2DM population

Data's obtained from the study clearly emphasize the among the study population majority of the people prevails to have smoking and alcohol consumption. 15% females have female disorders, kidney diseases prevails more in males than females. Existence of hypertension found to be more in males (25%) than females (12%). As shown in Figure 5 and listed in Table 1.

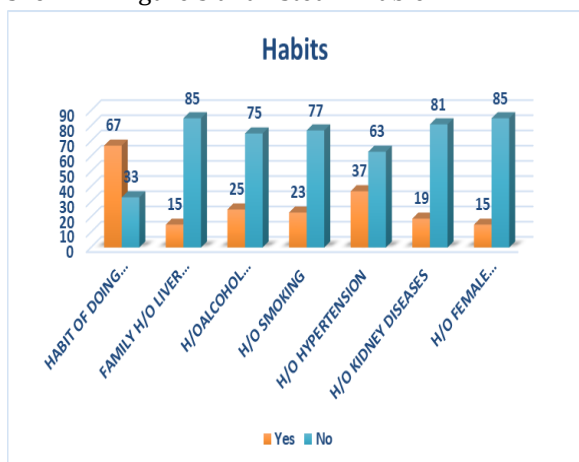


Figure 5 : Impact of Habit and co-morbidity in the prevalence of fatty liver disease

4. Discussion

Global prevalence of NAFLD in the general public is around 15-30%, however the prevalence amongst patients with obesity or T2DM is 70-80% [14]. Diabetes mellitus type 2, often known as T2DM, and nonalcoholic fatty liver disease, also known as NAFLD, frequently occur simultaneously. It has been thought of as a symptom of the metabolic syndrome in recent times. Simple steatosis (NAFL), nonalcoholic steatohepatitis (NASH), and cirrhosis

are the various manifestations of nonalcoholic fatty liver disease (NAFL). Patients with type 2 diabetes have a prevalence of NAFLD that is at 70%. There is a significant correlation between non-alcoholic fatty liver.

Patients with type 2 diabetes who were investigated have a greater BMI was a significant independent factor associated with a higher risk of NAFLD. This study found a positive dosage response relationship between body mass index and the risk of nonalcoholic fatty liver disease (NAFLD). This relationship may strengthen the association's overall strength. Previous research [16,17] has recommended that individuals who are overweight or obese lose weight because of the increased risk of nonalcoholic fatty liver disease (NAFLD) among patients with type 2 diabetes who are obese or overweight. This recommendation also applies to individuals who do not have diabetes. It was observed from the study that the fatty liver is more prevalent in the age group of 50-59 years. Among them females have 17% and males have 18%. Further it was also observed that 57 out of 100 participants were overweight persons. Out of 57, females were 27, males were 30. Because of the presence of insulin resistance, type 2 diabetes has been found to have a substantial association with nonalcoholic fatty liver disease [18]. Additionally, increased rates of overall mortality, mortality attributable to liver and cardiovascular illnesses have been documented when T2DM and NAFLD were present at the same time [19, 20]. In Asian nations, these determinants and co-factors are exhibiting a general upward tendency [21]. This could be owing to the fact that Asians have a different proportion and distribution of body fat compared to Caucasians, which makes Asians genetically prone to the development of insulin resistance even in the absence of significant levels of obesity [22]. It was observed from the study that that 38% of patients with Diabetes more than five years having more prevalence of fatty liver changes. More the duration , more the prevalence of complications of Diabetes such as fatty liver disease.

The Siddha system of medicine is a well-known ancient practise that has survived and thrived for millennia. With extensive knowledge of medicinal herbs and associated supplements, the link between the physiology of biological systems and their importance and coordination in individual well-being was well known. According to study 77% of the participants taking both Siddha and Allopathy medicine as noted with higher

prevalence and 23% of rely of only allopathy medication.

Recent findings point to the possibility that NAFLD is associated to an elevated risk of cardiovascular disease (CVD) in those who do not have diabetes as well as those who have type 2 diabetes. It is interesting to note that research has found links between elevated liver enzymes (especially serum -GGT levels) [23], which serve as surrogate markers of NAFLD, and the occurrence of cardiovascular disease events in both nondiabetic patients and people who have type 2 diabetes. The table that follows provides a summary of the studies that relate NAFLD with CVD [24,25]. Data's obtained from the study clearly emphasize the among the study population majority of the people prevails to have smoking and alcohol consumption. 15% females have female disorders, kidney diseases prevails more in males than females. Existence of hypertension found to be more in males (25%) than females (12%).

5. Conclusion

The prevalence of nonalcoholic fatty liver disease (NAFLD) in people with type 2 diabetes mellitus (T2DM) was reported to range between 34–94% worldwide. This widespread correlation might be explained by a dysfunction in lipid metabolism, which leads to the accumulation of triglycerides in the liver. Insulin resistance is the underlying condition. Patients who have type 2 diabetes and also have non-alcoholic fatty liver disease (NAFLD) have an increased chance of acquiring advanced stages of liver disease, such as fibrosis, cirrhosis, and hepatocellular carcinoma, as compared to patients who do not have diabetes. According to the findings of the current research, an increase in patients' body mass index (BMI), duration of type 2 diabetes, non-vegetarian diet, smoking, and hypertension was a significant contributory factor related with a higher risk of nonalcoholic fatty liver disease (NAFLD).

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Table 1: Impact of Habit and co-morbidity in the prevalence of fatty liver disease among T2DM population

Crosstab		GENDER		chi-square	p-value
		FEMALE	MALE		
HISTORY OF TAKING MEDICINE FOR DIABETES	Allopathy Medicine	13	10	0.508	0.476
	Both Indian and Allopathy Medicine	37	40		
TYPE OF DIET	Vegetarian	10	9	0.065	0.799
	Non vegetarian	40	41		
HABIT OF DOING EXERCISE	Yes	33	34	0.045	0.832
	No	17	16		
FAMILY H/O LIVER DISEASE	Yes	6	9	0.706	0.401
	No	44	41		
H/OALCOHOL CONSUMPTION	Yes	0	25	33.333	<0.001**
	No	50	25		
H/O SMOKING	Yes	0	23	29.870	<0.001**
	No	50	27		
H/O HYPERTENSION	Yes	12	25	7.250	0.007
	No	38	25		
H/O KIDNEY DISEASES	Yes	6	13	3.184	0.074
	No	44	37		
H/O FEMALE DISORDERS	Yes	15	0	17.647	<0.001**
	No	35	50		
USG ABDOMEN FINDINGS(FATTY LIVER CHANGES)	Yes	24	28	0.641	0.423
	No	26	22		