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A Clinical Study on Non-alcoholic Fatty Liver Disease in Type 2 Diabetes mellitus

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Abstract : Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycaemia). The most common liver disease seen in patients with diabetes mellitus is non-alcoholic fatty liver disease [NAFLD].The main objective of this study is to identify the contributing factor of NAFLD in Diabetes Mellitus patients is Whether HbA1c level is related to fatty liver, does the duration of diabetes mellitus has any contribution to this liver disorder, whether BMI is a risk factor for this group of patients, NAFLD is associated with Dyslipidemia. One hundred thirty one patients were included in this study and the lab reports were collected for BMI, Ultrasound examination report of liver, HbA1c, Lipid profile. The mean BMI among the patients was 26.22 kg/m^2 and 43% were over weight, 19% were obese & 35% were normal weight patients. BMI does not influence the incidence or occurrence of non-alcoholic fatty liver disease. Patients >40 yrs of age & diabetic duration>5 yrs are prone to have non-alcoholic fatty liver disease. All diabetic patients should therefore get checked for fatty liver.

This study provides an evidence based conclusion that Over weight patients, obese patients as well as normal weight patients are prone to have the risk of non-alcoholic fatty liver disease, HbA1c level under poor control (8 -10%) & unsatisfactory control (>10%) are at greater risk for developing fatty liver, Non-alcoholic fatty liver disease is not associated with Dyslipidemia.

Key words: Non-alcoholic Fatty Liver Disease, Diabetes Mellitus, Body Mass Index, HbA1c.

INTRODUCTION

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycemia).

Insulin is produced by the beta cells of islets of langerhans in pancreas. Insulin production is stimulated by high levels of glucose and inhibited (limited) by lower levels of glucose. Insulin regulates glucose with glucagon. Insulin's most important feature is its ability to increase the rate of glucose (a crystalline sugar) absorption by cells. Insulin causes a decreased concentration of glucose in the blood and causes the cells to store glycogen (a starch like substance), mostly in the liver. It also promotes the entry of other sugars and amino acids into the muscle and fat cells. Insulin is therefore responsible for promoting fat storage in fat cells and for the total quantity of protein in the body.

More than 50% of the 194 million people suffering from diabetes mellitus globally do not know that they have the disease. The majority of the undiagnosed and/or untreated people live in the developing world. The rate of diagnosis in the developed world is around 70% and in the developing world around 40% (ranging from 25% to 60%). By 2025 more than 333 million people will be suffering from diabetes according to IDF[1].

In India 7852 per million populations are with diabetes a leading cause contributing to 30.3% of patients. The most common liver disease seen in patients with diabetes mellitus is non-alcoholic fatty liver disease [NAFLD][2].

TYPES OF DIABETES

The World Health Organization recognizes three main forms of Diabetes Mellitus:

- Type 1
- Type 2
- Gestational Diabetes
- Type 1 Diabetes Mellitus

Other specific types of diabetes

1. Genetic defect of â cell function due to mutations in various enzymes

Eg: Hepatocyte Nuclear Transcription Factor (HNF), Glucokinase

2. Genetic defect in insulin action

Eg: Type A insulin resistance

3. Diseases of exocrine pancreas

Eg: Chronic pancreatitis, Pancreatic tumours, and Post Pancreatectomy

4. Endocrinopathies

Eg: Acromegaly, Cushing.s syndrome, Pheochromocytoma

5. Drug or chemical induced

Eg: Steroids, Thyroid hormone, Thiazides, â blockers etc.

6. Infections

Eg: Congenital rubella, Cytomegalo virus

7. Uncommon forms of immune mediated diabetes mellitus

Eg: Stiffman syndrome, Anti insulin receptor antibodies

8. Other genetic syndromes

Eg: Down.s syndrome, Kline felter.s syndrome, Turner.s syndrome[3]

This work has been necessitated due to the rising complications of non-alcoholic fatty liver disease (NAFLD) and in the search to find whether the HbA1c level is related to fatty liver, duration of diabetes mellitus has any contribution to this liver disorder NAFLD is associated with dyslipidemia.

MATERIALS AND METHODS

Study design: A prospective, double-masked, parallel, randomized, case control study.

Study site : Trichy Diabetes Speciality Center, Tiruchiappalli.

Study period: The study was conducted during a eight months period.

Inclusion/exclusion criteria:

The subjects of either sex with Type 2 Diabetes Mellitus, Age >30 yrs were included in this study.

Patients with viral hepatitis C, Alcoholic, Acute liver disease, Hepatic cellular, carcinoma, Tuberculosis, Pregnancy, Lactation, participated in any other interventional studies were excluded.

METHOD OF THE STUDY:

The clinical ethics committee of the institution approved of the study. The 131 patients' laboratory reports like BMI, Ultrasound examination report of liver, HbA1c, Lipid profile, Plasma glucose [Fasting, Random], Haematogram, Platelet Count, Hemoglobin count, ESR were collected from patients through the designed data entry format by the regular ward rounds and were thoroughly assessed[4].

Table No: 1: Diabetic Family History of Patients (n=101)

S.NO	Category	Percentage
1	With family history of diabetes mellitus	68%
2	Without family history of diabetes mellitus	32%

Figure No: 1

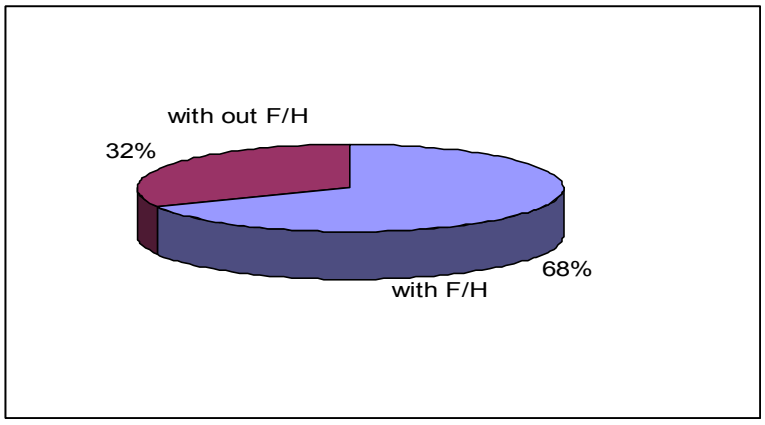


Table No: 2: Body Mass Index among Patients (n=101)

S.NO	Category	Percentage
1	Under Weight [< 18.5 Kg/m^2]	3%
2	Normal Weight [18.5-24.9 Kg/ m^2]	35%
3	Over Weight [25.0-29.9 Kg /m^2]	43%
4	Obese [30.0-39.9Kg/ m^2]	19%

Figure No: 2

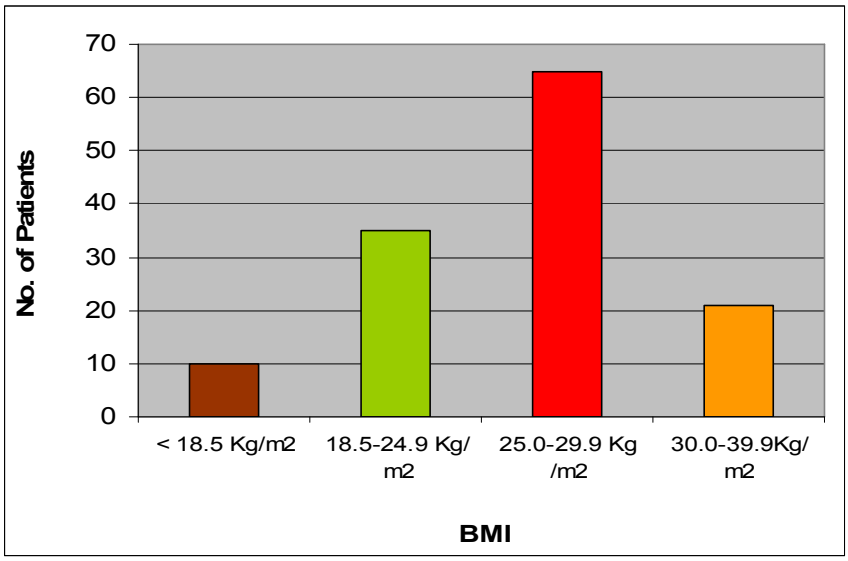
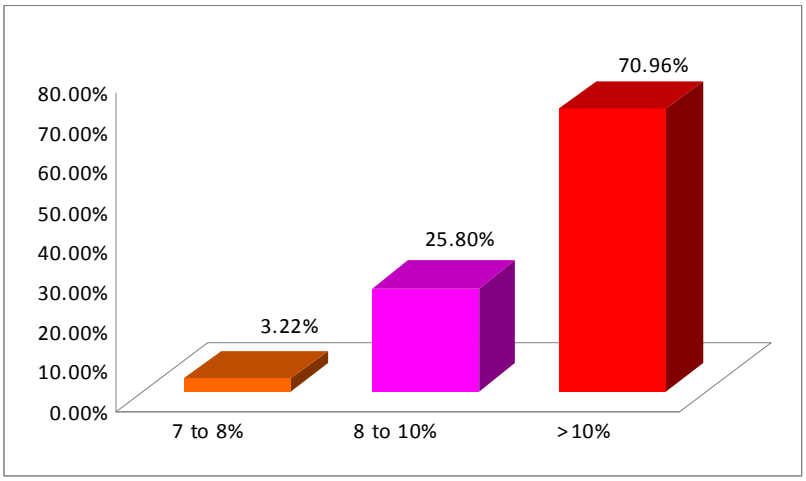


Table No: 3: Glycated Hemoglobin Level among the Patients(n = 31)

S.No	Category	Percentage
1	<6%[Normal Range]	0
2	6-7%[Good Control]	0
3	7-8%[Fair Control]	3.22%
4	8-10%[Unsatisfactory Control]	25.80%
5	>10%[Poor Control]	70.96%

Figure No: 3



RESULTS AND DISCUSSION

Out of the 131 patients under study, 68 were males and 63 were females. Males were more prone to have non-alcoholic fatty liver disease. Regarding social habits of the patients, excluding alcoholic patients, majority of the patients were with out any such social habits.

The mean BMI among the patients was 26.22 kg/m2 and 43% were over weight, 19% were obese & 35% were normal weight patients. BMI does not influence the incidence or occurrence of Non-alcoholic fatty liver disease.

According to this study, patients >40 yrs of age & diabetic duration >5 yrs are prone to have Non-alcoholic Fatty Liver Disease. All diabetic patients should therefore check for fatty liver.

Of the parameters selected for study only HbA1c level shows a clear cut association with diabetes mellitus & non-alcoholic fatty liver disease. Stricter control of diabetes has been shown without any point of doubt to play an important role in preventing the progression of fatty liver disease.

CONCLUSION

In this study, we come to an evidence based conclusion that NAFLD are more among male patients as compared to females, there is no relation between social habits of the patient and occurrence of fatty liver, patients with diabetic duration >5yrs were found to have fatty liver, Poor control (8 -10%) & unsatisfactory control (>10%) of HbA1c level are at a greater risk for developing fatty liver. And non-alcoholic fatty liver disease is not associated with dyslipidemia

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