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Original Research Article

Correlation of NAFLD with BMI and this in general population

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Abstract: Non-alcoholic fatty liver disease (NAFLD) refers to the accumulation of hepatic statuses not due to excess alcohol consumption. NAFLD is the most common liver condition in the world. NAFLD is shown to be associated with obesity, type 2 diabetes, dyslipidemia and hypertension. The thyroid gland is significantly involved in energy homeostasis, lipid and carbohydrate metabolism, regulation of body weight and adipogenesis. In recent years, growing body of evidence has led to speculation on the association between NAFLD/NASH with thyroid dysfunction. The main of this study was 1. To find out correlation of NAFLD with BMI and THS in general population by means of non-invasive methods. 2. To evaluate BMI and THS as a risk factors for the development of NAFLD in general population. The material and methods were total of 500 cases of age 30 to 65 yrs of both genders visiting Medicine OPD of SAMC & PG Institute, Indore over a period of 1½ yrs were included in the study. Anthropometric data were collected. TSH was done in all subjects and USG of abdomen was done in all subjects too see the evidence of NAFLD. The results of the study showed a co-relation between BMI and NAFLD. Among 138 cases with NAFLD out of 500 cases that were under study the mean BMI with SD was found to be 25.39±5.44 and cases without NAFLD the mean BMI with SD was found to be 22.42±3.11 (with p-value of 0.000). The study showed that mean TSH in cases with fatty liver was 2.75±3.02 mg/dl and in those with no fatty liver the mean TSH was 4.5±13.4 mg/dl (with p-value 0.135). In conclusion The BMI is having positive correlation with NAFLD in our study so that public health initiatives and long term preventive strategies hold the key to halt or reverse the pandemic of obesity and possible onset of NAFLD in our society.
Keywords: Non-alcoholic fatty liver disease (NAFLD), obesity, type 2 diabetes, dyslipidemia, metabolism , BMI

INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) refers to the accumulation of hepatic steato is not due to excess alcohol consumption. The prevalence of NAFLD is up to 30% in developed countries and nearly 10% in developing nations, making NAFLD the most common liver condition in the world [1]. Most patients with NAFLD have increased liver fat content alone (simple steato is), but others develop increasing hepatic inflammation known as nonalcoholic steato hepatitis (NASH), and up to 20% of patients reveal progressive hepatic fibrosis and may eventually develop cirrhosis or liver failure. Recent studies have shown NAFLD to be associated with obesity, type 2 diabetes, dyslipidemia and hypertension [2, 3]. Nonalcoholic fatty liver disease (NAFDL) is the hepatic manifestation of the metabolic syndrome (MS) and it is associated with obesity, diabetes mellitus and dyslipidemia [4]. Estimates from recent epidemiological studies indicate a prevalence rate of 10 to 30 percent in the Western adult population [5, 6, 7]. Similar to the one observed in Asian populations [8-11]. The thyroid gland is significantly involved in energy homeostasis, lipid and carbohydrate metabolism, regulation of body weight and adipogenesis. In a clinical setting, subclinical hypothyroidism has been associated with metabolic syndrome, cardiovascular mortality and disturbance of lipid metabolism. In recent years, growing body of evidence has led to speculation on the association between NAFLD/NASH and thyroid dysfunction [12].

Aim & Objective

To find out correlation of non-alcoholic fatty liver disease with BMI and THS in general population by means of non-invasive methods.

To evaluate BMI and THS as a risk factors for the development of non-alcoholic fatty liver disease in general population.

MATERIAL & METHOD

The study was a prospective observation study approved by the ethical committee of Sri Aurobindo medical college and Post graduate Institute, Indore

(M.P.), and an informed written consent was obtained from each patient. The present study was conducted in the OPD of Department of Medicine, Sri Aurobindo Medical College, PGI, INDORE. It was a population based study over a period of 1 ½ year in which 500 patients was taken for study was selected from medicine OPD and ward.

Inclusion Criteria

1. Age: 30-65 Years.
2. All non alcoholic and Alcoholic taking <30g/day in males and <20g/day in females

Exclusion Criteria

1. Alcohol intake >30g/day in males and >20g/day in females
2. Patients with pre-existing liver disease.
3. Patients with diagnosed DM II.

Detailed Clinical History was recorded. Detailed Clinical examination was done. Anthropometric data like weight in Kilogram and height in (Meter) 2 were collected to calculate BMI. The WHO criteria was taken in this study which shows BMI classification less than 18.5 as underweight and may indicate malnutrition, an eating disorder, or other health problems, while a BMI greater than 25 is considered overweight and above 30 is considered obese [13]**.** Based on their BMI the subjects will be classified as obese and non-obese. Subject with BMI≥30kg/m² were taken in the study. Ultrasonography of whole abdomen was done of all patients.

RESULT

A total of 500 cases aged between 30 to 65 years of both genders visiting OPD. Case group included 355 males and 145 females**.(Table-1)** NAFLD was defined as any degree of fatty liver in absence of alcohol intake. NAFLD, if present was classified based on standard Ultrasonography criteria. All the stastical analysis was done by SPSS software version-13.

Table-1: Distribution of study population stratified by Gender

S.No.	Gender	Study Population	%age
1	Males	355	71%
2	Females	145	29%
Total	--	**500**	**100%**

Table-2: Distribution of study population on the basis of BMI

BMI (kgm^2)	Cases	NAFLD	Prevalence
<25	378	79	20.89%
>25	122	59	48.36%

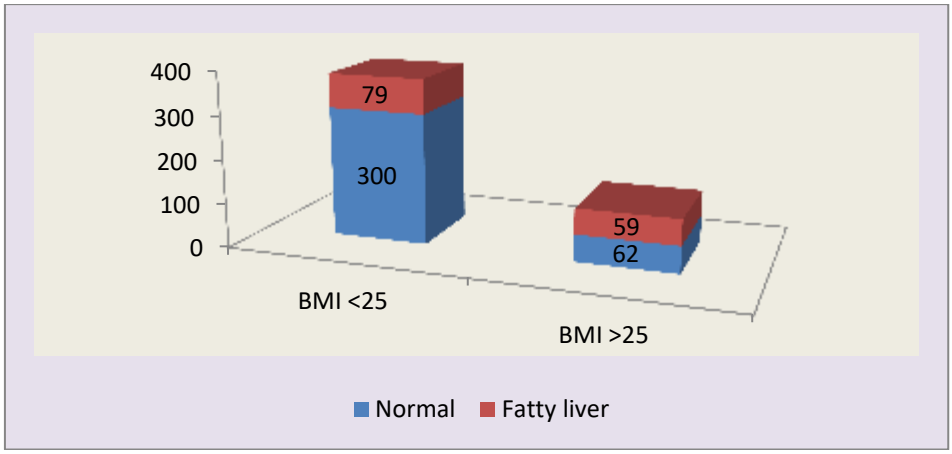

Fig-1: Prevalence of Fatty Liver in patients of BMI<25 and in BMI>25

Among the cases 122 were with BMI>25 kgm^2 , among them 59 were found to have NAFLD with a prevalence of 48.36% and there were 378 cases with BMI<25 kgm^2 in which 79 were having NAFLD with prevalence of 20.89%. **(Table-2 & Fig-1)**This indicates central obesity with BMI >25 have a high risk of development of NAFLD. Among 138 cases with NAFLD out of 500 cases that were under study the mean BMI with SD was found to be 25.39±5.44 and cases without NAFLD the mean BMI with SD was found to be 22.42±3.11 with p-value of 0.000 marking it a significant finding that with increase in BMI risk of development of NAFLD increases.

Table-3: Showing the prevalance of Fatty Liver in cases Hypothyroidism on the basis of serum TSH levels

TSH	N	Mean TSH	SD	SE Mean	t Test (p value)
Normal	362	2.75	3.02	0.25	-1.50(0.135)
Fatty liver	138	4.5	13.4	1.8	Not Sig

DF = 198 non significant

In the study population who were found to have fatty liver, the mean TSH in that group was lower than with no fatty liver.**(Table-3 & Fig-2)** The mean TSH in cases with fatty liver was 2.75±3.02 mg/dl and in those with no fatty liver the mean TSH was 4.5±13.4 mg/dl with p-value 0.135 suggesting hat however there is positive correlation of TSH with NAFLD but it was not significant.

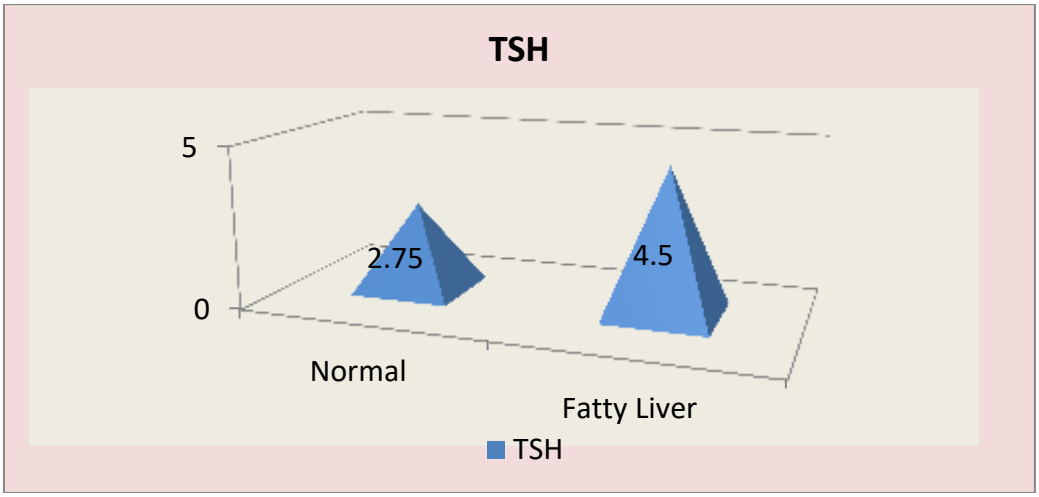

Fig-2: Showing levels of serum TSH in normal subjects and in cases of fatty liver

DISCUSSION

In our study a total of two hundred (500) subject were included in the study. NAFLD is associated with increases BMI. This has been shown by number of studies. In a study done by Cheng fu *et al.;* [14] in 2009 found BMI to be significantly associated with development of NAFLD in general population. In a study done in China by JG Fan [15] in 2009 found out people with BMI>25 have higher prevalence of 40% with mean BMI 29.03±2.8. Kirov ski et al in 2010 studied 155 subjects and his study, prevalence of ultrasound-diagnosed NAFLD was 40.0% NAFLD-patients had significantly higher body mass index (BMI) [16]. The present study also supports all the previous studies and found out that people with BMI >25 have higher risk for development of NAFLD with 48.36% of the study population having NAFLD with BMI >25 with mean value of BMI 25.39±5.44 irrespective of the gender and age which is suggested by p-value of 0.000. In the 122 cases were with BMI>25 kg/m2, among them 59 were found to have NAFLD with a prevalence of 48.36% and there were 378 cases with BMI <25 kg/m2 in which 79 were having NAFLD with a prevalence of 20.89%. This indicates central obesity with BMI>25 have a high risk of development of NAFLD. Among 138 cases with NAFLD out of 500 cases that were under study the mean BMI with SD was found to be 25.39±5.44 and cases without NAFLD the mean BMI with SD was 22.42±3.11 with p-value of 0.000 making it a significant finding that with increase in BMI risk of development of NAFLD increases. And is an important indicator for development of NAFLD in general population and our study supports all the previous studies regarding this.

Zhang J *et al.;* in 2012 study to explore the relationship between serum thyroid stimulating hormone (TSH) level and obesity and non-alcoholic fatty liver disease (NAFLD) in 1322 euthyroid subjects, and found that Serum TSH level was significantly higher in non-alcoholic fatty liver group than in normal group in females but Multiple logistic regression analysis showed that TSH level was not the independent risk factor of NAFLD [17]. In the present study we found that the mean TSH in patients having NAFLD was lower than with no fatty liver. The mean TSH in cases with fatty liver was 2.75±3.02 mg/dl and in those with no fatty liver the mean TSH was 4.5±13.4 mg/dl with p-value 0.135 suggesting that however there is positive correlation of TSH with NAFLD but not to be significant.

CONCLUSION

NAFLD is no longer a disease exclusive to developed Western countries. It should be regarded as a global problem. It can be attributed to the fact with increasing pandemic of overweight and obesity in our

society. Higher levels of BMI >25kg/m^2 is an independent single most important risk factors for development of NAFLD in our society and early indicator in predication of NAFLD. From the above finding we reach at a conclusion that public health initiatives and long term preventive strategies hold the key to halt or reverse the pandemic of obesity and possible onset of NAFLD in our society. Mass campaign regarding physical and dietary measures need to be undertaken in general masses regarding the gravity and potential prevention of fatty liver.

Limitation of Study

1. Histopathology diagnosis of NAFLD was not done.
2. Other anthropometric marker of Obesity like WHR and BSA were not included in the study.

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