



**ORIGINAL RESEARCH PAPER**

**Medicine**

**CORRELATION OF NAFLD WITH TOTAL CHOLESTEROL AND TRIGLYCERIDE IN GENERAL POPULATION**

**KEY WORDS:** NAFLD, total cholesterol, triglyceride, cardiovascular diseases

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**ABSTRACT**

**INTRODUCTION :-** In apparently healthy individuals The presence of Non-alcoholic Fatty Liver Disease (NAFLD) is a common benign finding in the ultrasonography reports and is associated with obesity, type 2 diabetes, dyslipidemia and hypertension. These conditions cluster to form the metabolic syndrome, which carries a high risk for cardiovascular disease. Dyslipidemia is also a growing problem in india and a risk factor also for cardiovascular diseases.

**AIM/OBJECTIVE:-** To find out correlation of non-alcoholic fatty liver disease with total cholesterol and triglyceride in general population by means of non-invasive methods. And To evaluate total cholesterol and triglyceride as a risk factors for the development of non-alcoholic fatty liver disease in general population

**MATERIAL & METHOD:-** All adults patient attending the Medicine OPD of SAMC & PGI in 1<sup>st</sup> year duration were enrolled in the study. Detailed history and clinical examination was done and Ultrasonography of whole abdomen and lipid profile was done for all the patients included in study.

**RESULT:-** We found The mean cholesterol level in NAFLD group was 165.7±63.7 and non fatty liver group was 126.1±41.6 with p-value<0.005 which shows it was significantly higher in NAFLD group than non-NAFLD group.

The mean value of Triglyceride in those with fatty liver was 162.4±77.8 mg/dl as compared to 130.4±51.9mg/dl with p-value 0.001 suggestive of higher level of Triglyceride 'in those having fatty liver

**CONCLUSION:-** The total cholesterol and triglyceride are 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

**INTRODUCTION**

Non-alcoholic Fatty Liver Disease (NAFLD) is a common benign finding in apparently healthy individuals on ultrasonography reports. NAFLD refers to a wide spectrum of diseases ranging from simple fatty liver to non-alcoholic steatohepatitis to cirrhosis. All stages have in common accumulation of fat in the liver cells<sup>(1)</sup>. It occurs in those who do not abuse alcohol but the pathological picture resembles that of alcohol induced liver disease<sup>(2)</sup>. NAFLD is shown it to be associated with dyslipidemia, obesity, type 2 diabetes and hypertension in recent studies<sup>(3)</sup>. These conditions form the metabolic syndrome altogether, which is a high risk factor for cardiovascular disease<sup>(4)</sup>. Most patients with NAFLD have increased liver fat content alone (simple steatosis), but others develop increasing hepatic inflammation known as non-alcoholic steatohepatitis (NASH), and up to 20% of patients reveal progressive hepatic fibrosis and may eventually develop cirrhosis or liver failure.<sup>(5)</sup>

Serum free fatty acids derived from lipolysis of visceral adipose tissue are the main source of hepatic triglycerides in NAFLD, although hepatic de novo lipogenesis and dietary fat supply contribute to the pathogenesis of NAFLD so dyslipidemia may be a risk factor for NAFLD<sup>(6)</sup>. And altered cholesterol level may be associated with the development of NAFLD in non-obese patients<sup>(6)</sup>.

**Aim & Objective**

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

To evaluate cholesterol and triglyceride 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 Department of Medicine. It was a 1<sup>st</sup> year duration study in which 400 patients was taken for study was selected from medicine OPD and ward. Ultrasonography of whole abdomen and lipid profile was done for all the patients included in study

**INCLUSION CRITERIA: -**

1. All patients between 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

**RESULT**

A total of 400 cases aged between 30 to 65 years of both genders visiting OPD. Case group included 284 males and 116 females among them 110 people irrespective of the gender were found to be having NAFLD thus giving a prevalence of 27.5% in general population..(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 as per presence/absence of NAFLD**

		Female	Male	Total
<b>Total</b>	N	116	284	400
<b>Fatty Liver</b>	N	50	60	110
<b>Prevalence of NAFLD IN General population</b>		43%	21%	27.5%
The Chi-square statistic is 9.9756. The P value is 0.001586. significant				

In the study population of 400 cases, 110 were found to have fatty liver with mean cholesterol level 165.7±63.7 with p-value<0.005 which shows this level of cholesterol is highly significant risk factor for development of NAFLD. Among the cases with no fatty liver, mean cholesterol level was 126.1±41.6.(table 1 & Fig 1)

**Table 1 -- Prevalence of NAFLD and Serum Total Cholesterol**

Total Cholesterol	N	Mean Cholesterol	SD	SE Mean	t Test (p value)
Normal	190	126.1	41.6	3.5	-5.13(.000)
Fatty Liver	110	165.7	63.7	8.6	Sig

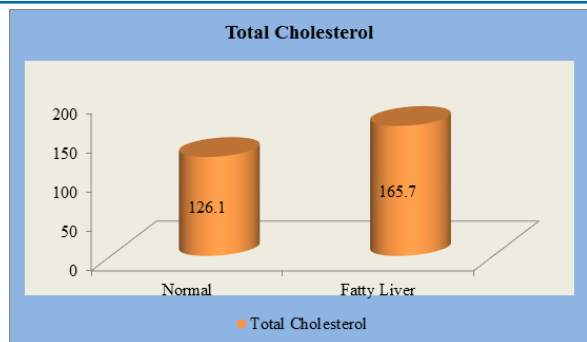


Fig 1 – showing Prevalence of NAFLD and Serum Total Cholesterol

In this study we also tried to find out relationship between Serum Triglyceride and NAFLD.

Among the 400 cases that were taken for the study 42 were having Triglyceride level >200mg/dl. Among them 24 were found to have NAFLD with a prevalence of 57.14% making TG level more than 200mg/dl a single most important risk factor for the development of NAFLD (table2&3)

Table 2- Distribution of study population on the basis of triglyceride

	N	Triglyceride (mg/dl)	
		>200	<200
Normal	190	18	272
Fatty Liver	110	24	86
Total	400	42	358

Table 3 – prevalence of NAFLD with Triglyceride level >200mg/dl

Cases with TG level >200	NAFLD	Prevalence
42	24	57.14%

In the study group of 400 cases 110 were found to be having fatty liver, and in those with fatty liver mean level of Triglyceride was found to be higher than those with no fatty liver. The mean value of Triglyceride in those with fatty liver was 162.4±77.8 mg/dl as compared to 130.4±51.9mg/dl with p-value 0.001 suggestive of higher level of Triglyceride in those having fatty liver, (table 4 & Fig 2) making high level of Triglyceride one of the important risk factors for development of fatty liver. Out of 42 people with fatty liver, 24 were found to have Triglyceride level more than 200(57.14%) making it as one of the single most important risk factor for development of fatty liver.

Table 4 -- PREVALENCE OF NAFLD AND TRIGLYCERIDE

Triglyceride	N	Mean TG	SD	SE Mean	t Test (p value)
Normal	190	130.4	51.9	4.3	-3.36(.001)
Fatty Liver	110	162.4	77.8	10	Sig

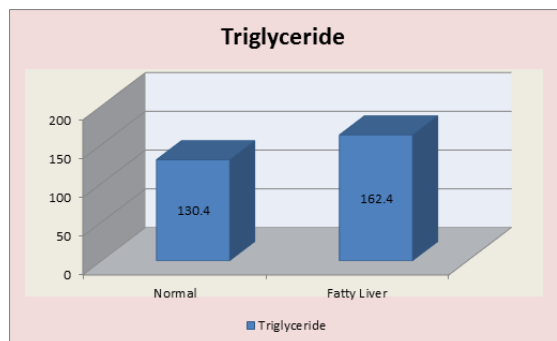


Fig 2 – SHOWING PREVALENCE OF NAFLD AND TRIGLYCERIDE

DISCUSSION

This study was conducted in Department of Medicine, SAIMS & PG Institute, Indore, (M.P.). A total of four hundred (400) subject were included in the study

In our study we found that NAFLD was associated with high total cholesterol and triglyceride level. This has been shown by many studies. In a study by **Deepa et al**<sup>(7)</sup> in 2008 showed prevalence of high TG and total cholesterol level to be significantly associated in development of NAFLD. Mean value of TG in NAFLD positive on Ultrasonography was 277.02±88.90 mg/dl as compared to 132.56±69.77 mg/dl in non-NAFLD population. A study by **Aggrawal et al**<sup>(8)</sup> in 2010 compared lipid profile of NAFLD and found high level of TG and total cholesterol level to be significantly associated with development of NAFLD. In a study done by **Araujo et al**<sup>(9)</sup> in Brazil in 2010 also found that out of 76 people with Triglyceride level > 200, 68% had NAFLD. In the same study he showed people having NAFLD the mean TG level was 253±40.13.

In the present study out of total 400 cases 110 were found to be having fatty liver, and in those with fatty liver the mean cholesterol level was 165.7±63.7 with p-value<0.005 which shows this level of cholesterol is highly significant risk factor for development of NAFLD. Among the cases with no fatty liver, mean cholesterol level was 126.1±41.6 And in our study we also found that the mean value of Triglyceride in those with fatty liver was 162.4±77.8 mg/dl as compared to 130.4±51.9 mg/dl with p-value 0.001 suggestive of higher level of Triglyceride in those having fatty liver, making high level of Triglyceride one of the important risk factors for development of fatty liver. Out of 110 people with fatty liver, 24 were found to have Triglyceride level more than 200. Among 42 cases with TG level >200, 24 were found to have NAFLD with a prevalence of 57.14% making it as one of the single most important risk factor for development of fatty liver. And total cholesterol and triglyceride are important indicators for development of NAFLD in general population and our study supports all the previous studies regarding this.

CONCLUSION

NAFLD is now not confined to developed Western countries only but is a global problem nowadays. With a prevalence of 27.5% in our study its prevalence is almost equal to Western countries which can be attributed to the fact with increasing pandemic of overweight and obesity in our society.

It has been found that higher level of serum cholesterol and triglyceride could act as biochemical marker for prediction of development of fatty liver in general population and beside that Higher levels of triglyceride is a important risk factors for development of NAFLD in our society and early indicator in prediction 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 dyslipidemia 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

Histopathology diagnosis of NAFLD was not done

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