

Lipid Profile of Patients with Non Alcoholic Fatty Liver Disease

Pravin Kumar, N Biplab Singh, Salam Kenny Singh, Lourembam Robin Singh, Takar Biyaching

Date of Submission: 07-02-2020

Date of Acceptance: 22-02-2020

I. Introduction:

The term non alcoholic fatty liver disease (NAFLD) was first coined by Ludwig J et al¹ in 1980. It indicates fatty infiltration of the liver, defined as a fat concentration > 5–10 % of the liver weight in the absence of excessive alcohol consumption and other causes of chronic liver disease such as viral hepatitis or drugs. The prevalence of NAFLD in Indian population ranges from 5-28 % which is comparable to the West. NAFLD is the hepatic manifestation of the metabolic syndrome and is associated with obesity, diabetes mellitus and dyslipidemia. The present study is designed to study the lipid profile of patients with NAFLD diagnosed by Ultrasonography and evaluate the relationship between the non alcoholic fatty liver disease and various metabolic abnormalities.

II. Aims And Objects :

To study the lipid profile of patients with non alcoholic fatty liver disease
To assess the risk factors associated with non alcoholic fatty liver disease.

III. Material And Methods:

The cross sectional study was conducted in the Department of Medicine, Regional Institute of Medical Sciences, Imphal. Patients attending Medicine OPD, Liver and gastroenterology OPD and those admitted in medicine ward, were included in the study. All patients diagnosed as NAFLD by ultrasonography were investigated for lipid profile abnormalities.

INCLUSION CRITERIA:

1. Age:18 years and above
2. Both male and female patients fulfilling the criteria of non alcoholic fatty liver disease on imaging (USG or CECT whole abdomen)
3. Patients who gave informed consent to this study.

EXCLUSION CRITERIA:

1. Patients consuming more than 20g of alcohol per day.
2. Coexisting liver disease namely
 - a. Chronic viral hepatitis
 - b. Autoimmune hepatitis
 - c. Primary billiary cirrhosis
 - d. Primary sclerosing cholangitis
 - e. Wilson's disease
 - f. Hemochromatosis
 - g. α -AT deficiency
 - h. Billiary obstruction
3. Secondary causes (e.g. corticosteroid use, gastric bypass surgery.) of liver steatosis.

IV. Results And Observation

The study titled "**Profile of patients with non alcoholic fatty liver disease**" was carried out in the Department of Medicine, RIMS, Imphal. Patients attending Medicine OPD, Liver and gastroenterology clinic and patients admitted in Medicine ward were included. A total of 144 patients with NAFLD were included in the study

Table 1: Age distribution of patients studied

Age in years	n=144	%
18-30	16	11.1
30-50	53	36.8
50-70	71	49.3
70-90	4	2.8
Total	144	100.0

Mean ± SD: 47.17±14.61

Table 1 shows the age distribution of patients with NAFLD. Most of the patients 49.3% were in the age group of 51-70 years. The age varied from 18 years to 90 years with a mean of 47.17±14.61 years.

Table 2: Gender distribution of patients studied

Gender	n=144	%
Female	105	72.9
Male	39	27.1
Total	144	100.0

Table 2 shows the distribution of study population by sex. Females were predominantly involved comprising 72.9% of the total study population. Male:female ratio in the study population was nearly 1:2.6

Table 3: HDL level in patients studied

HDL (mg/dl)	n=144	%
• <35	41	28.5
• 35-59	93	64.6
• ≥60	10	6.9

Table 3 shows that 64.6% of study subjects had HDL level between 35-60 mg/dl. HDL was < 35 mg/dl in 28.5% of the study participants while only 6.9% of the participants had HDL > 60 mg/dl

Table 4: Low density lipoprotein (LDL) level in studied population

LDL (mg/dl)	n=144	%
• <100	6	4.2
• 100-199	130	90.3
• ≥200	8	5.6

Table 4 shows that most of the study participants 90.3% had LDL level between 100-199 mg/dl. 4.2% of the study population had LDL <100 mg/dl and 5.6% had LDL level ≥ 200 mg/dl.

Table 5 : Distribution of study subjects according to their total cholesterol level.

Total Cholesterol (mg/dl)	n=144	%
• <150	30	20.8
• 150-199	68	47.2
• 200-249	41	28.5
• ≥250	5	3.5

Among the studied participants 47.2% had total cholesterol level between 150-199 mg/dl. 28.5% had total cholesterol level between 200-249 mg/dl, and 20.8% had total cholesterol below 100 mg/dl. Only 3.5% of the study subjects had total cholesterol level above 250 mg/dl.

Table 6: Distribution of study subjects according to their triglyceride level.

triglyceride (mg/dl)	n=144	%
• <150	49	34
• 150-199	72	50
• ≥200	23	16

Most of the study participants 50.0% had triglyceride level between 150-199 mg/dl. 34% had triglyceride level below 150 mg/dl and only 16% had triglyceride level above 200 mg/dl

Table 7: Distribution of study subjects according to their PPBS.

PPBS (mg/dl)	n=144	%
• <140	25	17.4
• 140-200	90	62.5
• >200	29	20.1

Table 7 shows the distribution of study subjects according to their PPBS. 62.5% of the study participants had PPBS level between 144-199 mg/dl, 17.4% had PPBS level below 140 mg/dl and 20.1% participants had the level \geq 200 mg/dl

Table 8: Distribution of study subjects according to their FBS. (n=144)

FBS (mg/dl)	n=144	%
• <100	102	70.8
• 100-126	25	17.4
• >126	17	11.8

Table 8: Shows that of the study participants 60.8% had FBS level <100 mg/dl, 11.8% participants had the FBS level \geq 126 mg/dl and 27.4% had the FBS level in between 100-125 mg/dl.

Among 144 patients, 22% were diabetic, 66.4% were prediabetic and 11.6% were non diabetic.

Table 9: Serum ferritin distribution of patients.

Serum Ferritin	n=144	%
<100	24	16.7
100-120	23	16.0
>120	97	67.4
Total	144	100.0

Most of the study participants 67.4% had serum ferritin level \geq 120 ng/ml.

Table 10 : BMI (kg/m²) distribution of patients studied

BMI (kg/m ²)	n=144	%	WHO Asian BMI classification ⁹
18.5-22.9	61	42.4	Normal
23.0-24.9	39	27.1	Overweight
25.0-29.9	30	20.8	Class 1 obesity
30.0 & above	14	9.7	Class 2 obesity
Total	144	100.0	

Table 10 shows that among the studied population 42.4% had the BMI within **normal range** of 18.5-22.9 kg/m². 27.1% of the patients were **overweight** with a BMI of 23-24.9 kg/m². 20.8% of the subjects were **obese (class 1)** with a BMI of 25.0-29.9 kg/m². While 9.7% of the studied population were **obese (class 2)** with a BMI of 30 kg/m² and above.

V. Discussion

71 patients in our study 49.3% were in the age group 50-70 years with age varying from 18 to 90 years with a mean \pm SD of 47.17 \pm 14.6. In a study by Lazo MD et al² on the epidemiology, NAFLD was found in all age groups; however the prevalence appears to be increasing with age.

Male:female ratio was 1:2.6, with females comprising 72.9% and male comprising 27.1% in our study. Similarly in a study by Kapoor A et al³ on the prevalence of NAFLD among adults aged 30 years and above in a rural population of Jammu it was found that the prevalence of NAFLD was more in females i.e. 38.4% as compared to males 36.6%.

Among 144 NAFLD patients 21% (31) were diabetic of which 65% (20) were female and 35% (11) were male and 66.4% of the patients were prediabetics or having impaired glucose tolerance test. The mean fasting blood sugar level was 96.99 \pm 29.90 mg/dl and mean post prandial blood sugar level was 169.30 \pm 47.17 mg/dl. Similarly in a study by Kalra S et al⁵ on prevalence of NAFLD in type 2 diabetes patients in India, 56.5% T2DM patients were identified as having NAFLD. Prevalence of the disease was found to be higher in females than in males

67.4% patient had a serum ferritin level of >120 ng/ml similarly in Du SX et al⁶ study of association of serum ferritin with non-alcoholic fatty liver disease showed that higher serum ferritin level was noticed in NAFLD patients against control group .

The mean total cholesterol was 188.45 \pm 51.18 mg/dl, mean triglyceride level was 184.06 \pm 72.35 mg/dl, mean LDL level was 137.57 \pm 44.7 mg/dl and mean HDL level was 41.33 \pm 11.22 mg/dl. NAFLD had significant statistically differences in terms of total cholesterol, triglyceride, LDL cholesterol. Similarly in Qazi N et al⁷

study to see the association of lipid profile and liver enzyme in NAFLD patients attending a tertiary care hospital in northern India found that there was statistically significant differences (<0.001) in terms of total cholesterol, triglyceride, HDL and LDL cholesterol.

Among our studied population 42.4% had the BMI within normal range of 18.5-22.9 kg/m². 27.1% of the patients were overweight with a BMI of 23-24.9 kg/m². 20.8% of the subjects were preobese with a BMI of 25.0-29.9 kg/m² while only 9.7% of the studied population were obese with a BMI of 30 kg/m² and above. The mean BMI was 21.2±3 kg/m² (normal body weight). Sadroddin L et al⁸ study on assessment of NAFLD cases and its correlation to BMI and metabolic syndrome in healthy blood donors found that 378 donors had elevated ALT levels at first measurement. Among the 378 donors, 35 cases had persistently elevated serum ALT level. NAFLD was the diagnosis in 22 (62.9%) of these 35 cases with persistently elevated serum ALT level and the mean BMI of these 22 cases was 31.18 ±5.7 (type1 obesity)

VI. Conclusion

NAFLD showed female predominance in our study and most of the patients were in the age group of 50-70 years. The BMI of 42.2% of our studied population was in normal range, 27.1% of the patients were overweight. 20.8% of the subjects were preobese while 9.7% of the studied population were obese.

Lipid profile was abnormal in 67.2% of cases, high density lipoprotein was high in 6.9% cases, while 28.5% of the subjects had low HDL, total cholesterol was high in 42.4 % cases and LDL was high in 90.3% of cases. Serum triglyceride was high in 66% of cases.

Among the NAFLD patient in our study 22% were diabetic, 66.4% were prediabetic and 11.6% were non diabetic. The mean fasting blood sugar level was 96.99±29.90 mg/dl and mean post prandial blood sugar level was 169.30±47 mg/dl.

Among our studied patients, 97(67.4%) had a serum ferritin level of > 120 ng/ml. In most of our study population TSH, PT-INR, Serum uric acid and liver enzymes level were in the normal range

. Our study reveals that there is higher prevalence of dyslipidemia, prediabetes and hyperferritinemia in cases of NAFLD. Liver biopsy is considered the gold standard for diagnosing NAFLD, but is not practical and most patients shy away from getting it done. Thus patients must be evaluated for the presence of NAFLD by abdominal USG. Early detection would help in modifying the disease course and delaying its complications. Preventive programs should be launched to encourage people to adopt healthy life style i.e. regular exercise, low calorie, high fibre diet and avoid over indulgence in alcohol.

Further studies need to be undertaken to keep up with changing trends in the lipid profile of NAFLD patients

References

- [1]. Ludwig J, Viggiano TR, McGill DB, Ott BJ. Nonalcoholicsteatohepatitis. Mayo Clinic experiences with a hitherto unnamed disease. *Mayo Clinic Proc*1980;55(7):434-38.
- [2]. Lazo MD, Clark J. The epidemiology of nonalcoholic fatty liver disease: A global perspective. *Semin Liver dis* 2008;28(1):339-50.
- [3]. Kapoor A, Chowdhary S, Dewan D, Dev G, Kumari R, Kumar D. Prevalence of non alcoholic fatty liver disease (NAFLD) among adults aged 30 years and above in a rural population of Jammu-An Observational Study. *NJCM* 2018;9(1):787-93.
- [4]. Lopez-Suarez A, Guerrero JMR, Elvira-González J, Beltran RM, Canas-Hormigo F, BascuñanaA. Nonalcoholic fatty liver disease is associated with blood pressure in hypertensive and nonhypertensive individuals from the general population with 11;23(1):1011-17.
- [5]. Kalra S, Vithalani M, Gulati G, Kulkarni CM, Kadam Y, Pallivathukkal J, et al. Study of prevalence of non-alcoholic fatty liver disease(NAFLD) in type 2 diabetes patients in India (SPRINT). *J Assoc Physicians India* 2013;21(7):448-53.
- [6]. Du SX, Lu LL, Geng N, Victor DW, Chen LZ, Wang C, et al. Association of serum ferritin with non-alcoholic fatty liver disease: a meta-analysis. *Lipids in Health Dis* 2017;16(1):228-34.
- [7]. Qazi N, Sameer SA, Aziz R, Hamid S. Association of lipid profile and liver enzyme among non alcoholic fatty liver disease patients attending a tertiary care hospital in northern Indian. *Int J Curr Res* 2015;7(1):14348-52.
- [8]. Sadroddin L, Alireza G, Mahnaz Y, Ahmad E, Reza M. Assessment of NAFLD cases and its correlation to BMI and metabolic syndrome in healthy blood donors in Kerman. *GastroenterolHepatol Bed Bench* 2012;5(1):183-89.
- [9]. World Health Organization (WHO). International Association for the Study of Obesity (IASO) and International Obesity Task Force (IOTF). *The Asia-Pacific Perspective: Redefining Obesity and its Treatment*. Geneva: World Health Organization 2000;(1):378-420.

Pravin Kumar, et al. "Lipid Profile of Patients with Non Alcoholic Fatty Liver Disease." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(2), 2020, pp. 44-47.