

# Association of Non Alcoholic Fatty Liver Disease in Systemic Hypertension

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**Abstract:** To investigate the association of non alcoholic fatty liver disease in hypertension. Non alcoholic fatty liver disease (NAFLD) is the most common liver disease. It was thought to be a benign condition but is now increasingly recognized as a major cause of liver-related morbidity and mortality. NAFLD results from insulin resistance and it is considered as part of the metabolic syndrome. Essential hypertension is also considered an insulin resistant state. Studies on non-obese and non-diabetic patients with primary hypertension has shown that hypertension increases the risk of NAFLD. It is worthwhile evaluating for NAFLD in hypertensive patients by simple ultrasonography and liver function tests

**Keywords:** Fatty liver, Hypertension, Alcohol, Obesity, Risk factors

## 1. Introduction

Non alcoholic fatty liver disease (NAFLD) is the most common liver disease, it occurs as a histological spectrum of disease and includes the subtypes of simple steatosis and nonalcoholic steatohepatitis (NASH) (1). Studies introduced that NAFLD may progress to cirrhosis, liver failure, and hepatocellular carcinoma (2). It has been shown that NAFLD is strongly associated to the features of metabolic syndrome. Essential hypertension is also considered an insulin resistant state, recent studies consider NAFLD as an early mediator of atherosclerosis and an increased cardiovascular risk factor. Essential hypertension is known to be associated with the metabolic syndrome and hyperinsulinaemia being seen in up to 50% of non-obese patients with hypertension. Non-alcoholic fatty liver disease is considered the most common liver disease affecting 15–25% of the general population. Although hypertension has been associated with the development of severe NAFLD in obese patients, (3) hypertension and fatty liver have also been linked in the non-obese population. Hypertensive patients with raised liver enzymes should be referred for further assessment, particularly if risk factors for progressive liver disease, such as obesity and diabetes, are present (4). The aim of this study is to investigate the prevalence of non alcoholic fatty liver disease in systemic hypertensive patients.

## 2. Materials and Methods

### Study Population

From January 2016 to June 2016 a retrospective study of case sheets were conducted. The case sheets of hypertensive subjects were collected from medical records department of Saveetha medical college.

The study included systemic hypertensive and non alcoholic patients, study excluded patients with portal hypertension, pulmonary hypertension and patients who consume alcohol.

Case sheets of 100 patients were collected, reports of liver function tests, Ultrasound abdomen, Lipid profile and Blood

pressure were collected. The results were analyzed and tabulated.

The data was divided into patients with NAFLD and patients without NAFLD. Results for Prevalence of NAFLD among different age groups was also calculated.

### Proforma

ASSOCIATION OF NON – ALCOHOLIC FATTY LIVER DISEASE IN HYPERTENSION  
Retrospective Study of Case sheets

Name :	Hospital No:
Age :	Weight :
Sex :	Height :
Diagnosis :	
USG Abdomen :	
BP level – Stage JNC VIII :	
Fasting blood Sugar level (FBS):	Post Prandial Sugar level (PP) :
TSH:	
Lipid profile : 1) Cholesterol- 2) LDL - 3) VLDL - 4) Triglycerides- 5) HDL -	
Uric Acid :	
ECG:	ECHO Heart :
Liver function test (LFT): 1) Sr. Bilirubin- 2) SGOT- 3) SGPT - 4) Sr. Protein - 5) SAP-	
Renal function test (RFT) : 1) Blood urea- 2) Serum Creatine - Electrolytes : 1) Sodium - 2) Potassium-	

## 3. Results

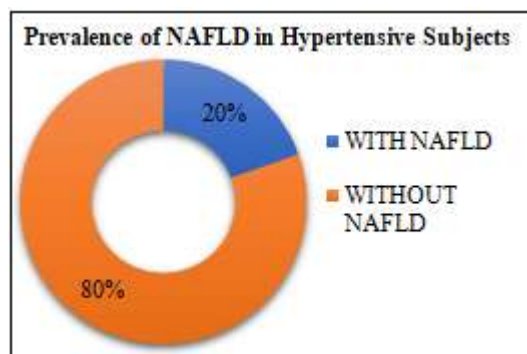
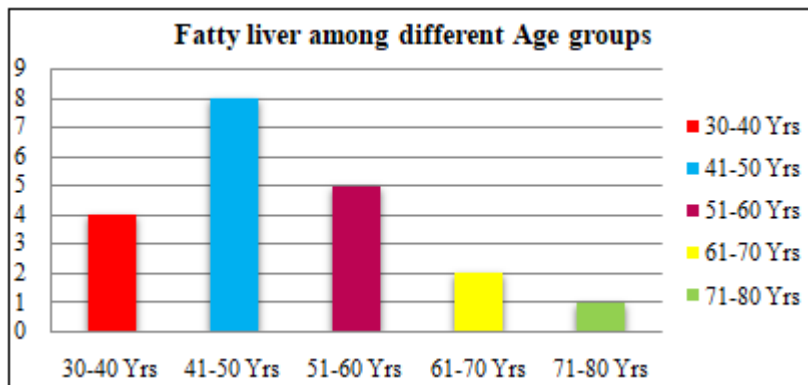


Figure 1 Shows the prevalence of NAFLD in the hypertensive patients. NAFLD was present in 20% of patients

Table 1 shows mean and standard deviation of variables by comparing patients with NAFLD and patients without NAFLD.

S.NO	Variable	With NAFLD (n=20)		Without NAFLD (n=87)	
		Mean	STDEV	Mean	STDEV
1	AGE	51.4	11.1	59	12.9
2	SYSTOLIC	148.5	16.3	88.6	13.3
3	DIASTOLIC	88.5	14.96	149.3	18.7
4	FBS	79.4	52.6	95.5	94.1

5	PPBS	84.5	5.9	89.2	55.6
6	TB	0.8	0.64	0.85	1.42
7	DB	0.3	0.21	0.27	0.26
8	SGOT	26.1	15.2	32.7	32.2
9	SGPT	26.2	12.9	27	17
10	ALP	90.6	35.4	79	37
11	TP	6.03	0.6	5.74	1.03
12	BLOOD UREA	30.5	13.8	36.5	28.03
13	CREATINE	0.8	0.32	1.57	1.92
14	SODIUM	133.1	4.69	133.3	25.4
15	POTASSIUM	3.94	0.72	3.84	0.61



**Figure 2:** Shows prevalence of NAFLD among different age groups

The prevalence of NAFLD was higher in age group of ( 41-50) years followed by patients among the age group of( 51-60) years , which was followed by patients among the age group of 31-40 years.

#### 4. Discussion

An association between abnormal liver function tests and hypertension was identified by Ramsay in 1977, who found that up to 15% of all male hypertensive patients had abnormal liver function tests (5). In this study, NAFLD was present in 20% of the hypertensive patients. The mean systolic value was 148.5 in patients with NAFLD and 88.6 in patients without NAFLD. The mean diastolic value was 88.5 in patients with NAFLD and 149.3 in patients without NAFLD. The FBS and PPBS values were increased in patients without NAFLD than in patients with NAFLD. Blood urea is higher in patients without NAFLD than patients with NAFLD . Sodium levels are increased in patients without NAFLD than patients with NAFLD. Potassium levels are increased in patients with NAFLD than patients without NAFLD. The interaction of hypertension, fatty liver and the metabolic syndrome is complex. The clinical significance of fatty liver remains poorly understood, although there is clear evidence of potential progression to NASH, hepatic fibrosis and cirrhosis in high-risk groups.

In addition to a greater prevalence of fatty liver, our hypertensive group showed many features of the metabolic syndrome—namely, higher insulin, glucose, and insulin resistance, and a clear trend towards higher cholesterol which, according to the literature, are associated with arterial hypertension in approximately 50% of patients (6,7).

#### 5. Conclusion

There is a pressing unmet need to determine the prevalence of NAFLD in hypertensive population and to evaluate its association with CVD. Studies on non-obese and non-diabetic patients with primary hypertension has shown that hypertension increases the risk of NAFLD .It has only recently been recognized that NAFLD represents an important burden of disease for patients with hypertension.

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