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NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD); FREQUENCY IN DIABETES MELLITUS (TYPE II) PATIENTS AND NON DIABETIC GROUP AT SHALAMAR MEDICAL AND DENTAL COLLEGE, LAHORE.

Dr. Nusrat Alavi[1], Dr. Saima Amin[2], Madiha Mumtaz[3]

1. Assistant Professor, Department of Pathology, Shalamar Medical and Dental College, Lahore
2. Associate Professor, Department of Pathology, Shalamar Medical and Dental College, Lahore
3. Medical Laboratory Technologist, Department of Pathology, Shalamar Medical and Dental College, Lahore

Correspondence Address:
Dr. Nusrat Alavi
Assistant Professor,
Department of Pathology,
Shalamar Medical and Dental College, Lahore
nusratpinky@hotmail.com

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ABSTRACT… Objectives: To assess the incidence of NAFLD and biochemical profile in non-diabetic and diabetic patients. **Study Design:** It was a cross sectional descriptive study. **Setting:** Shalamar Institute of Health Sciences (SIHS), Lahore. **Period:** Six months, Jan 2015 to Jun 2015. **Methods:** The patients coming to the Radiology Department for abdominal ultrasound were age and sex matched into fatty liver and non-fatty liver groups and diabetic and non-diabetic groups and were further evaluated on the basis of glucose, alanine aminotransferase (ALT) and triglycerides (TG) levels from the laboratory data. **Results:** The findings of all biochemical parameters were raised in diabetic patients with fatty liver as well as in non-fatty liver diabetic group and the differences were found to be statistically (P value less than 0.05) significant. In non-diabetic group, out of 200 subjects 56.5% had NAFLD whereas 43.5% had no NAFLD. In diabetic patients, out of 200 patients 69% had NAFLD and 31% had no NAFLD and the difference was significant statistically (P= <0.05). The prevalence of NAFLD 12.5% was higher in type-2 diabetic patients as compared to non-diabetic group. In non-diabetic group, 113 subjects had TG value of 181±82.49, while 87 subjects had TG of 141±44.5. In diabetic patients, 138 patients had TG value of 467±277.64 whereas 62 patients had TG value of 178±46.52, which was statistically significant (P= <0.05). **Conclusion:** Fatty liver is an important marker for metabolic syndrome which is a pre-diabetic condition. The occurrence of NAFLD was elevated in type II patients of diabetes. The traditional risk factors for NAFLD are considered to be female sex, type II diabetes mellitus, obesity and hypertriglyceridemia. Hyperglycemia, hypertriglyceridemia and elevated ALT were observed more repeatedly in fatty liver than in non-fatty liver (type II) diabetic patients.

Key words: Non-alcoholic fatty liver disease (NAFLD), Triglycerides (TG), Alanine aminotransferase (ALT), Hepatocellular carcinoma (HCC), Statistical packages for social science (SPSS), OPD (outpatient department).

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INTRODUCTION

Non-alcoholic fatty liver disease[2, 3] is progressively known as main reason of chronic liver disease. It affects broadly the pathology of liver from steatosis followed by non-alcoholic steatohepatitis (NASH) which is a necroinflammatory type of disorder, and finally cirrhosis[5, 6] and hepatocellular carcinoma (HCC).[1, 2] Fat accumulation, mitrochondial oxidative stress and cytokines (inflammatory) produce liver damage.[1, 2]

In steatosis (pathogenesis), main abnormality is insulin resistance, causing lipolysis, resulting in elevation of circulating fatty acids (free)[8], which are used as source of energy by liver. Liver mitochondrial oxidation system is overloaded by fatty acids, cause FA accumulation in liver.[9]

Undeniably, some researchers proposed that NAFLD to be the hepatic expression of the insulin resistance syndrome.[7, 9-10] The NAFLD absolute diagnosis is rely on histological findings of liver sample's biopsy on the basis of sonography. It is expensive & invasive process and is linked with several complications.[13, 15] Manifestation of deep attenuation, bright echo-texture (in comparison to kidneys) & vascular blurring either in combination or individually are of NAFLD's

important sonographic features .[14] It had been described that fatty liver strongly effects the severity of liver resistance to insulin in diabetes (type-II) mellitus.[11] The liver fat amount predicts the quantity of regular insulin required to sustain suitable glucose level.[12]

OBJECTIVE

The objective of this research was to find out the link between NAFLD with diabetes, hypertriglyceridemia and ALT in patients coming from diabetic clinic and general OPD of Shalamar Institute of Health Sciences (SIHS), Lahore.

MATERIAL& METHOD

Study of Association of NAFLD with type 2 diabetes was carried out at Shalamar Institute of Health Sciences (SIHS), Lahore in Departments of Radiology and Pathology.

Study Design

It was a cross sectional study perform with non- probability comfort sampling on 400 patients in Shalamar Hospital, Lahore over the period of 6 months, starting from Jan 2015 to Jun 2015. The patients were divided into two categories diabetic (type II) and non-diabetic.

Inclusion/Exclusion Criteria

Patients were diagnosed as having fatty liver on ultrasonography. Patients with suspected autoimmune hepatitis, hemochromatosis and Wilson disease were excluded on the basis of history. The subjects were between the ages of 30-60 years and include diabetic (type II) and non-diabetic patients. Age and sex matched subjects (diabetic (type II) + non diabetic) were selected. Biochemical results of subjects of ALT, triacylglycerides and glucose (random) were taken from medical record. NAFLD was diagnosed to be present in patients with elevated ALT in the presence of fatty liver on ultrasound. The ultrasound, showed a diffuse hyper echoic texture (bright liver).

The patients were selected age sex matched into non-fatty liver and fatty liver groups and were more assessed on the basis of glucose, alanine aminotransferase (ALT) and triglycerides (TAG) profile from the clinical data.

The data was entered into Statistical packages for social science (version 20.0) and get results. Mean and standard deviation were calculated for quantitative variables like Glucose and triglycerides by "T-test". It was used for comparison of "mean" of the quantifiable variables among patient's two groups which were considered not significant statistically at P value >0.05. P value <0.05 was consider significant in statistics.

RESULTS

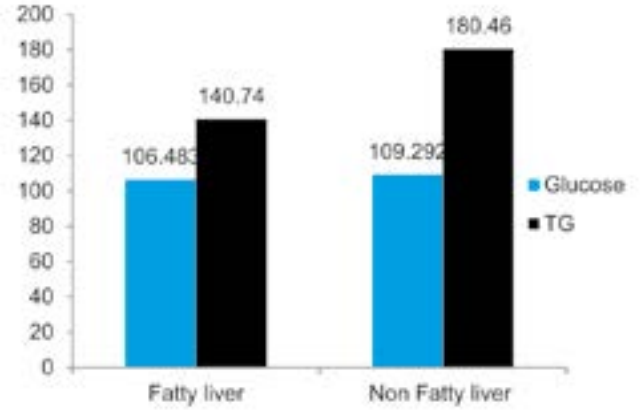
The study contained within total 400 patients of diabetes mellitus (Type II) and non-diabetic subjects. The normal ages of patients were ranging from 35 to 66 years which includes 67% females and 33% males. Comparison of serum biochemical profile's means between fatty-liver and non-fatty liver groups of diabetic (type II) and non-diabetic patients is showed in Table and graph-1 and 2.

STUDY VARIABLES	NAFLD =113	NO NAFLD=87	T-VALUES	P-VALUES
Glucose	109± 22.8	106± 19.7	t=-0.915	P=0.03*
Triglycerides (TG)	181± 82.5	141± 44.5	t=-4.057	P=0.00*

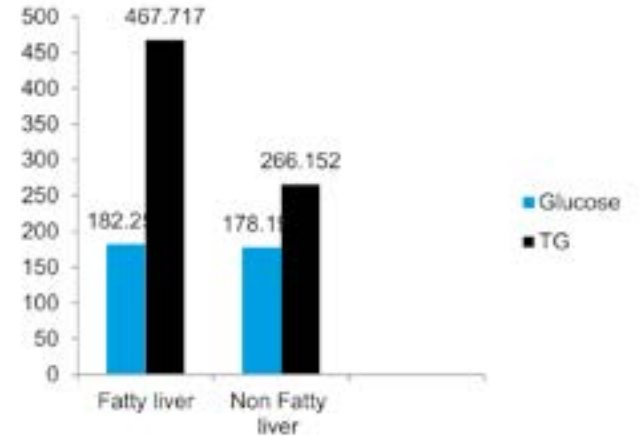
Table-I. Comparison of laboratory findings between fatty liver and non-fatty liver in non-diabetic group (n=200)
**SIGNIFICANT*

STUDY VARIABLES	NAFLD =138	NO NAFLD=62	T-VALUES	P-VALUES
Glucose	266± 95.7	182± 67.2	t=-6.238	P=0.00*
Triglycerides (TG)	467± 277.6	178± 46.5	t=-8.149	P=0.00*

Table-II. Comparison of laboratory findings between fatty liver and non-fatty liver in diabetic patients (n=200)
**SIGNIFICANT*



Graph-1. Comparison of laboratory findings between fatty liver and non-fatty liver in non-diabetic group (n=200)



Graph-2. Comparison of laboratory findings between fatty liver and non-fatty liver in diabetic patients (n=200)

The results of all biochemical indicators were higher in both diabetic fatty (liver) disease patients also in diabetic (non-fatty liver) group and the variances between them were shows significant (P value <0.05) values. In non-diabetic group, out of 200 subjects 56.5% had NAFLD whereas 43.5% had no NAFLD. In diabetic patients, out of 200 patients 69% had NAFLD and 31% had no NAFLD and the difference was also significant (P=<0.05). The prevalence of NAFLD was 12.5% greater in type-II diabetic-patients in comparison to non-diabetic group. In non-diabetic group, 113 subjects had fatty liver with TG and glucose value of 181± 82.49 and 109± 22.8, while 87 subjects had no fatty liver on ultrasonography and their TG and glucose values were 141± 44.5 and 106± 19.7 respectively. In diabetic patients, 138 patients had fatty liver with TG and glucose value of 467± 277.64 and 266± 95.7 whereas 62 patients had no fatty liver on ultrasonography and their TG and glucose values were 178± 46.52 and 182± 67.2 respectively, which was statistically significant (P= <0.05). Out of 200, diabetic patients 13 (6.5%) had TG <150, 42 (21%) TG >500 and 4 (2%) TG=500. Out of 200, non-diabetic group 103 (56.5%) had TG <150, 0 (0%) TG >500 and TG=500.

DISCUSSION

In liver diseases, (NAFLD) non-alcoholic fatty liver disease is a common one. It is primarily seen in diabetic and obese persons. The incidence of fatty liver lies between 10-20% in common population and rises 50 to 75% in type 2 DM subjects.[18] In our study, we had 200 non diabetic group and 200 diabetic patients. In Pakistan estimated that 69% of patients with type II "DM" have fatty liver; that conclusion is alike to results from different studies, a research from Karachi, investigated by Luxmi *et al.* on 120 diabetic patients report the occurrence of NA-FLD 60.8% & Akber *et al.* from Saudi-Arabia 55.6% of diabetic Type-2. From India, Gupta *et al.* described that in diabetes is 49%. The increase in the fatty liver in diabetics in our setup is due to a very active diabetic outpatient clinic, leading to majority of patient referrals.[17-18, 22]

Higher levels of triglycerides were observed more in diabetic patients who may possibly reflect a greater accumulation of fatty acid into the liver, higher insulin resistance and a greater tendency to develop into NAFLD.[18] Elevated serum triglyceride is the features of the metabolic syndrome. Hypertriglyceridemia in diabetic patients has been reported in 93% of patients with NAFLD in our study. This is similar to Ijaz-ul-Haque *et al* and Luxmi *et al* who reported serum triglycerides rose in up to 92.15% in fatty liver patients.[18, 22]

In our study, non-diabetic group, 56.5% subjects had fatty liver with TG 181± 82.49 while 43.5% subjects had no fatty liver on ultrasonography and their TG was 141± 44.5. In diabetic patients, 69% patients had fatty liver with TG 467± 277.64,

whereas 31% patients had no fatty liver on ultrasonography and their TG values was 178± 46.52. These conclusions are constant with those stated in the literary texts.[25] Jin HB *et al.* in China, study performed also established that fatty liver absolutely associated with serum levels of triglyceride.[21]

Our study showed that in non-diabetic group (56%) had ALT > 40 IU/L, ALT = 40 IU/L (7.5%), ALT < 40 IU/L (36.5%) respectively. In diabetic patients, (69%) had ALT > 40 IU/L, ALT = 40 IU/L (6%), ALT < 40 IU/L (25%) respectively. These findings are with accordance to Rector RS *et al.* (2008).[19]

It is appropriate to said that we had used ultrasound of abdomen as marker for revealing NAFLD which can be identify if the fat >33% in liver and ultrasonography sensitivity for finding of fatty liver is reduced if fat content < 33% of hepatic weight in patient. The utmost common NAFLD cause is slight rise of plasma ALT[23], the most widespread disease of liver in diabetes 2 type.

We use ultrasonography of abdomen to monitor the patients of NAFLD. US characteristics of NAFLD comprise of raised vascular blurring, liver echogenicity and deep attenuation signals of ultrasound.[24] NAFLD is frequently linked with diabetes mellitus, obesity, hypertriglyceridemia, higher ALT, hypercholesterolemia and high uric acid. In non-obese subjects, amongst metabolic disorders, hypertriglyceridemia was interrelated to NAFLD. Plasma level of ALT was not as worthy interpreter of metabolic importance in individuals with NAFLD.[20]

CONCLUSION

Inpatients of type II diabetes, nonalcoholic "fatty liver-disease" (NAFLD) is most frequently seen. Serum ALT and serum triglyceride are considerably elevated in "NAFLD" patients. Patients of diabetes having pain or heaviness upper right abdomen with raised serum triglycerides and ALT would be further carefully observed for NAFLD, cardiovascular risk factor and liver complications. The prevalence of fatty liver in Non-diabetic group markedly high, suggesting that these patients are at risk for developing complications of metabolic syndrome. We suggested that abdomen ultrasound should be added in number of tests for individuals undertaking fitness or health checkups before getting employment.

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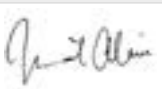
AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Nusrat Alavi	Precption, Study design, Data collection & analysis, manuscript writing	
2	Dr. Saima Amin	Preception, Study design, data collection & analysis, manuscript writing	
3	Madiha Mumtaz	Percpetion, Study design, data collection & analysis manuscript writing