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Frequency of Ischemic Heart Disease and Diabetes Mellitus in Patients having ultra-sonographic Non-Alcoholic Fatty Liver Disease

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Abstract

Aims and Objectives: Non-alcoholic fatty liver disease is one of the most common liver conditions globally. This study was aimed to assess the frequency of ischemic heart disease & diabetes mellitus in patients having Fatty Liver disease.

Methods: This was a cross-sectional study. It was carried out in the department of internal medicine KRL Hospital, Islamabad from May 2022 to October 2022. Patients aged 18 years and above having ultrasonography evidence of fatty liver disease were included. All subjects were evaluated for the presence of Diabetes Mellitus and Ischemic Heart Disease. Prior ethical approval was obtained from the hospital committee. Data was analyses using SPSS version 21.

Results: This study included 250 patients. 66% were female and 34% were male. Age ranges from 18 to 80 years with a mean of 49± 4.5. 175 (70%) had Grade I fatty liver disease on ultrasound, 63(25.2%) had Grade II fatty liver disease while 12 (4.8%) had Grade III fatty liver disease. Diabetes Mellitus was present in 145(58%) while Ischemic Heart Disease was found in 75(30%).

Conclusion: A significant relation was found between underlying fatty liver disease and Diabetes Mellitus and Ischemic Heart Disease. In view of the above, lifestyle changes become inevitable in all patients having underlying Fatty Liver Disease.

Keywords: Diabetes Mellitus, Ischemic heart disease (IHD), Fatty liver disease,

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Introduction

Non-alcoholic fatty liver disease (NAFLD) is a hepatic illness marked by aberrant fat build-up in liver cells. The disease occurs when fat forms more than 10 to 15% of the liver's weight, with histological similarities to alcohol-induced liver damage[1]. In the absence of heavy alcohol consumption, the term NAFLD is used to characterize a wide range of fatty liver alterations, from simple steatosis to steatohepatitis, cirrhosis, and hepatocellular carcinoma (HCC)[2].

Non-alcoholic fatty liver disease, which is defined as hepatic steatosis without a secondary etiology, is the most frequent cause of liver disease in westernized nations, affecting up to 33% of the general population. and up to 75% in specific subgroups such as obese people[3], compared to Pakistan, where fatty liver disease affects roughly 15% of the general population[4].

NAFLD can be diagnosed using a variety of investigations such as ultrasonography (US), computed tomography (CT), nuclear magnetic resonance (NMR) and liver biopsy. Present literature has proved that nuclear magnetic resonance (NMR) showed high sensitivity and specificity followed by ultrasonography (US) and computed tomography (CT), as a noninvasive approach.

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Although liver biopsy is the gold standard for diagnosing steatosis, it is an intrusive procedure[5].

The presence of nonalcoholic fatty liver disease (NAFLD) in type 2 diabetes is connected to an elevated risk of cardiovascular disease (CVD), regardless of other metabolic syndrome components[7]. Fatty liver changes are linked to obesity and metabolic disorders such as hyperglycemia and dyslipidemia. All of which are risk factors for atherosclerosis and ischemic heart disease (IHD)[8] Type 2 diabetes is becoming more common across the world, with endemic levels in some Asian countries. Recently, liver disease has been recognized as a major complication of type 2 DM with standard mortality rates for cirrhosis greater than that for cardiovascular disease. Insulin resistance is a key pathogenetic factor in both type 2 diabetes and NAFLD, the latter being a hepatic manifestation of the metabolic syndrome[9-10]

Ongoing studies have reported that there is a role of Non-alcohol Fatty Liver Disease in development of ischemic heart disease and diabetes. For furthering this co-relation, we aimed to assess the frequency of ischemic heart disease & diabetes mellitus in patients with Fatty Liver.

Material and Method

This Cross-sectional Study was conducted in the department of internal medicine KRL Hospital, Islamabad from May 2022 to October 2022. 250 participants were included in the study by multistage simple random sampling technique. Conventional ultrasonography was used as a tool to look for Fatty Liver. ultrasound-based grading is Parenchymal brightness, Liver-to kidney contrast, deep beam attenuation, bright vessel walls and gall bladder wall definition. Grades range from 0 to 3, with Grade 0 being normal. Grade 1 (mild) being slightly diffused, increase in fine echoes in hepatic parenchyma with normal visibility of diaphragm and intra-hepatic artery boundaries. Grade 2 (moderate) has moderate diffuse increase in fine echoes with slightly impaired visualizations of intra-hepatic vessels and diaphragm. Grade 3 or severe, is depicted by marked increase in fine echoes with poor or no visualizations intrahepatic vessel borders, diaphragm, and posterior portion of right lobe of liver6. Patients with chronic liver disease and those who did not give consent were excluded from our study. Data was collected after ethical approval from KRL hospital committee & Informed consent was taken. The predesigned questionnaire was used having patients' demographic details.

Table I: shows patients demographics

		Number	Percent
Gender	Female	165	66.0
	Male	85	34.0
Age	18-40 years	64	25.6
	41-80 years	186	74.4

Table 2: shows BMI and personal characteristics.

BMI	Number	Percent
less than 8.5	1	0.4
18.5 to 24.9	68	27.2
Overweight 25 to 30	106	42.4
Grade 1 obesity 30 to 34.9	49	19.6
Grade 2 obesity 35 to 40	23	9.2
Severe obesity more than 40	3	1.2

Data were analyzed using SPSS version 21. Results were interpreted in terms of frequencies and percentages. Chi-square test was used to test the relationship between the qualitative variables, and independent t test was used for the quantitative variables. A P value < .05 was regarded as statistically significant.

Results

A total of 250 patients were included in our study. Age ranges from 18 to 80 years with a mean of 49± 4.5 years

Table 3: shows Grades of Fatty Liver and co-existing Diabetes and Ischemic Heart Disease in studied population.

Grades of Fatty Liver	Number	Percent
Grade 1	175	70.0
Grade 2	63	25.2
Grade 3	12	4.8

Discussion

Ultrasonography of the liver can be used as a preliminary workup tool to label steatosis as liver enzyme levels are seen to be normal in early stages of fatty liver6. In this study association of diabetes mellitus and ischemic heart disease with non-alcoholic

fatty liver disease (NAFLD) was studied. Review articles favour the idea that NAFLD has a strong association with Diabetes Mellitus [11-12]. Additionally, it is associated with ischemic heart disease13.

According to our study more women than men were affected with NAFLD. This is consistent with research done on gender differences around the world. ([14-15]) Additionally older age groups having greater incidence of NAFLD was also seen.[16] In our study highest prevalence of NAFLD was amongst the group that was classified as Overweight (42.4%) followed by obese grade 1 (19.6%). It is widely accepted that obesity is a definite risk factor in leading to NAFLD and so is smoking (17-19). 60% of the sample population in this study had a sedentary lifestyle. In this study patients having Grade 3 fatty liver disease had 91.7% coexisting diabetes while those having Grade 2 fatty liver disease had 73% co-existing diabetes. As regards ischemic heart disease, it was found in 91.7% of Grade 3 fatty liver disease patients and 34.2% in Grade 2 fatty liver disease patients.

Patients proven to have NAFLD have higher incidence of Major adverse cardiovascular events (MACE) including ischemic heart disease, stroke, CHF, and cardio-vascular mortality.[9,20]

There are certain limitations to this study, one being the small population that participated in the study, further studies with a larger population would yield more accurate results, including people with NAFLD from the community, since this study include only patients of KRL Hospital and that might lead to selection bias. Secondly, studies should be done taking into account different ethnic groups in Pakistan, and also from different regions and provinces of Pakistan. Thirdly, though ultrasound is considered to be very specific in diagnosing NAFLD, the gold standard test that is liver biopsy should be considered in future research.

Conclusion

A significant relation was found between underlying fatty liver disease and Diabetes Mellitus and Ischemic Heart Disease. In view of the above, lifestyle changes become inevitable in all patients having underlying Fatty Liver Disease.

Conflict of Interest: No
Acknowledgement: No

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