Original Article

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Prevalence of Fatty Liver Disease in Patients Presenting to General Medicine Clinic with Abdominal Pain and Deranged Liver Function Tests at Tertiary Care Hospital Islamabad

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ABSTRACT

Objective: To determine the frequency of fatty liver disease in patients presenting with abdominal pain and deranged liver function tests at a tertiary care hospital in Islamabad.

Methodology: This cross-sectional study was conducted using a non-probability sampling technique in the Department of General Medicine, Rawal Institute of Health Sciences, Islamabad, over a period of eight months from March 2023 to October 2023. Adult male and female patients presenting with upper abdominal pain and deranged liver function tests (LFTs) were included. Baseline demographic and clinical data were collected and analyzed using SPSS version 26.0.

Results: A total of 512 patients were screened, out of which 199 (38.86%) were diagnosed with fatty liver disease. Patients with fatty liver were significantly older (mean age: 40.22 ± 6.84 years), had a higher body mass index (BMI: 26.81 ± 2.34 kg/m²), and elevated alanine aminotransferase (ALT: 63.18 ± 29.33 mg/dL). Comorbidities were also more prevalent: diabetes mellitus (n = 63, 31.65%), hypertension (n = 74, 37.18%), and current smoking (n = 41, 20.60%)—all statistically significant ($p < 0.05$).

Conclusion: The study demonstrates a significant association between fatty liver disease and patients presenting with abdominal pain and deranged LFTs. Advanced age, elevated ALT levels, hypertension, diabetes mellitus, and smoking were found to be important risk factors.

Keywords: Fatty liver disease, abdominal pain, liver function tests, South Asia, risk factors

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Introduction

Fatty liver disease is becoming more prevalent due to increased use of junk food and a sedentary lifestyle leading to obesity, type II diabetes mellitus, hyperlipidemia, and metabolic syndrome.[1] A recently published study included pooled data from 1990 – 2019 has shown the global prevalence of fatty liver was 30.05%.[2] Progression of simple fatty liver disease (NAFLD) to NASH is common if the patient does not take proper care. Dyson JK[3] in his study observed a 10%-30% prevalence of NASH among simple fatty liver disease. A study from Pakistan has shown the prevalence of non-alcoholic steatohepatitis (NASH) and non-alcoholic fatty liver disease (NAFLD) was 47% and 12.3%, respectively[4] The prevalence of NAFLD and NASH is lower in America, 46% and 12.2%, respectively.[5]

Most patients with fatty liver disease are asymptomatic; however, some may present with mild right upper quadrant pain or tenderness.[6] Additionally, these individuals may report nonspecific gastrointestinal symptoms such as abdominal discomfort, altered bowel habits, increased thirst, and feelings of anxiousness.[7] Early initiation of appropriate management is crucial, as untreated fatty liver disease can progress to inflammation, fibrosis, cirrhosis, and ultimately hepatocellular carcinoma. [8]

Liver function tests (LFTs) are often deranged in cases of advanced fatty liver disease, although they may remain within normal limits in simple steatosis. [9] A study by Forlano et al. [9] demonstrated elevated ALT levels in patients diagnosed with fatty liver disease. Despite this, limited research has focused on the identification of fatty liver disease based on clinical presentation combined with abnormal LFTs. Therefore, we conducted this study to investigate the frequency of fatty liver disease in patients presenting with abdominal pain and deranged liver function tests. This approach represents a non-invasive and cost-effective preliminary diagnostic strategy before proceeding with more expensive and complex investigations.

Methodology

This cross-sectional, hospital-based study was conducted using a convenient sampling technique in the Department of General Medicine at Rawal Institute of Health Sciences (RIHS), Islamabad—a tertiary care hospital serving a population of 2.09 million (as of 2017). The study was carried out over a period of eight months, from March 2023 to October 2023. RIHS not only caters to the population of Islamabad and nearby cities but also receives patients from across Pakistan.

Ethical approval was obtained from the hospital's ethical committee (IRB No. RIHS/IRB/14/2023) prior to the commencement of the study. Informed consent was obtained from all participants after explaining the purpose and benefits of the study.

All adult males and females aged 18 to 60 years presenting to the outpatient department (OPD) with complaints of abdominal pain and deranged liver function tests were included. Patients were excluded if they had conditions that could affect liver function tests (e.g., hepatitis, alcohol consumption, liver cancer), abdominal pain not localized to the right hypochondriac region, or were taking medications for hyperlipidemia.

The diagnosis of fatty liver disease was made based on abdominal ultrasound findings. A structured questionnaire was used to collect relevant data, including demographic information (age, gender, area of residence, social class, and marital status), anthropometric measurements (weight, height, and body mass index), and laboratory investigations such as random blood sugar (RBS, mg/dL), gamma-glutamyl transpeptidase (GGT, mg/dL), alanine aminotransferase (ALT, mg/dL), and aspartate aminotransferase (AST, mg/dL).

Data entry and analysis were performed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. Independent sample t-tests were used to compare continuous variables between groups. Pearson's chi-square test or Fisher's exact test, as appropriate, was used for comparisons between categorical variables. A two-sided p-value of <0.05 was considered statistically significant.

Results

A total of 512 patients were screened and among them, 199 (n = 38.86%) patients were diagnosed with fatty liver disease who presented with abdominal pain and deranged liver function test while 313 (61.13%) did not have fatty liver disease. (Figure 1)

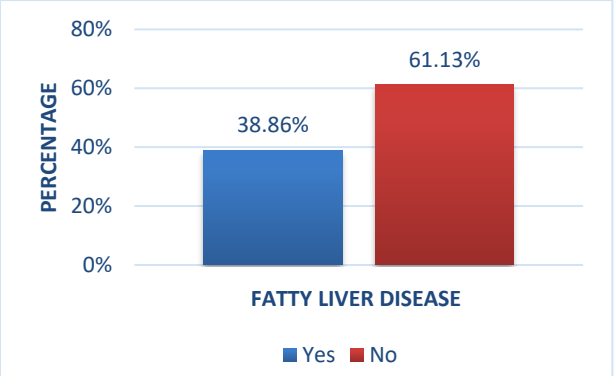

Figure 1. Prevalence of fatty liver disease in patients presenting with abdominal pain and altered LFT. (n= 512)

The overall mean age of patients was 36.41±12.59 years. Most of our study participants were males (62.10%, n = 318), urban dwellers (77.92%, n = 399), belongs to middle socio-economic stratum (75.78%, n = 388), married (84.96%, n = 435), and hypertensives (26.95%, n = 138). (Table I)

Table I: Baseline and clinical characteristics of study participants. (n = 512)

Characteristics	Overall
Age – years	36.41±12.59
Weight -Kg	82.14±15.08
Height -cm2	174.22±6.1
BMI - kg/m2	23.04±6.55
RBS - mg/dL	135.5±100.42
ALT - mg/dL	48.11±60.42
AST - mg/dL	58.44±18.20
Gender	N (%)
Male	318 (62.10%)
Female	194 (37.89%)
Area of residence	
Rural	113 (22.07%)
Urban	399 (77.92%)
Social Class	
Lower	81 (15.82%)
Middle	388 (75.78%)
Upper	43 (8.39%)
Marital Status	
Single	74 (14.45%)
Married	435 (84.96%)
Widowed	3 (0.58%)
Comorbid conditions	
Type 2 DM	93 (18.16%)
Hypertension	138 (26.95%)
Current Smoker	60 (11.71%)

Table II: Baseline and clinical characteristics of study participants. (n = 512)

Characteristics	**Fatty liver disease**		**p-value**
	Yes (N = 199)	**No (N = 313)**	
Age - years	40.22±6.84	38.10±11.51	**0.02***
Weight -Kg	88.61±12.31	81.8±10.2	**0.04***
Height -cm2	171.10±8.53	172.66±4.33	**<0.01***
BMI - kg/m2	26.81±2.34	23.08±3.86	**<0.01***
RBS - mg/dL	183.66±98.42	148.22±78.09	**<0.01***
ALT - mg/dL	63.18±29.33	48.39±60.22	**0.03***
AST - mg/dL	61.43±22.34	59.79±24.18	0.09
Gender	**N (%)**	**N (%)**	
Male	112 (56.28%)	206 (65.81%)	0.34
Female	87 (43.71%)	107 (34.18%)	
Area of residence			
Rural	71 (35.67%)	42 (13.41%)	0.08
Urban	128 (64.32%)	271 (86.58%)	
Social Class			
Lower	22 (11.05%)	59 (18.54)	0.49
Middle	165(82.91%)	223 (71.24%)	
Upper	12 (6.03)	31 (9.90%)	
Marital Status			
Single	55 (27.63%)	19 (6.07%)	0.55
Married	142 (71.35%)	293 (93.61%)	
Widowed	2 (1.0%)	1 (0.31%)	
Comorbid conditions			
Type 2 DM	63 (31.65%)	30 (9.58%)	**0.02***
Hypertension	74 (37.18%)	64 (20.44%)	**<0.01***
Current Smoker	41 (20.60%)	19 (6.07%)	**<0.01***

***p value <0.05 is statistically significant*

Further evaluation of patients concerning their association with fatty liver disease was assessed in Table No. 02. A significant proportion of patients with fatty liver disease were older (40.22±6.84 – years), higher BMI (26.81±2.34 – kg/m^2), raised ALT levels (63.18±29.33 – mg/dl), diabetic (31.65%), hypertensive (37.18%), and current smokers (20.60%), p-value <0.05. (Table II)

Discussion

Fatty liver disease has become a major public health concern due to its complications in long-term if left untreated.[10] Most of the patients remain undiagnosed and present with non-specific symptoms unless the disease becomes advanced[6] Concerning the serious nature of this problem, a physician should be able to make a suspicion in such patients who present with abdominal pain and deranged LFTs because more than 50% of the patients with fatty liver disease present with upper abdominal pain or discomfort.[11] On the other hand, LFTs are usually normal but, deranged LFTs may be found in around 10% of the cases with fatty liver disease.[12] Due to high suspicion of fatty liver disease among these patients, we have planned to conduct this study so that true prevalence of fatty liver disease and its association with other baseline and clinical manifestations would be ascertained.

A previously conducted study by Teng ML[13] and colleagues showed the global incidence of fatty liver disease rose from 26% in 2005 to 38% in 2016, demonstrating 47 cases per 1,000 population. Furthermore, the authors explored a higher prevalence of males than females. Our study findings are consistent with previously published study. There are multiple causes of this projected prevalence including increased uptake of junk food, change in environment, change in dietary habits, and also, an adaptation to a sedentary lifestyle.[13, 14] In light of known causes, authors are now recommending lifestyle modification to prevent this disease's occurrence and progression to advanced fatty liver disease.[15, 16] In our study, the overall prevalence of hypertension was higher as compared to patients with diabetes mellitus, 37.18% and 31.65%, respectively. Similar findings were observed in previously conducted studies where the prevalence of hypertension was 78.9% and the prevalence of diabetes mellitus was 23.7%.[17] Furthermore, hypertension was 1.4 times more prevalent among patients with fatty liver disease. [18] A recently published study from Pakistan has shown a higher prevalence of fatty liver disease among diabetics in which

other risk factors such as dyslipidemia, higher HbA1c levels, and higher diastolic blood pressure were present.[19]

In our study, we also explored the association of fatty liver disease with baseline and clinical characteristics of patients with abdominal pain and altered liver function tests. A significant proportion of patients with fatty liver disease were older (40.22±6.84 – years), higher BMI (26.81±2.34 – kg/m^2), raised ALT levels (63.18±29.33 – mg/dl), diabetic (31.65%), hypertensive (37.18%), and current smokers (20.60%), p-value <0.05. A meta-analysis conducted in the South Asian region has shown a significant association of fatty liver disease among urban dwellers, diabetes mellitus, hypertension, dyslipidemia, central obesity, and metabolic syndrome.[20] Another study conducted in Morocco also agrees with previously published studies.[21] The reason behind this high prevalence is quite obvious, urban residents usually eat junk food more than rural dwellers along with a high prevalence of metabolic syndrome and its risk factors.

Besides important findings obtained from our study, this study also has certain limitations that shall be corrected in future studies so that more relevant data may be obtained. First of all, the sample size for this study is small and the study was conducted from a single center. The stage of fatty liver should also be included along with its association with baseline and clinical parameters. Lastly, the duration of symptoms and lifestyle of patients should also be included to determine their relationship with the occurrence of fatty liver disease.

Conclusion

This study provides scientific evidence supporting an association between abdominal pain, deranged liver function tests, and fatty liver disease. Therefore, patients presenting with these clinical features should be routinely screened for fatty liver disease to enable early detection and timely intervention, potentially preventing progression to advanced disease stages and associated complications.

This study provides scientific evidence of association with abdominal pain and deranged fatty liver disease.

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