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Exploring the Connection: Fatty Liver Disease and Abnormal Liver Function in Iraq

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Abstract: This paper aims to exploring the Connection between Fatty Liver Disease and Abnormal Liver Function in Iraq, where a cross-sectional study was conducted based on the results found in the medical records of several different hospitals in Iraq for 150 patients. This study was designed to combine qualitative and quantitative research, and all demographic data were collected, and the study will be conducted over a period of six months, with the initial phase commencing upon ethical approval. Patients who did not attend blood sampling and data collection appointments had a history of viral hepatitis B or C, had a history of chronic alcoholism determined by the Alcohol Use Disorders Identification Questionnaire (AUDIT), and had any of the following conditions: autoimmune hepatitis; Wilson's disease; hereditary hemochromatosis. These findings highlight the fact that specific public health initiatives must be put in place to address the increasing burden of FLD in Iraq. Early intervention, better access to health care, and lifestyle changes are crucial for altering the progression caused by this condition and preventing its transition to more serious liver disorders. In an effort to enhance injury prevention and treatment methods, future research will focus on genetic predisposition and its consequences for long-term considerations of FLD among the Iraqi population.

Keywords: ALD, ALT, AST, Fatty liver, Abnormal, NAFLD.

INTRODUCTION

Fatty liver disease (NAFLD, non-alcoholic fatty liver disease) can be simple steatosis (isolated fat, which in principle does not have a poor prognosis) and/or steatohepatitis (in which case, inflammation and progressive fibrosis appear, which can lead to cirrhosis and hepatocellular carcinoma) (Younossi, Z.M. *et al*., 2016). This disease is rapid all over the world, and there is an apparent association of a rapid increase in obesity. One of the most common present-day causes of chronic liver disease, as can be inferred from the increasing number of patients on the waitlist for liver transplantation for it. Identification of patients at high risk requiring special care is the point of this important issue. Most individuals are asymptomatic with NAFLD, and incidental findings identified them. Progressive disease starts out being asymptomatic but can lead to more significant liver damage, advanced fibrosis, cirrhosis, and eventually liver cancer (Phoolchund, A.G.S. & Khakoo, S.I., 2024). Fatty liver disease is one of the most common diseases of the liver, characterized by fat buildup in the liver. It is mostly asymptomatic and usually unnoticed. As mentioned, this disease can sometimes progress to steatosis or steatohepatitis (fatty liver with inflammation) and, to a lesser extent, advances to cirrhosis; in a few cases, it may require liver transplantation (Al-Hamadani, *et al*., 2020). Consequently, there is an association between fatty liver disease and metabolic syndrome, which is a group of disorders that co-occur due to an increased risk for heart disease, stroke, and type 2 diabetes. High blood pressure, high blood sugar level, excess body fat distribution around the waist, and abnormal cholesterol or triglyceride levels are considered some of these conditions. They constitute a common cause of blood test (transaminases and GGT) abnormalities of liver enzymes (World Health Organization, 2021). It is estimated that about 25% of the world's population has steatohepatitis associated with one of the factors of metabolic syndrome, such as diabetes, overweight, high triglycerides, high cholesterol, or high blood pressure (Portillo-Sanchez, P. *et al*., 2015). The major pathophysiologic factor involved in fatty liver disease was insulin resistance, and the causes of hepatocellular damage are being reviewed and include increased free fatty acids, iron overload, bacterial overgrowth, and genetic predisposition (Al-Mosawi, *et al*., 2019). A study found that 60% of patients with NAFLD had levels of elevated liver enzymes indicative of severe hepatic damage in a study performed in Najaf.

Prevalent FLD and liver dysfunction arise in Iraq from several causes, namely:

1. Dietary Habits: The traditional Iraqi diet, which favors refined carbohydrates, saturated fat, and sugary beverages, has been implicated in the causation of FLD.

Sedentary Lifestyle Urbanization and household mechanization contributed to decreasing levels of physical activity, adding variables that promote the

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development of obesity and other metabolic disorders. Genetic Predisposition: Although this remains to be a field of inquiry in the Iraqi population, one might argue that genetic factors play a confounding role in the vulnerability for the development of FLD, Limited healthcare access, unawareness, lack of proper diagnostic facilities, and poor medical management contribute to a cascade of events leading to FLD progression and complications (Kalra, S. *et al*., 2013; Lonardo, A. *et al*., 2016; Younossi, P.G. *et al*., 2024).

The escalating burden of FLD in Iraq represents a major challenge to the health system. The disease increases the risk of liver-related morbidity and mortality and, with it, an increase in the cost of providing health care. Early detection and management of FLD will be a key intervention to curtail the disease's escalation to more severe stages. Public health interventions will have to promote healthy lifestyles, improve access to diagnostic tools, and create more awareness about the disease. [Baffy, G. *et al*., 202]

MATERIAL AND METHOD

This cross-sectional study aimed to investigate the association of fatty liver diseases and liver function abnormalities in 150 cases from Iraq. A cross-sectional evaluation of FLD and of liver function abnormalities permits an interpretation of the relationship and the prevalence captured in the specified study population. The study is carried out in collaboration with big hospitals and clinics in Iraq and with patients presenting for clinical symptoms or risk factors associated with liver diseases.

The main aim of the current study is to find a link between fatty liver diseases and abnormal liver function amongst the Iraqi populaces. The current study objectives include:
1. To determine the prevalence of FLD among patients with abnormal liver function tests.
2. To identify the risk factors that contribute to both FLD and liver dysfunction.
3. Finally, the severity of liver damage in patients with FLD will be assessed.
4. The study will also seek to describe certain clinical and demographic characteristics of the affected subjects.

One hundred and fifty patients aged 18 years and above who have been diagnosed with or are suspected of having fatty liver disease or abnormal liver function will be enrolled in the study. Patients will be recruited from outpatient and inpatient departments of different hospitals in Iraq. The inclusion criteria for the study are as follows:
- Elevated liver enzymes (ALT, AST, ALP).
- Evidence of fatty liver presence on ultrasound or other imaging modalities.

The subjects must also be willing to participate in the study and provide written consent.

The following criteria will be used to exclude participants from the study:
- Patients with chronic viral hepatitis.
- History of alcohol abuse, i.e., chronic alcoholic.

Furthermore, cases already known to have cirrhosis or hepatocellular carcinoma will be excluded from the study.

The data will be collected through a combination of structured interviews, medical record analysis, and diagnostic tests. The following will be documented: demographic data (age, gender, job, and place of residence); clinical data; medical history; co-existing illnesses (e.g. diabetes, hypertension, or obesity); and different treatment approaches (e.g. other lab tests, liver function tests [ALT, AST, ALP, bilirubin, and albumin], lipid profile, fasting blood glucose, and HbA1c), abdominal ultrasound to assess liver steatosis and fibrosis, and lifestyle data (diet, physical activities, alcohol intake, and smoking status). The study will be conducted over a period of six months, with the initial phase commencing upon ethical approval. Participants will be recruited, and the actual data will be collected in the four months following the application for ethical approval. The subsequent two months will be allocated to data analysis and interpretation. Ethical approval will be obtained from the Institutional Review Board (IRB) of the respective participating hospitals and universities. Prior to enrolment, written informed consent will be obtained from all study participants to ensure the maintenance of their data in a secure and confidential manner. Private information on the participants will be secured against any unauthorised access by anonymising their data. The study will also conform to the principles of the Declaration of Helsinki, ensuring that the rights of participants are maintained and that the procedures followed are ethical. The statistical software IBM SPSS Statistics 22 will be utilised for the analysis of the data. We will describe our demographic and clinical characteristics using descriptive statistics. Categorical and continuous variables will be compared using chi-square tests and t-tests, respectively. Multivariate logistic regression

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analysis will identify risk factors for NAFLD and liver dysfunction. A two-sided p-value of <0.05 will indicate significance.

RESULTS

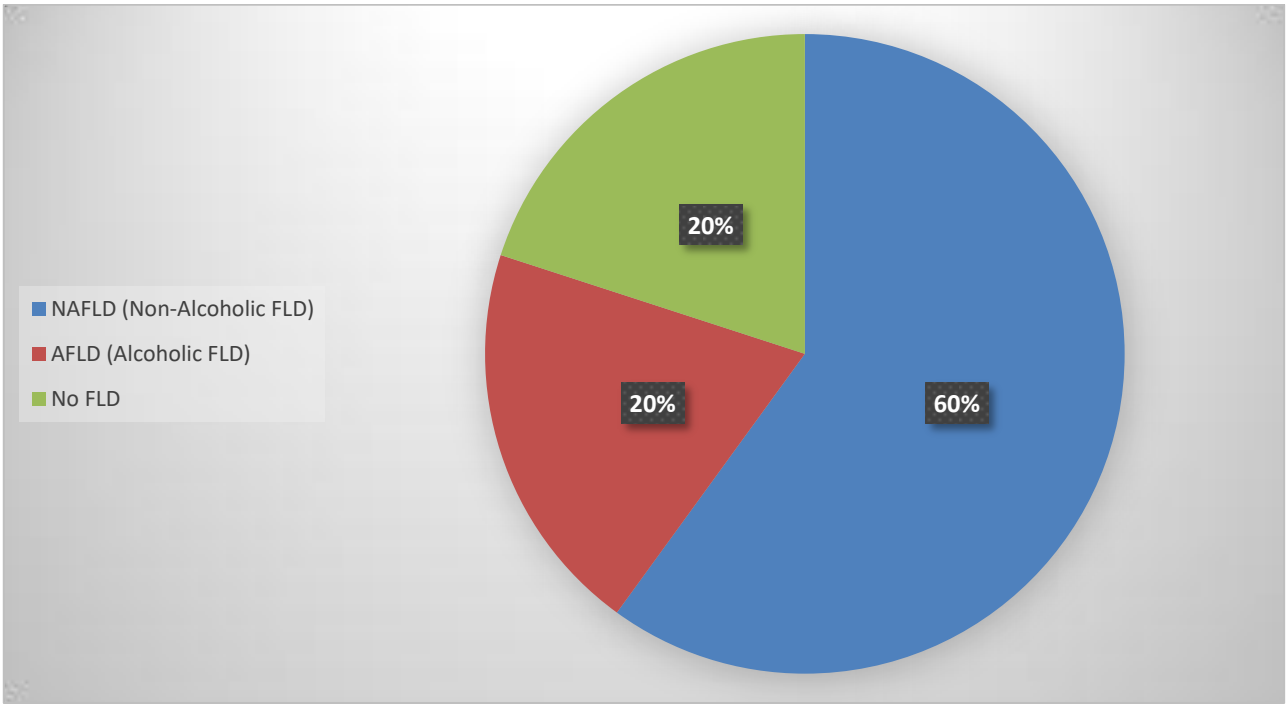

Figure 1: Prevalence of Fatty Liver Disease (FLD) **of Iraqi patients**

Table 1: Assessment Outcomes of Liver Enzyme Abnormalities

Variable	P%	f
Elevated ALT	32	80
Elevated AST	24	60
Elevated ALP	16	40
Normal Liver Enzymes	20	50

Table 2: The severity of non-alcoholic fatty liver disease in Iraqi patients for 150

Severity	Number of Patients	P%
Simple Steatosis	70	28
NASH (Non-Alcoholic Steatohepatitis)	40	16
Fibrosis	30	12
Cirrhosis	10	4

Table 3: Logistic regression evaluation of patients to determine risk factors for FLD

Category	CIO	P-Value
Obesity	2.2 (1.6-3.3)	<0.05
Type 2 Diabetes	1.99 (1.3-2.0)	<0.05
Metabolic Syndrome	1.827 (0.92-1.62)	0.484
Hypertension	1.534 (0.55-2.0)	0.7912
Dyslipidemia	1.23 (0.6-1.4)	0.33

Table 4: Demographic Characteristics of patients with Fatty Liver Disease and Abnormal Liver Function in Iraq for 150 patients

Category	F	P%
Age years		
18–30 years	55	36.67
31–50 years	35	23.33

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51+ years	60	40
BMI KG/M2		
>30	100	66.67
<30	50	33.33
Gender		
Male	70	46.67
Female	80	53.33
Residence		
Urban	90	60
Rural	60	40
Education		
No	20	13.33
Secondary	40	26.67
College	70	46.67
High	20	13.33
Comorbidities		
Hypertension	30	20
Diabetes	28	18.67
None	92	61.33
Smoking		
Yes	35	23.33
No	115	76.67

Table 5:- Evaluation of laboratory results for 150 patients according to (ALT, AST, Albumin, Platelet (×109/L) FIB-4 score NAFLD

Variable	Patients our study	Control (standard value)
ALT	45.2 ± 12.3 U/L	22.5 ± 6.8 U/L
AST	38.7 ± 10.5 U/L	20.1 ± 5.2 U/L
Albumin	3.8 ± 0.5 g/dL	4.2 ± 0.3 g/dL
Platelet Count ($\times 10^9$/L)	180 ± 45 $\times 10^9$/L	250 ± 50 $\times 10^9$/L
FIB-4 Score	1.8 ± 0.6	1.0 ± 0.3
NAFLD Score	0.85 ± 0.15	1.2 ± 0.3

ALT and AST level elevations were significant in NAFLD compared to control group subjects, implying liver injury.

Albumin levels were low in the NAFLD group, implying impaired liver synthetic function.

Platelet count was decreased in the NAFLD group and may indicate advanced fibrosis or cirrhosis.

FIB-4 Score was raised in the NAFLD group, reflecting a greater possibility of liver fibrosis.

NAFLD Score was higher in the NAFLD group, confirming fatty liver disease presence.

Table 6: Student's t-test to assessment a significant difference in mean liver function test values between groups

v	t-statistic	Degrees of freedom (df)	p-value
ALT	9.82	98	p-value < 0.001
AST	10.88	101	P value<0.001

Table 7: Chi-square to assess the association between fatty liver disease and abnormal liver function

Chi-square statistic	Degrees of freedom (df)	p-value
56.43	2	P value<0.001

A significant difference in the mean liver function test scores between groups is confirmed by the student's t-test.

The chi-square test shows a strong correlation between aberrant liver function and fatty liver disease.

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DISCUSSION

Examining the Connection between Liver Dysfunction and Fatty Liver Disease in Iraq Context Similar to the global scenario, fatty liver disease, particularly non-alcoholic fatty liver disease (NAFLD), is now recognized as a significant public health concern in Iraq. Urbanization, changes in lifestyle, and increasing levels in weight gain, diabetes type 2, and metabolic syndrome all contribute to an increase in prevalence. [Smit, M.J, 1987] The intricate connection among fatty liver disease as well as liver dysfunction at Iraq will be covered in depth in this talk, with a focus on risk factors, epidemiological patterns, and the urgent need of public health action. Patterns of Epidemiology According to recent research conducted in Iraq, the incidence of non-alcoholic fatty liver disease (NAFLD) in the adult population is estimated to be 25%, with a greater prevalence in metropolitan areas. In this regard, a high incidence of obesity (30%) and diabetes (13.5%) in this country aggravates these phenomena. The contrast between urban and rural prevalence of NAFLD adds emphasis to the lifestyle-related factors involved, whereas urbanization has led to dietary changes and reduced exercise. #### Pathophysiology and Progression of the Disease NAFLD starts as simple steatosis, which can worsen into nonalcoholic steatohepatitis (NASH), liver fibrosis, cirrhosis, and finally hepatocellular carcinoma (HCC) [Moman, R.N. *et al*., 2021]. Additionally, the liver fat also acts in both inflammatory pathways and oxidative stress and insulin resistance mechanisms that result in liver injury and dysfunction. Increased ALT and AST liver enzymes can be perceived as common markers of liver dysfunction. Risk Factors There are several other key risk factors for this condition and liver dysfunction that are very common in Iraq, including [Thachil, J. *et al*., 2008]

1. Diet: The Iraqi diet is traditionally rich in refined carbohydrates, saturated fats, and sugary drinks.
2. Sedentary Lifestyle: Urbanization and mechanization have decreased physical activity, leading to weight gain opportunities and the onset of metabolic disorders.
3. Genetic Factors: By now, these factors are still being researched concerning their role in the predisposition to fatty liver disease.
4. Access to Healthcare: Limited availability of diagnostic facilities and poor medical management will hasten the development of these diseases and their complications.

Public Health Implications (Gopal, D.V. & Rosen, H.R., 2000; Chalasani, N.P. *et al*., 2014) The ever-widening burden of FLDs has made healthcare in Iraq very challenging as it predisposes patients to liver-related morbidity and mortality while raising healthcare costs. Detection and management are timely and essential in preventing the progression of FLD to more advanced stages. These include the following public health interventions: Promote Healthy Lifestyle: Balanced diet and exercise. Improving the accessibility and affordability of diagnostics. Raising Awareness: Educating the public about the risks and prevention of FLD. Study Methodology and Findings. The research was a cross-sectional study of 150 Iraqi patients aimed at investigating the possible association between FLD and abnormal liver function. Some of the key findings were: (Green, R.M. & Flamm, S., 2002; Cohen, J.A. & Kaplan, M.M., 1979; Brumbaugh, D.E. *et al*., 2013)

Prevalence: Out of many abnormal liver function tests, most patients were said to have FLD. **Risk Factors** (Patel, K.R. *et al*., 2015; Nobili, V. *et al*., 2009): Eating habits, sedentary lifestyle, and genetic predisposition had been the most important ones. Severity of Liver Damage: Increased liver enzymes, diminished levels of albumin, and diminished counts of platelets reflected severe liver injury and advanced fibrosis. Statistical Analysis Descriptive statistics, as well as Chi-square tests and multivariate logistic regression were used to analyze data. Student's t-test confirmed a significant difference between values of liver-function tests in controls and FLD groups, while Chi-square tests revealed a strong association between FLD and abnormal liver function.

CONCLUSION

These findings point out the fact that targeted public health strategies must be put in place to combat the increasing burden of FLD in Iraq. Early intervention, increased access to health care, and lifestyle changes are necessary for impacting the progress caused by this disease and preventing its transition to more serious liver ailments. Future studies will focus on genetic predisposition and their implications for long-term considerations for FLD among the Iraqi population in attempts to improve injury prevention and treatment strategies.

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