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EC GASTROENTEROLOGY AND DIGESTIVE SYSTEM

Research Article

Prevalence of Non-Alcoholic Fatty Liver Disease and its Relationship with Overweight

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Received: August 25,2021; **Published:** October 28, 2021

Abstract

Introduction: Overweight and obesity is one of the great global pandemics; its liver disease is fatty liver, which could progress to chronic liver disease such as cirrhosis and hepatocarcinoma; hence the importance of its prevalence, and high impact on Ecuadorian morbidity and mortality.

Objective: To determine the prevalence of NAFLD, related to overweight in outpatients of the Metropolitan Hospital of Quito, in a period of 6 months.

Methodology: A cross-period analytical epidemiological study was carried out in outpatients who attend the Metropolitan Hospital of Quito under the modality of a medical check-up.

Results: The prevalence of fatty liver according to sonography was 37%. When comparing nutritional status and fatty liver, the overweight and obesity group had 51.7%; according to age in > 50 years they predominate with 44.4%; by gender, men stand out with 74%; and in relation to physical exercise, the patients who performed did not present fatty liver with 67.2%.

Conclusion: It is concluded that there is a high prevalence of NAFLD related to overweight and obesity, predominantly in the male gender; In addition, as age advances, they are prone to acquire this liver disease. NAFLD can be evaluated in the majority of patients with high sensitivity and specificity through hepatic sonography and the INDEX biochemical test. (HSI); An adequate healthy lifestyle that includes physical activity (exercise) reduces the risk of suffering from non-alcoholic fatty liver.

Keywords: *Obesity; Nonalcoholic Fatty Liver Disease (NAFLD); Hepatic Echosonography (Ultrasound); Hepatic Steatosis Index (HSI); Transaminases; Steatohepatitis; Cirrhosis; Hepatocarcinoma*

Introduction

NAFLD is a progressive liver disease that includes steatosis, fibrosis, cirrhosis, and hepatocellular carcinoma. It is common and underdiagnosed, associated with characteristics of metabolic syndrome, obesity, and type 2 diabetes mellitus. It is associated with an increased risk of mortality related to the liver and cardiovascular system [1].

The prevalence of NAFLD is not well defined, the prevalence rates in general worldwide are 2.8 and 46%, its prevalence increases along with the rates of obesity and diabetes mellitus, 33.8% for the obesity population and 10.6% for the diabetes mellitus population [2]. The prevalence according to ethnicity was 33% in Caucasians, 24% in African Americans, with multifactorial causes according to the Heart of Dallas study, which included a bad eating habit and a sedentary lifestyle, associated with high rates of NAFLD [3].

The accumulation of macrovesicular fat in more than 5% of hepatocytes is the defining characteristic of non-alcoholic fatty liver, most do not present fibrosis, when it occurs, it predominates in the acinar area, although it can extend to the portal and periportal region to as the disease progresses [1,4,5]. Dysregulation in the metabolism of fatty acids leads to steatosis, associated with various cellular adaptations and altered signaling pathways, hepatocytes become vulnerable to a second process of necrosis and inflammation of hepatocytes, on rare occasions some factors activate a fibrogenic cascade leading to cirrhosis [2].

Adipocytokines (tumor necrosis factor (TNF-α), leptin and adiponectin), they promote insulin resistance and liver inflammation, and are elevated in nonalcoholic fatty liver; the type 2 adiponectin receptor is associated with a higher degree of steatosis, obesity and overweight have been associated with low levels of adiponectin [6]. Serum leptin concentrations are elevated in NAFLD and are related to the degree of steatosis [7]. As the disease progresses, fat-laden hepatocytes and perisinusoidal fibrosis can impair microvascular hepatic blood flow, decreasing oxygen and nutrient exchange and stimulating the microvascular inflammatory response and an increasing cycle of liver damage and vascular failure [8].

Most of them are 50-75% asymptomatic, or have nonspecific symptoms such as asthenia, general discomfort or pain in the right upper quadrant (30 - 40%) [9,10]. On physical examination, 55 - 85% show hepatomegaly [11]. A common finding is acanthosis related to insulin resistance [12].

The diagnosis of non-alcoholic fatty liver is based on 3 criteria: 1) detection of steatosis by imaging or histology; 2) exclusion of alcoholic liver disease; 3) exclusion of other liver diseases such as viral hepatitis, autoimmune diseases, metabolic or inherited liver diseases [1]. The diagnosis is considered in the absence of significant alcohol consumption < 20 gr/day in men and < 10 gr/in women [3]. Laboratory tests can manifest themselves with elevated transaminase levels, which can sometimes be their only finding [8,13]. The gold standard for histological NAFLD lesions is liver biopsy, which is important to determine the effect of medical treatment, however, it is an invasive, expensive method, with mild complications in 20% and severe in 0.3% [2,14].

The NASH system is a histological scoring system, it addresses the full spectrum of NAFLD, applicable at all ages. The score is determined with the unweighted sum of the scores for steatosis (0 - 3), lobar inflammation (0 - 3) and balloon degeneration (0 - 2); a score greater than or equal to 5 is correlated with the diagnosis of nonalcoholic steatohepatitis; in the same way, scores less than 3 are correlated with "NO steatohepatitis", scores 3 or 4 are considered the limit. Regarding fibrosis, stage 1 refers to perisinusoidal fibrosis in the perivenular area, stage 2 is characterized by periportal fibrosis, stage 3 as bridging fibrosis, and stage 4 as cirrhosis [1].

Ultrasound and CT and MRI are reliable for the detection of moderate-severe fatty changes in the liver [15]. A systematic review of 49 studies (4720 participants), concludes that ultrasound is a reliable method, accurate compared to histology (gold standard), with a sensitivity of 84.8%, specificity of 93.6%, for the diagnosis of fatty liver, as well as due to its low cost, safety and accessibility [16-18].

Among the biomarkers is the hepatic steatosis index (HSI), useful in the diagnosis of NAFLD, it is also used to determine the need for changes in lifestyles, it was applied when conducting a cross-sectional study with 10,724 patients, where 5,363 presented NAFLD and an analysis indicated that the AST/ALT relationship, BMI, and diabetes mellitus are independent risk factors. Using these variables, a formula of a logistic regression model was obtained: (HSI) = 8 x (ALT/AST ratio) + BMI (2, if female); 2 if you have diabetes mellitus), NAFLD values < 30 were ruled out with a sensitivity of 93%; On the other hand, it was confirmed when they presented a value > 36.0 with a specificity of 92% [19-22].

There is no specific treatment for NAFLD; general measures are considered: avoiding alcohol, moderate exercise, a balanced diet, and avoiding the administration of drugs and environmental toxins [1,4]. The progressive loss of weight, together with the treatment of diabetes and/or dyslipidemia produces a considerable improvement, the loss of weight with physical exercise and a balanced diet [2].

There are several pharmacological approaches, such as weight loss drugs, antioxidants such as vitamin E, C and betaine, which decrease cellular oxidative stress and improve serum transaminase levels; insulin sensitizing drugs, cytoprotective agents, lipid lowering agents, and other therapies such as angiotensin II receptor antagonists [1].

Aim of the Study

To determine the prevalence of NAFLD, related to overweight in outpatients of the Metropolitan Hospital-Quito, in the period of 6 months.

Methods

The universe of the study was made up of outpatients who attended the Metropolitan Hospital under the modality of executive check-ups, which are medical services for adults > 18 years of age, which include an assessment by specialists in gastroenterology, cardiology, pulmonology, otolaryngologist, ophthalmologist and nutritionist, includes laboratory and imaging tests (liver ultrasound).

The instruments used for this study were: liver ultrasound and hepatic steatosis index (ISH), in addition, a survey was carried out with the participating patients, to collect information such as age, sex, race, lifestyle, physical exercise, height, weight, diseases such as type 2 diabetes mellitus, -hypertension, hypothyroidism, dyslipidemia and ISH report.

The inclusion criteria were: patients ≥ 18 years of age, any sex, race, executive medical check-up, and patients expressing their consent to participate in the study. The exclusion criteria were patients with a previous diagnosis of viral, autoimmune, metabolic liver diseases (Wilson's disease, Hemochromatosis), patients with a daily alcohol consumption greater than 20 grams per day, patients with gastrointestinal derivative surgeries, patients with consumption of drugs that produce steatosis fat such as: corticosteroids, methotrexate, amiodarone, valproic acid, estrogens, patients with a history of psychiatric pathology, patients who do not agree to participate in the study, and finally patients under 18 years of age.

Results

The universe of the study was 272 subjects, the average age was 47 years, ± 10.3 and the range was between 19 and 70 years of age, its highest percentage corresponded to ages between 18 - 49 years with 60%. The highest percentage of participants was of mixed race with 98.9%, followed by 0.74% white and 0.37% indigenous.

Physical activity understood as exercise performed 3 times a week for 40 minutes (walking, jogging, swimming), 61% did not perform physical activity, and 39% did; According to the nutritional status, 62.5% correspond to the highest prevalence in the overweight and obesity group, and 37.5% correspond to a normal and low nutritional status (body mass index).

According to the personal pathological history, 69.8% did not present, 9.9% had dyslipidemia, 8% had more than one comorbidity, 7.3% had hypothyroidism, 4.4% had hypertension and 0.7% had type 2 diabetes mellitus.

The general prevalence of fatty liver according to sonography was 37% with a 95% CI. The hepatic steatosis index (HSI), a prevalence of 52.5% positive for fatty liver and 47.5% negative was obtained. Comparing age groups and fatty liver, it is observed that in the group (> 50 years) it is greater with 44% of fatty liver, in relation to the other group (19 - 49 years). In both groups there is no significant difference whose $p > 0.05$. Relating gender and fatty liver, in the group of men it is higher with 46% of fatty liver, in relation to the other group (women). Comparing both groups, $p < 0.005$ reflects that there is a significant difference.

When comparing physical activity and fatty liver, the group that does not exercise has 40% fatty liver, in relation to the other group that does. Comparing both groups, p > 0.005 reflects that there is no significant difference.

Physical activity	Fatty Liver				
	Yes		No		CI 95%
	N°	%	N°	%	
Yes n = 107	35	32.7	72	67.2	23.9---41.5%
No n = 165	66	40.0	99	60.0	

Table 1: *Percentage distribution of fatty Liver according to physical activity in patients who attend outpatient clinics as executive check-ups at theQuito metropolitan hospital.*
Source: Research survey in the Quito metropolitan hospital 2017.

When comparing nutritional status and fatty liver, we observe that in the overweight and obesity group it is greater with 51.7% of fatty liver, in relation to the other weight group. Comparing both groups, p <0.005, reflecting that there is a significant difference.

Nutritional Condition	Fatty Liver				
	Yes		No		CI 95%
	N°	%	N°	%	
Normal and low (n = 102)	13	12.7	89	87.2	6.2-19.1%
Overweight and obesity (n = 170)	88	51.7	82	48.2	44.1-59.2%

Table 2*: Percentage distribution of fatty liver according to nutritional status in patients who attend outpatient clinics as executive check-ups at the Quito metropolitan hospital.*
Source: Research survey in the Quito metropolitan hospital 2017.

When comparing the nutritional status, sex and with fatty liver, we observe that, in the overweight and obesity group, in male patients the percentage is higher with 74%, in relation to the group that maintains normal and low weights, which reaches 16%. Comparing both nutritional groups and only in men is p <0.05, reflecting that there is a significant difference.

Nutritional Condition	Gender	Fatty Liver				Ci95%
		Yes		No		
		N°	%	N°	%	
Normal and low (n = 102)	F (n = 48)	8	16.6	40	83.3	13.3--21.9%
	M (n = 54)	8	14.8	46	85.2	
Overwieight and obesity (n = 170)	F (n = 128)	95	74.2	33	25.8	66.6--81.7%
	M (n = 42)	31	73.8	11	26.2	

Table 3: *Percentage distribution of Fatty Liver according to Nutritional Status and Sex in patients who attend outpatient clinics as executive check-ups at the metropolitan hospital of Quito.*
Source: Research survey in the Quito metropolitan hospital 2017.

Discussion

Current studies on NAFLD are scarce in Latin America; reports of its prevalence worldwide are approximately 25% in the adult population [23]. In Latin America there is a high prevalence in countries such as Brazil 35.2%, followed by Colombia with 26.6%, Chile 23% in the

general population [24]. In Ecuador there are no data and studies reported about NAFLD; According to the present study, the prevalence is 37% assessed through ultrasound and 52.5% through the INDEX (ISH), in a population with and without comorbidities, the result of which is related to the rest of the countries in Latin America.

The increase in prevalence is related as one advances in age [23], because there is a tendency to sedentary lifestyle, lack of daily exercise, and comorbidities that predispose to imminent weight gain. In our study, the group of (19 - 49th) obtained 32% while those over 50 years obtained 44% [23]. There are some studies that show a high prevalence in men, others suggest that it is more common in women and in others that there is no significant difference, generating an information conflict [24].

One of the greatest magnitudes of association in this study was found precisely with the relationship between sex and fatty liver, where it was shown that there is a significant prevalence in men with 46%, as opposed to 19% in women; therefore, the male sex can be considered as one of the risk factors for this disease [24].

In the results of this study, type 2 diabetes mellitus was not found in the sample as a risk factor, probably because the study patients were asymptomatic and undergoing executive check-up, where the majority are active workers; however, it was shown that within the overweight and obesity group, fatty liver was 51.7%; which confirms your association to suffer from it; In addition, when relating the overweight group with obesity, fatty liver and sex, there was no significant difference between men and women with figures of 74.2% in men and 73.8% in women, which indicates that it is of the same proportion in terms of sex for liver fatty in the presence of overweight or obesity.

Studies have shown that the population in America is susceptible to both obesity and type 2 diabetes mellitus, a metabolic syndrome, associated with an inappropriate lifestyle and eating habits typical of the region [23].

In this study, a relationship between physical activity and fatty liver was found, where people who do not perform physical activity have a 40% higher prevalence of suffering from it, in relation to people who perform physical activity 32%, which indicates that the exercise performed three times a week, with a minimum time of 40 minutes and leading a healthy lifestyle, that is, that way of life in which the person maintains a harmonious balance in their diet, physical and intellectual activity, recreation (especially in the air free) rest, hygiene and spiritual peace, is a protective factor for the development of diseases such as NAFLD.

The HSI is a reliable, non-invasive and inexpensive method for the diagnosis of NAFLD, with a sensitivity and specificity of 93.1% and 92.4% respectively [24]. In our study, 52.5% were found. Ultrasound is a reliable method with a sensitivity of 84.8% and specificity of 93.6%, for the diagnosis of fatty liver, as well as due to its low cost, safety and accessibility [16-18]. In our study, the general prevalence of fatty liver diagnosed with ultrasound was 37%, which contrasts with international reports.

The method used for the diagnosis of fatty liver, non-invasive, such as ultrasound, is used to evaluate steatotic changes in the liver, while the gold standard for diagnosis continues to be liver biopsy [4,6]. However, the aforementioned limitations do not invalidate the results provided in this study about the broad relationship between the prevalence of fatty liver and overweight-obesity. On the other hand, the results obtained generate new perspectives for future research on the subject in Ecuador.

Conclusion

According to the study carried out, it is concluded that there is a high prevalence of NAFLD related to overweight and obesity, one of the main associated risk factors for both men and women.

As individuals advance with age, they are prone to acquiring this liver disease, even more so if risk factors are added, especially metabolic syndrome, which is very prevalent in our country.

NAFLD can be evaluated in most patients with high sensitivity and specificity through liver ultrasound and the INDEX biochemical test (ISH).

An adequate healthy lifestyle includes physical activity (exercise), decreases the prevalence of NAFLD.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Ethical Approval

In the research, each participant was informed and voluntarily agreed to be part of the study under informed consent, no clinical or surgical intervention was carried out, so evaluation by the bioethics committee was not required.

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Volume 8 Issue 11 November 2021