



Original Article

Correlation between Body Mass Index and nonalcoholic fatty liver disease

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ABSTRACT

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Introduction

Non-alcoholic fatty liver disease is the most common liver disorder globally. The prevalence is 25% worldwide but is widely distributed across different populations and regions. The highest rates are reported in the Middle East (32%) (1). Due to modern lifestyles and diets, there has been a persistent increase in the

Background: Non-alcoholic fatty liver disease (NAFLD) is the most common liver disorder globally. The prevalence is 25% worldwide, distributed widely in different populations and regions. The highest rates are reported for the Middle East (32%). Due to modern lifestyles and diet, there has been a persistent increase in the number of NAFLD patients. This increase occurred at the same time where there were also increases in the number of people considered being obese all over the world. By analyzing fatty liver risk factors, studies found that body mass index, one of the most classical epidemiological indexes assessing obesity, was associated with the risk of fatty liver.

Objectives: To assess age, sex, and body mass index (BMI) as risk factors in NAFLD.

Subjects and Methods: It is a case-control cross-sectional study from September 2020 till June 2021 which included all obese patients consulted the obesity research and therapy unit during the period of the study. Age and sex were recorded, body mass indices were calculated for all patients and categorized into normal with BMI < 25kg/m², overweight with BMI 25-30 kg/m², and obese with BMI > 30 kg/m², ultrasonography was done to them to diagnose fatty liver changes which were categorized into three grades; mild, moderate and severe

Results: 192 patients were enrolled in the study with an age range from 18-55 years with a mean of 38.09, males were 48 and females were 144. Sever NAFLD is present in 2.8% of obese females and 5.5% of obese male with 0% in normal and overweight individuals.

Conclusion: NAFLD was more prevalent with increasing BMI and age in all sexes.

number of NAFLD patients. This increase occurred at the same time that there were also increases in the number of people considered being obese all over the world (2,3). By analyzing fatty liver risk factors, studies found that body mass index (BMI), one of the most classical epidemiological indexes assessing obesity, was associated with the risk of fatty liver (4-13). NAFLD represents a spectrum of progressive liver disease occurring in the absence of excessive

alcohol consumption. The clinical spectrum ranges from isolated intrahepatic triglyceride accumulation to necroinflammation of hepatocytes. A certain proportion of the patients ultimately progress to fibrosis/cirrhosis and potentially hepatocellular carcinoma (HCC). NAFLD has a low fatality for liver diseases. Although a high proportion of the population has NAFLD, only a minority progresses to advanced liver disease or liver-related death (14,15). It's commonly associated with related metabolic diseases, leading to cardiovascular events as its leading cause of death. The metabolic disorders include abdominal obesity, hypertension, dyslipidemia, and insulin resistance (IR) with further increased risk of cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), and chronic kidney disease (CKD)(16). There is a close link between NAFLD and metabolic syndrome (17). Individuals with metabolic syndrome-related disorders have a higher risk of developing NAFLD, whilst NAFLD confers an increased risk of developing metabolic syndrome-related disorders (18,19).

Subjects and Methods

It is a case-control cross-sectional study done in the obesity research and therapy unit in Alkindy college of medicine/University of Baghdad from September 2020 till June 2021, which included all obese patients consulted the obesity research unit during the period of the study. Age and sex were recorded, body mass indices were calculated for all patients and categorized into normal with BMI < 25kg/m², overweight with BMI 25-30 kg/m², and obese with BMI > 30 kg/m², ultrasonography was done to them to diagnose fatty liver changes which were categorized into three grades; mild, moderate and severe according to Ultrasound B mode imaging where grade 0 has normal liver echotexture, grade 1 slight diffused increased echogenicity with normal liver visualization of the diaphragm and portal vein wall, grade 2 moderate increase in liver echogenicity with slightly impaired appearance of portal vein wall and diaphragm and grade 3 in case of a marked increase in liver echogenicity with poor or no visualization of the portal vein wall, diaphragm and posterior part of the right liver lobe.

A control group was set in the study of 70 individuals with normal BMI and no alcohol consumption

Exclusion criteria were patients with a diagnosis or history of chronic diseases and patients with a history of alcohol consumption.

Ethical approval and permission

Ethical permission was approved by the scientific committee in Alkindy college of medicine

Statistical analysis

Statistical analysis was performed by use of IBM SPSS 23.0.

Results

A total of 192 patients were enrolled in the study with an age range from 18-55 years with a mean of 38.09, males were 48 and females were 144 as shown in figure 1:

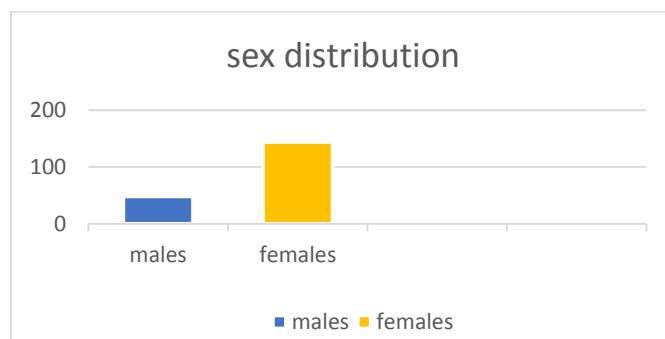


Figure.1: sex distribution in the study sample.

One hundred and ten patients (57%) out of 192 were obese and 82(42%) were overweight

The severity of NAFLD was shown in table 1, 36 obese males and 109 obese females, severe NAFLD present in 2.8% of obese females and 5.5% of obese males. With 0% in normal and overweight individuals. The incidence of NAFLD in obese and overweight was increasing with age in both sexes table 2,3,4 and 5.

Table 1: NAFLD in relation to BMI and sex

The severity of fatty liver disease	Obese male	Obese females	Overweight males	Overweight females	Normal males (%)	Normal females (%)
Severe (grade III)	2 (5.5%)	3 (2.8%)	0	0	0	0
Moderate (grade II)	4(11.1%)	14(12.8%)	1(8.3%)	1(2.8%)	1(2.9%)	0(0%)
Mild (Grade I)	17(47%)	45(41.3%)	3(25%)	11(31.4%)	3(8.5%)	4(11.4%)
Normal	13(36%)	47(43.1%)	8(66.7%)	23(65.7%)	31(88.6%)	31(88.6%)
Total	36	109	12	35	35	35

Table 2: Incidence of NAFLD in relation to age in obese females.

The severity of fatty liver disease	18-30 years	30-40 years	40-55 years	Total
Severe (grade III)	0(0%)	1 (34%)	2 (66%)	3
Moderate (grade II)	4 (28%)	4 (28%)	6 (42%)	14
Mild (Grade I)	10(22.22%)	13(28.88%)	22(48.9%)	45
Total	14	18	30	62

Table 3: Incidence of NAFLD in relation to age in obese males.

The severity of fatty liver disease	18-30 years	30-40 years	40-55 years	Total
Severe (grade III)	0	0	2 (100%)	2
Moderate (grade II)	0	2 (50%)	2(50%)	4
Mild (Grade I)	1(5.9%)	4(23.5%)	12(70.6%)	17
Total	1	6	16	23

Table 4: Incidence of NAFLD in relation to age in overweight females

Severity of fatty liver disease	18-30 years females	30-40 years females	40-55 years females
Severe (grade III)	0	0	0
Moderate (grade II)	0	0	1
Mild (Grade I)	1	4	6
Total	1	4	7

Table 5: Incidence of NAFLD in relation to age in overweight males

Severity of fatty liver disease	18-30 years males	30-40 years males	40-55 years males
Severe (grade III)	0	0	0
Moderate (grade II)	0	0	1
Mild (Grade I)	0	1	2
Total	0	1	3

Discussion

In this study, there was more prevalence of NAFLD in females than in males in all age groups and more prevalence with increasing age as shown in tables 2,3,4 and 5 this finding compared to Jee-FuHuangabc et al.(20) where There was an increasing trend of NAFLD according to the increasing age, ranging from 25.8% of those aged <30 years to 54.4% of those aged 50–70 years while contrasting it in the prevalence of NAFLD among the males was (49.3%) , which was numerically higher than the females (42.5%). There was no gender difference in the prevalence of NAFLD across each age group(20).

A Vusirikala et al. (21) showed that individuals who were overweight were at significantly greater risk of incidence of NAFLD(21) compared to this study, as shown in table 1

A Katrina Loomes et al. (22) showed the risk of recorded NAFLD increased linearly with BMI and was approximately 5-fold higher in Humedica (HR = 4.78; 95% confidence interval, 4.17–5.47) and 9-fold higher in THIN (HR = 8.93; 7.11–11.23) at a BMI of 30–32.5 kg/m² rising to around 10-fold higher in Humedica (HR = 9.80; 8.49–11.32) and 14-fold higher in THIN (HR = 14.32; 11.04–18.57) in the 37.5- to 40-kg/m² BMI category. The risk of NAFLD/NASH was approximately 50% higher in men . This is comparable to this study, which showed an increased incidence of NAFLD with increasing BMI (obese vs overweight as in table 1).

Conclusion

NAFLD is more prevalent with increasing BMI and age.

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This research did not receive any specific fund.

Conflict of Interest

No conflict of interest

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