Screening for "Non-Alcoholic Fatty Liver Disease" at King Faisal University

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Abstract—

Background: Non-alcoholic Fatty Liver Disease (NAFLD) is spectrum of conditions described by accumulation of fats in the liver in individuals who do not consume or consume a little quantities of alcohol. NAFLD is highly associated with obesity, diabetes mellitus, and some other metabolic syndromes. The aim of the study is to determine the prevalence of NAFLD among academic staff and students of King Faisal University (KFU), and to find risk factors associated with NAFLD.

Methodology: A prospective cross sectional study was carried in KFU for 10 days. During this period, 39 samples were collected. The present study was done in two locations; simulation laboratory in the college of medicine in KFU, and in the male and female outpatient clinic at King Faisal University medical center. People with coexisting liver disease or alcohol consumption were excluded from the study.

Results: 39 participants who fulfilled the questionnaire were included in the study. It was found that 41% of participants with NAFLD compared to 59% without NAFLD. Obesity was one of the most important risk factors associated with NAFLD with a 50% prevalence. On the other hand, there wasn't significant relationship between NAFLD and hypertension, hyperlipidemia, smoking and exercise.

Conclusion: The study confirmed a significant relationship between obesity and NAFLD, and showed the prevalence of NAFLD in KFU. However, another study is needed to be done, because this study has a very few sample which affects the accuracy of the study.

Keywords— Al-Ahsa, King Faisal University, non-alcoholic fatty liver, Saudi Arabia, screening.

1 Introduction

NON-alcoholic fatty liver disease (NAFLD) is one of the most common liver diseases globally that caused by metabolic disorder. NAFLD is a spectrum of conditions used to describe the presence of hepatic steatosis (fatty liver) in individuals who do not consume, or consume a little quantities of alcohol [1]. There are several diseases that highly associated with NAFLD such as obesity, type two diabetes mellitus and some metabolic syndromes [1].

Researches demonstrated that the majority of patients with NAFLD are asymptomatic, especially those without complications [1]. However, some symptoms might be present such as fatigue and abdominal discomfort which caused by hepatomegaly. Therefore there were no definitive clinical signs or biochemical markers for NAFLD. Ultrasonography of liver is one of the important tests that used for the diagnosis of NAFLD but not the fibrosis [2]. Ultrasonography is an imaging test that uses high frequency sound waves to give precise images of the structures inside the body. In spite of the fact that liver biopsy and histology is most accurate way to diagnose NAFLD and to assess liver fibrosis, the ultrasonography has sensitivity up to 89% and specificity reaches up to 93% for diagnosis of NAFLD. In addition ultrasonography is non-invasive and inexpensive diagnostic tool [2],[3].

The treatment of NAFLD aimed to improve biochemical markers, liver morphology and reduce the risk of progression [2]. Nowadays, the treatment of NAFLD based mainly on weight reduction and lifestyle changes, however these are not successful at all ages [2].

The prevalence of NAFLD varied worldwide, however it is more prevalent in developing countries, for example in Saudi Arabia the rate was reported to be 7-10%, where it increased to 25-75% in patients with diabetes mellitus and obesity [4],[5]. To our knowledge there was no study done about NAFLD in King Faisal University (KFU). Therefore, the aim of this research is to find out the prevalence of NAFLD within staffs and academics in KFU.

Objectives

- To determine the prevalence of non-alcoholic fatty liver disease (NAFLD).

- To find out the risk factors that associated with NAFLD

METHODS

Design

A prospective cross sectional study was carried out between 3/4/2014 and 13/4/2014 at King Faisal University (KFU). The study was done at college of medicine in the simulation laboratory and in the male and female outpatient clinic at King Faisal University medical center. NAFLD was defined as an appearance of fatty liver on abdominal ultrasonography in the absence of coexisting liver disease and alcohol consumption.

All staffs and students at college of medicine in KFU who met the inclusion criteria and gave consent to participate in the study were included. In addition, the patients who came to the outpatient clinic for ultrasonography and fulfilled the inclusion criteria were included. All ages of both sexes were included. In addition, alcoholic and those with known fatty liver diseases were not included. After an official permission from the authorized persons was obtained, the campaign was done. Detailed information about study objectives and detailed information sheet was given and explained to participants. Then, a designed questionnaire was filled by the participants. Participants who filled the questionnaire were referred to ultrasonography room in the simulation laboratory or in the ultrasonography room in the King Faisal University medical center depending on where the participants filled questionnaire. Ultrasonography was done by a single experienced radiologist. The radiologist used an ultrasound scanner, Mini focus 1402. B-K medical, Mileparken 34,DK-2730, Her Lev, Denmark, in ultrasonography of participants. The probe of the device was 2.5-5 MHz.

Data collection

The questionnaire included the participant identification data such as age, sex, nationality, education. It also included history of risk factors such as diabetes mellitus, hypertension, hyperlipidemia, smoking, exercise and its type, and family history of NAFLD.

Ethical considerations

An official permission from the authorized persons at KFU was obtained before data collection. Filling the questionnaire considered to be an agreement to participate in the study. Participation in the study was voluntary. Moreover, participants had the right to withdraw from the study at any time without any sequel.

Data analysis

Through the use of SPSS software, version 21 (2011), the data collected over a ten days period 3/4/2014- 13/4/2014 was analysed. All participants fulfilled the inclusion criteria were included in the analysis.

The univariate analysis included: (i) demographic information; (ii) participant job; (iii) body mass index (BMI); (iv) prior knowledge about NAFLD; (v) family history of chronic diseases; (vi) smoking status; (vii) exercise; (viii) diet; (ix) history of chronic diseases. The bivariate analysis included categorical variables between participant groups (e.g. participant with fatty liver v normal), and where appropriate these were compared using the chi-square test. A p-value of 0.05 was considered to be statistically significant.

Results

Demographic characteristics of patients

Of the 39 participants included in the study, 84.6% were males and 15.4% were females. Their ages ranged between 19 and 61 years (mean 27±11.5SD). A significant group (71.8%) was between 19 and 24 years. The majority of participants (71.8%) were medical students, and 28.2% were employees (Table 1).

There were significant proportion of participants (30.8%) with overweight, 20.5% were obese, however, less

than half (46%) were with normal body mass index. 35.9% of participants had prior knowledge about NAFLD, while the majority (64.1%) were without knowledge. The source of knowledge was from physician (15.3%). There were minority of participants with knowledge of their status condition of NAFLD (2.6%), on the other hand (59%) did not know about their condition.

Participants and risk factors

48.7% of the participants had family history of more than one chronic disease, 20.5% had diabetes mellitus and 25.6% were without family history of chronic diseases. The vast majority of participants (87.2%) were without any chronic disease, 5.1% were with diabetes mellitus, and few participants (2.6%) were with diabetes mellitus, hypertension and hyperlipidaemia (Table 2).

92.3% of participants were non-smoker and 7.7% were smokers. A significant proportion (38.5%) had regular exercise. 28.2% of the participants used walking as regular exercise. Large proportions (77%) of participants were with normal diet, 10.2% eat meat more than vegetables, and 5.1% were vegetarian (Table 2).

Characteristics of participants, fatty liver and non-fatty liver

41% of participants were diagnosed with ultrasonography to have fatty liver compared to 59% without fatty liver (Figure 1).

93.8% of participants with fatty liver were male, compared to 84.6% of participants who were non-fatty liver and this gender difference was statistically not significant $(x^2 = 1.74, p = 0.196)$. Participants with age between 19 and 24 years had the highest proportion of fatty liver compared to 82.6% of participants with non-fatty liver. However, there was no statistically significant association between age and fatty liver $(x^2 = 3.24, p = 0.076)$ (Table 3).

50% of the fatty liver participants were obese compared to none of the participants with non-fatty liver. There were 31.2% of overweight participants had fatty liver compared to 30.4% who had non-fatty liver. Moreover, 18.8% of participants with normal BMI had fatty liver, compared to 65.2% without fatty liver. These BMI differences gender were statistically significant $(x^2 = 16.6, p = 0.001)$ (Table 3).

37.5% of participants with fatty liver had family history of more than one chronic disease, compared to 56.5% of participants without fatty liver. However, there was no statistically significant association between family history of chronic disease and fatty liver status $(x^2 = 1.36, p = 0.713)$ (Table 3). 12.5% of participants with fatty liver had diabetes mellitus, compared to none of participants without fatty liver. 75% of participants with fatty liver had no chronic diseases, compared to 95.7% of those non-fatty livers. However, there was no statistically significant association between chronic diseases and fatty liver $(x^2 = 4.84, p = 0.184)$. Similarly, there were no statistically significant differences in the history of smoking between fatty liver and non-fatty liver participants $(x^2 = 0.079, p = 0.64)$ (Table 3).

37.5% of participants with fatty liver did exercise regularly, compared to 39.1% of non-fatty liver, but this difference was not statistically significant $(x^2 = 0.011, p = 0.59)$. There was no statistical significant differences in the type of exercise which done regularly between fatty and non-fatty liver participants (Table 3).

Discussion

NAFLD has been increasingly recognized as the most common liver disease in Western countries. However, there are no accurate incidence is available. The present study is KFU based study, which showed the prevalence of NALFD as 41%. The reported prevalence of NAFLD varies widely, mainly based on the information available in a given population

and the diagnostic criteria. Some literatures reported the prevalence of NAFLD varies between 2.8% to 88% [6]. Another study showed the prevalence of NAFLD ranges 3%-24% in the world [7]. In Saudi Arabia, the prevalence of NAFLD was 7% to 10%, which was lower than our study [5].

The relationship between the age and gender were conflicting in the literatures, some found that the prevalence of NAFLD increases with age in both genders [7]. However, in our study age and gender were not significantly determinants of NALFD in spite of the high prevalence of NALFD in younger and male participants.

The risk factors for NALFD were reported in various reports all over the world [8]. One of the most important risk factor was obesity. In the present study the prevalence of obesity was 50% and was significantly associated with NALFD. This finding is similar to what has been reported worldwide. However, our study did not showed significant association between some risk factors such as diabetes mellitus, hypertension, hyperlipidaemia, smoking and exercise. These findings are dissimilar to reported studies elsewhere [6],[9]. The variation in the findings could be due to small sample size of the present study, short duration and limitation of study population of King Faisal University.

The strength of the present study is that it is prospective. However, we have to acknowledge that there are some limitations such as small sample size due to limited study period and confined to King Faisal University population. Furthermore, ultrasonography evaluation was the only method used for the diagnosis of NAFLD, while still the gold and the better standard for diagnosis of NAFLD is histological examination.

CONCLUSION

The present study demonstrates the prevalence of NAFLD in King Faisal University in Saudi Arabia. It confirmed the association of some risk factors with NAFLD such as obesity. Moreover, our study showed gender variation between diseased participants, where high prevalence of NAFLD in males than in females. Another prospect is recommended to be done for satisfactory period and to include large population in order to represent the actual prevalence rate of NAFLD and also to include more diagnostic methods such as histological examination.

Table 1 Characteristics of the study population

	Range and Mean with St. Dev.	Number	Proportion (%)
Age	19-60 years (27± 11.5 years)	39	
19-24 years		28	71.8
>25 years		11	28.2
Sex			
Male		33	84.6
Female		6	15.4
Type of participants			
Student		28	71.8
Employee		11	28.2
Type of college			
Medical		28	71.8
Other		11	28.2
BMI			
Underweight		1	2.6
Normal		18	46.1
Overweight		12	30.8
Obese		8	20.5
Prior knowledge about NAFLD			
Yes		14	35.9
No		25	64.1
Source of prior knowledge			
Physician		6	15.3
Internet		2	5.1
Others		3	7.7
Multiple		3	7.7
No		25	64.1
Prior status of NAFLD			
Yes		1	2.6
No		15	38.4
Didn't know		23	59.0

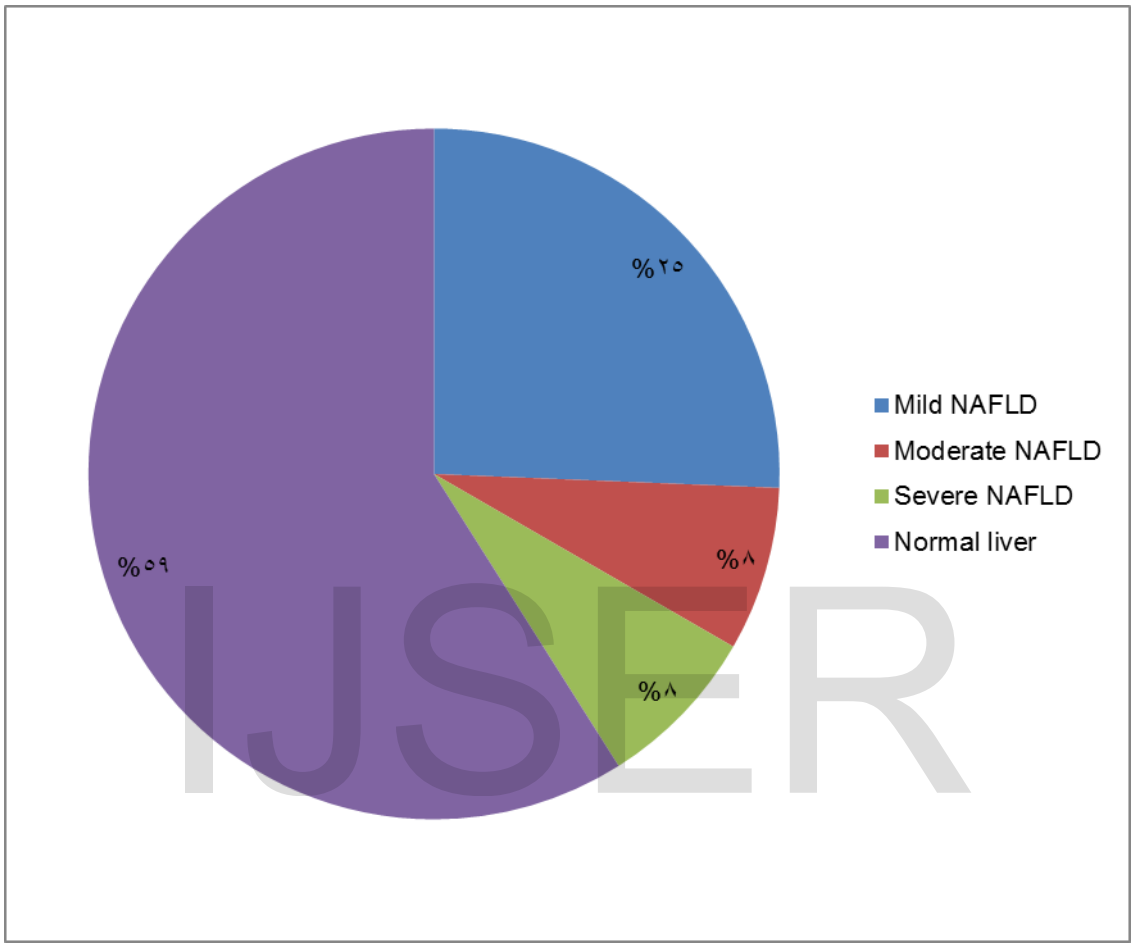
Table 2 Risk factors for NAFLD

Risk factor	Number	Proportion (%)
Family history of chronic diseases		
No family history of chronic diseases	10	25.6
Diabetes Mellitus	8	20.5
Hypertension	2	5.1
More than one disease	19	48.7
Chronic diseases		
No	34	87.2
Diabetes mellitus	2	5.1
Hyperlipidaemia	2	5.1
DM, hypertension and Hyperlipidaemia	1	2.6
Smoking		
Yes	3	7.7
No	36	92.3
Exercise		
Yes	15	38.5
No	24	61.5
Type of exercise		
Walking	11	28.2
Multiple	3	7.7
Others	2	5.1
No exercise	23	59
Diet		
Normal	30	77
Vegetarian	2	5.1
Vegetable more than meat	1	2.6
Meat more than vegetable	4	10.2
Fast food	2	5.1

Table 3 Characteristics of risk factors

		Fatty liver	Normal	Total	$x^2, p-value$	
Participant sex	Male	15(93.8%)	18(78.3%)	33(84.6%)	1.74,	0.196
	Female	1(6.3%)	5(21.7%)	6(15.4%)		
Age	19-24	9 (56.3%)	19 (82.6%)	28(71.8%)	3.24,	0.076
	>24 years	7(43.8%)	4 (17.4%)	11(28.2%)		
BMI	Underweight	0	1(4.3%)	1(2.6%)	16.6,	0.001
	Overweight	5(31.2%)	7(30.4%)	12(30.8%)		
	Obese	8(50%)	0	8(20.5%)		
Family history of chronic diseases	Normal	3(18.8%)	15(65.2%)	18(46.2%)		
	DM	4(25%)	4(17.4%)	8(20.5%)	1.36,	0.713
	HPT	1(6.2%)	1(4.3%)	2(5.1%)		
	More than one chronic disease	6(37.5%)	13(56.5%)	19(48.7%)		
	No family history of chronic diseases	5(31.2%)	5(21.7%)	10(25.6%)		
History of chronic diseases	DM	2(12.5%)	0	2(5.1%)	4.84,	0.184
	Hyperlipidaemia	1(6.2%)	1(4.3%)	2(5.1%)		
	DM, HPT and hyperlipidaemia	1(6.2%)	0	1(2.6%)		
	No chronic diseases	12(75%)	22(95.7%)	34(87.2%)		
History of smoking	Yes	1(6.2%)	2(8.7%)	3(7.7%)	0.079,	0.64
	No	15(93.8%)	21(91.3%)	36(92.3%)		
Exercise	Yes	6(37.5%)	9(39.1%)	15(38.5%)	0.011,	0.59
Type of exercise	Yes	10(62.5%)	14(60.9%)	24(61.5%)		
	Walking	4(25%)	7(30.4%)	11(28.2%)	2.003,	0.57
	Multiple	1(6.2%)	2(8.7%)	3(7.7%)		
	Others	0	7(30.4%)	11(28.2%)		
	No	11(68.8%)	12(52.2%)	23(59%)		

Figure 1: Outcome of ultrasound test



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