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Risk Factors of Non-Alcoholic Fatty Liver Diseases in Bangladesh: A Tertiary Care Hospital Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: NAFLD (non-alcoholic fatty liver disease) is a highly frequent condition. Data on the epidemiology of non-alcoholic fatty liver disease (NAFLD) is scarce, especially in underdeveloped nations like Bangladesh. Although many people have risk factors for NAFLD, the majority do not progress to severe liver disease such as cirrhosis, hepatic decompensation, or hepatocellular carcinoma. It's critical to identify those who are at a high risk of developing these complications so that risk factors can be identified and illness progression can be avoided.
Aim of the Study: The study aims to analyze the risk factors of non-alcoholic fatty liver disease in a tertiary care hospital of Bangladesh.

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Method: This cross-sectional study was conducted from September 2019 to February 2020 at Dhaka Medical College Hospital, Bangladesh. This study was purposefully conducted among 35 participants.

Results: Among 35 participants, the mean age of the participants were 38.89±8.50 years. Maximum participants (80%) were female and housewife (68.6%). And 60% participant's socioeconomic status was middle class state. Maximum (48.6%) participants had diabetes mellitus (DM) and obesity (42.9%). Their mean body weight was 72.74 ± 8.74 and mean body height was 61.37± 2.67.

Conclusion: In Bangladesh, NAFLD is becoming the leading cause of chronic liver disease. This necessitates the attention of health policymakers and physicians to investigate and battle this threat as soon as possible. To control and prevent NAFLD and its negative health implications, public health actions are required.

Keywords: Non-alcoholic; fatty liver disease; risk factors; tertiary care hospital.

1. INTRODUCTION

"Nonalcoholic fatty liver disease (NAFLD) is a condition in which the liver accumulates excessive amounts of lipid defined as the presence of lipid in more than 5% of hepatocytes or a lipid content greater than 5% of liver weight in people who consume little less than 20 g of alcohol per day or no alcohol" [1, 2]. It is the leading cause of chronic liver disease [3]. "Nonalcoholic steatohepatitis (NASH) is a condition in which NAFLD is combined with liver cell damage and inflammation" [2]. "About 30% of people with NAFLD develop NASH, which can lead to fibrosis, cirrhosis, and possibly hepatocellular carcinoma (HCC) if left untreated" [4]. "Nonalcoholic fatty liver disease prevalence has risen dramatically in the Asia-Pacific area over the years, affecting up to 30% of the general population" [5]. "The prevalence of NAFLD in adults has been rising in both developing and developed Asian nations" [6]. "Metabolic syndrome is a major risk factor for NAFLD in adults from South Asia, with Bangladeshi ethnicity being a significant independent risk factor" [3]. NAFLD has become a major public health concern due to its high incidence, propensity for progressing to severe liver disease, and relation to serious cardio-metabolic abnormalities such as type 2 diabetes mellitus (T2DM), metabolic syndrome, and coronary heart disease. Because of the increased incidence of obesity, diabetes, and metabolic syndrome in the general population, NAFLD has become the most common cause of chronic liver disease in western countries, as well as lower BMI locations like Asia. Recent socioeconomic developments, such as rising wealth and lifestyle modifications, have led in the emergence of a noncommunicable disease epidemic, such as NAFLD. "Nonalcoholic fatty liver disease was the most commonly reported liver disease, with Bangladeshi individuals being the most affected. Bangladeshi ethnicity, diabetes, increased BMI, hypertension, and hypercholesterolemia were all found to be independent risk factors for NAFLD in a multivariate study. The prevalence of NAFLD in the general population of Bangladesh has been reported to range from 4 to 18.4%, with diabetic individuals having a prevalence of 49.8%" [7, 8]. "In their rural population-based investigation, Rahman et al found a prevalence of 18.4%, with a higher prevalence of 59.4% in diabetes patients" [8]. "Diabetes, obesity (BMI>25), increased waist circumference, and hypertriglyceridemia were all found to be independent risk factors for the development of NAFLD in the study" [8]. After chronic hepatitis B, this is the second most common reason for a hepatology out-patient visit in the country [9]. As a result, the nature and scope of the NAFLD problem in Bangladesh must be seriously addressed.

1.1 Objective

The aim of the study was to analyze the risk factors of non-alcoholic fatty liver disease in a tertiary care hospital of Bangladesh.

2. MATERIALS AND METHODS

2.1 Methods

This cross-sectional study was carried out in the OPD, Department of Hepatology, Dhaka Medical College Hospital, Bangladesh in a total of 35 individuals between September 2019 to February 2020. Data collected from the participants in a prescribed protocol. Before enrolment, each

applicant had given their informed, voluntary written consent. The research population's medical history and physical examination were reported on a datasheet. The monitoring of each individual's blood pressure was put to the test by measuring blood pressure in a variety of scenarios. The body mass index (BMI) of the study population was estimated by measuring the subject's height and weight while standing stationary on a weighing scale, feet roughly 15 cm apart, and weight distributed evenly on each leg. FibroScan was used to examine the severity of fibrosis and steatosis in our patients. It is a specialized ultrasound machine for liver that measures fibrosis (scarring) and steatosis (fatty change) in liver.

2.1.1 Inclusion criteria

- Patients not more than 60 years of age.
- Patients with the history of NAFLD.
- Patients who wanted to participate in this study

2.1.2 The procedure for collecting and analyzing data

Data were entered in the computer using SPSS version 21.0, calculation of percentage resistance within a 95% confidence interval (CI). The level of significance was considered as a “P” value less than 0.05 and double-checked before analysis.

3. RESULTS

Table 1 shows the demographic characteristics of the participants of the study. Among 35 participants, 48.6% participants were below 40 years old and 51.4% were between 40 to 60 years old. The mean age of the participants were 38.89 ± 8.50 years**.** Maximum participants **(**80**%)** were female and housewife **(**68.6**%).** Maximum participants **(**82.8**%)** we’re not used to with exercise**.** And 60**%** participant’s socioeconomic status was middle class state.

Table 2 showed the status of the risk factors among the participants. In our study, maximum (48.6%) participants had diabetes mellitus and obesity (42.9%). The HBs Ag and Anti-HCV was negative among all participants. Their mean body weight was 72.74 ± 8.74 and mean body height was 61.37 ± 2.67.

Table 3 showed the status of the investigations done among the participants. The mean amount of S. Bilirubin, SGPT, SGOT, ALK PHOS, RBS, HBA1C, TSH, and Lipid profile C, Lipid profile H, Lipid profile L and Lipid profile T.

Table 3 A showed, among 35 participants 60% was SGPT <42 and rest 40% was SGPT > 42.

Table 4 showed the Hepatic fibrosis status among the participants. Here, mild level was in 94.4% patients, moderate level was in 5.7% patients and severe level was observed in 2.9% patients. See the table below-

The stiffness status of participants are shown in Fig. 1. See the different levels of stiffness observed in our patients, in the Fig. 1.

Table 1. Demographic status of participants (N=35)

Variables	n	%	Mean ± SD
Age group			
<40 yrs.	17	48.6	
40-60 yrs.	18	51.4	
Mean in Age	35		38.89 ± 8.50
Gender			
Male	7	20.0	
Female	28	80.0	
Rice 1 time	3	8.6	
Rice 2 times	13	37.1	
Rice 3 times	19	54.3	
Exercise			
Yes	5	14.3	
No	29	82.8	
Occasional	1	2.9	

Table 2. Risk factors status of participants (N=35)

Variables	n	%	Mean ± SD
Risk factors			
DM	17	48.6	
Obesity	15	42.9	
Hyperlipidemia	9	25.7	
HTN	8	22.9	
IHD	2	5.7	
Thyroid disorders	2	5.7	
HBs Ag			
Positive	0	0.0	
Negative	35	100.0	
Anti-HCV			
Positive	0	00	
Negative	35	100.0	
Body (BMI)			
Body weight			72.74 ± 8.74
Body Height			61.37 ± 2.67

**DM- Diabetes mellitus, HTN- Hypertension, IHD: Ischemic Heart Disease, HBs Ag: Hepatitis B surface antigen, Anti-HCV: Antibody to hepatitis C virus, BMI: Body Mass Index*

Table 3. Investigations status of participants (N=35)

Variables	Mean ± SD	95% confidence interval of the difference		P-Value
		Lower	Upper	
S. Bilirubin	0.53 ± 0.20	0.46	0.60	0.544
SGPT	50.89 ± 24.82	42.36	59.41	0.011
SGOT	42.94 ± 23.92	34.73	51.16	0.116
ALK PHOS	56.63 ± 24.98	48.05	65.21	0.968
RBS	6.62 ± 2.99	5.60	7.65	0.231
HBA1c	5.58 ± 1.75	4.98	6.18	0.243
TSH	2.40 ± 1.33	1.94	2.85	0.805
Lipid profile C	207.14 ± 56.82	187.63	226.66	0.161
Lipid profile H	42.97 ± 10.72	39.29	46.65	0.084
Lipid profile L	120.09 ± 45.91	104.32	135.85	0.137
Lipid profile T	214.54 ± 108.25	177.36	251.73	0.937

** SGPT: Serum Glutamic Pyruvic Transaminase, SGOT: Serum Glutamic-oxaloacetic Transaminase, ALK PHOS: Alkaline phosphatase, RBS: Random blood sugar, HBA1c: Hemoglobin A1c, TSH: Thyroid stimulating hormone*

Table 3A. SGPT Distribution of participants (N=35)

Variables	n	%
SGPT <42	21	60.0
SGPT >42	14	40.0

Table 4. Hepatic fibrosis status among the participants (N=35)

Hepatic Fibrosis	Fatty liver score	
	n	%
Mild (1-8.6) [stage 0, 1]	32	94.4
Moderate (8.6-11.7) [stage 2,3]	2	5.7
Severe (11.7-75) [stage 4]	1	2.9

Table 5 showed that among total participants more than fifty percent (57.2%) was in stage four of severe. And mild level was observed in 11.4% patients followed by 31.4% patients with moderate level of hepatic steatosis.

Table 5. Hepatic steatosis status among the participants (N=35)

Hepatic steatosis (Fat content in liver)	Fatty liver score	
	n	%
Mild (1-270) [stage 0, 1]	4	11.4
Moderate (270-302) [stage 2]	11	31.4
Severe (302-400)) [stage 3]	20	57.2

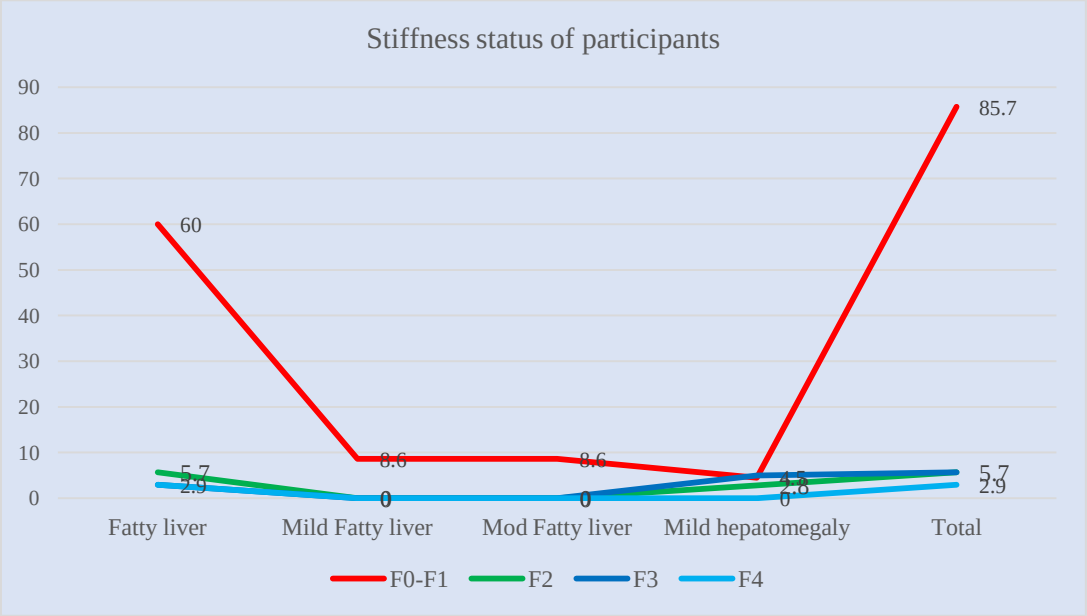

Fig. 1. Stiffness status of participants

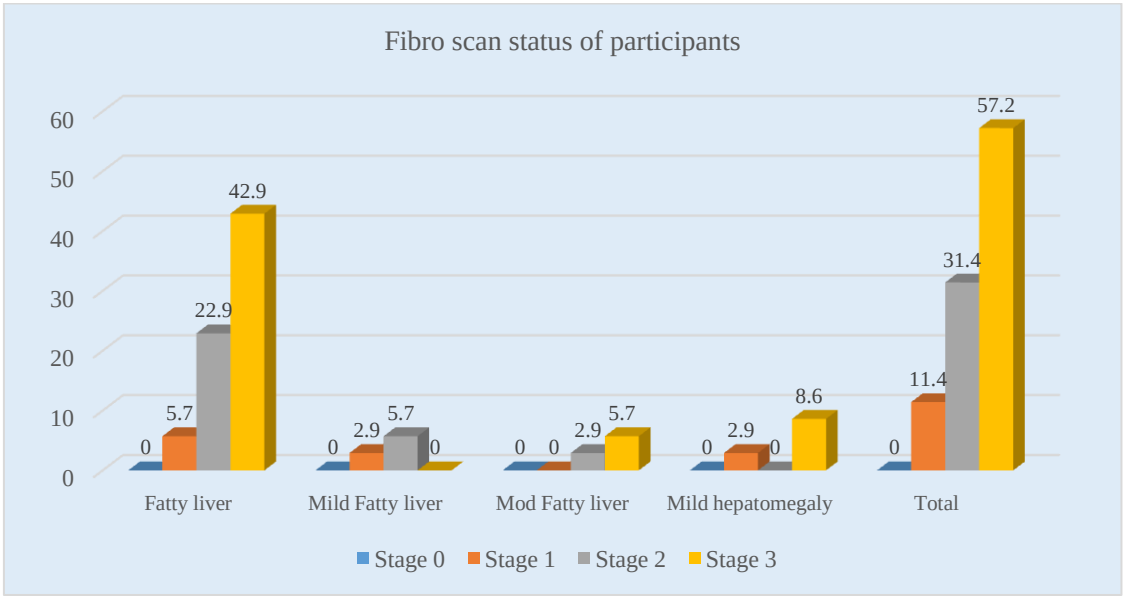

Fig. 2. Fibro scan status of participants

Fig. 2 showed the fibro scan status of participants of this study. It showed that maximum patients had stage 3 according to their status and minimum number of patients had stage 1 status according to their status.

4. DISCUSSION

Nonalcoholic fatty liver disease is a highly common condition that affects one out of every three to five people and one out of every ten children [10]. Obesity is regarded to be the leading cause of fatty liver infiltration. In our study, maximum (48.6%) participants had diabetes mellitus and obesity (42.9%). Their mean body weight was 72.74 ± 8.74 and mean body height was 61.37 ± 2.67. According to some specialists, fatty liver affects roughly two-thirds of obese adults and half of obese children [11]. Type 2 diabetes and other insulin-resistant diseases, such as polycystic ovarian syndrome, are well-known risk factors for the development of fatty liver and NASH [11]. With some minor modifications, “the risk factors for NAFLD in

Bangladesh appear to be similar to those in the Western world. The main risk factors include age, obesity, insulin resistance, and the general development of metabolic syndrome" [12, 13]. "HTN, waist circumference, BMI, and insulin resistance have all been linked in multiple population-based studies from South Asia" [14]. "BMI, homeostatic model assessment of insulin resistance (HOMA-IR), waist-hip ratio, diabetes, HTN, family history of metabolic syndrome, and sleep apnea were all identified as risk factors for NAFLD in a study conducted in India in 2015" [14,15]. Furthermore, "in India, specific dietary behaviors were linked to NAFLD, including non-vegetarian diets, fried foods, spicy foods, and tea" [15]. "It was discovered that NAFLD patients had a greater prevalence of all components of the metabolic syndrome10. Finally, there are non-modifiable risk factors for south Asian NAFLD that are linked to genetic and epigenetic changes, such as SNPs" [16].

Interestingly, many research from South Asia show that NAFLD strikes young in this region, with an average age in the 40s and a male predominance [16, 17]. In our study, among 35 participants, 48.6% participants were below 40 years old and 51.4% were between 40 to 60 years old. The mean age of the participants were 38.89 ± 8.50 years**.** There were fewer studies that looked at the link between other metabolic risk variables and incident severe liver disease, and the definitions of prognostic factors of relevance varied. As a result, pooling results was not possible, but the largest, highest-quality studies suggested that lipid abnormalities (low HDL and high triglycerides) and hypertension are both independently linked to incident severe liver disease. The corrected impact sizes appear to be similar to those found in studies of people with a high BMI. There were fewer studies looking at the metabolic syndrome, which is a collection of metabolic risk variables, as a predictor of liver outcomes.

5. CONCLUSION

NAFLD rates are increasing in lockstep with obesity and type 2 diabetes, posing an ever-increasing strain on the health-care system. Increased knowledge of this problem among primary care physicians is critical for reducing the disease's impact through metabolic risk factor screening and management. More population-based research is needed to better understand the dangers and inform future public health interventions.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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