

EVALUATION OF LIVER DISEASES AMONG PATIENTS OF METABOLIC SYNDROMEParimal Sarkar¹, Subarna Bhattacharjee²¹Assistant Professor, Department of General Medicine, Agartala Government Medical College, Agartala, Tripura.²Postgraduate Trainee, Department of General Medicine, Agartala Government Medical College, Agartala, Tripura.**ABSTRACT****BACKGROUND**

Several cross-sectional studies have reported on the prevalence of liver diseases among patients of metabolic syndrome. The aim of the study was to determine the prevalence of liver diseases among patients of metabolic syndrome.

METHODS

The study included 123 patients between 18-70 years of age, over a period of one & half year from January 2016 to June 2017. Anthropometric measurements like height, weight, waist & hip circumference, body mass index (BMI) were recorded. Biochemical tests included blood sugar (FBS & PPBS), lipid profile, LFT, viral markers & ultrasonography of whole abdomen were done to detect presence of liver diseases among patients of metabolic syndrome.

RESULTS

In this study group, 52.8% were males & 47.2 % were females. Most of the cases were overweight (51.2%). The prevalence of overall liver disease was 60.2 %. NAFLD was the most commonly observed liver disease (34.1%). It was followed by raised transaminase level (16.3%) & lastly NASH related cirrhosis (9.8%). Presence of dyslipidaemia (58.5%), hypercholesterolemia (73.0%), hypertriglyceridemia (85.1%) & low HDL-C (81%) were associated with liver disease.

CONCLUSION

A very high prevalence (60.2%) of liver disease was found in this study. Females were having higher prevalence of liver diseases than males. NAFLD was the most commonly observed liver disease. The proportion of NASH related cirrhosis & transaminasemia were marginally higher as compared to studies done in other parts of India.

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BACKGROUND

Metabolic syndrome (Syndrome X) consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular diseases (CVD) & Type 2 Diabetes Mellitus (T2-DM).¹

Features of this syndrome include insulin resistance with associated hyperinsulinemia, impaired glucose tolerance and diabetes, Dyslipidaemia characterized by hypertriglyceridemia and low serum High density lipoprotein cholesterol (HDL-C) levels. The metabolic syndrome usually occurs in persons with frank obesity, but it also has been reported in normal weight persons who presumably have an increased amount of abdominal fat.²

Risk factors for metabolic syndrome are overweight /obesity, sedentary lifestyle, diabetes, cardiovascular diseases, lipodystrophy, hyperuricemia, obstructive sleep apnoea, polycystic ovarian syndrome and lastly non-alcoholic fatty liver diseases.¹

Obesity is associated with a spectrum of liver abnormalities known as non-alcoholic fatty liver disease (NAFLD), which is characterized by an increase in intra-

hepatic triglyceride content (i.e., steatosis) with or without inflammation and fibrosis.²

NAFLD has been found to be associated with approximately 25%-60% patients having metabolic syndrome and up to 35% have non-alcoholic steatohepatitis (NASH). Epidemiological studies suggest prevalence of NAFLD in around 9% to 32% of general population in India with higher prevalence in those with overweight or obesity and those with diabetes or pre-diabetes. Studies showed that prevalence of NAFLD in T2DM patients in India as high as 49%.³

Published literatures on NAFLD from India are sparse. This may be related to the fact that the condition was recognized fairly recently, (ii) a presumption that the condition is benign and has a non-progressive course, (iii) a large burden of viral hepatitis in India tends to reduce the priority accorded to this condition.⁴

In a country like India, incidence of metabolic syndrome is increasing in the face of rapid industrial growth & urbanization. The associations of metabolic syndrome with various liver diseases such as NAFLD form the heart of this study.

This present study is likely to offer some knowledge regarding the burden of various associated liver diseases along with metabolic syndrome & associated clinic-biochemical profile in this part of the country and will be a useful tool for further reference in near future.

Aim and Objectives**Aim**

To evaluate patients of metabolic syndrome for the presence of liver diseases.

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Objectives

1. To study the prevalence of liver diseases among patients of metabolic syndrome.
2. To study the clinical and bio-chemical profile of patients of metabolic syndrome.

METHODS

- The study was conducted in Agartala Government Medical College & G.B. Pant Hospital, Agartala over a period of one and half year from June 2017 to January, 2019.
- All newly diagnosed metabolic syndrome patients who came for check-up for other reason at AGMC & GBPH and were not having any known liver diseases from before were included in the study. This was conducted in patients between 18 to 70 yrs attending AGMC & GBPH. They underwent thorough screening process for the presence of metabolic syndrome as per NCEP: ATP III criteria i.e. presence of three or more of the following criteria:
 - a) Waist circumference ≥ 90 cm in men & ≥ 80 cm in female,
 - b) Fasting blood glucose > 110 mg/dl, or previously diagnosed type 2 diabetes,
 - c) Hypertension by means of ≥ 130 mm Hg systolic blood pressure (SBP) or ≥ 85 mm Hg diastolic blood pressure (DBP),
 - d) hypertriglyceridemia by mean of triglyceride ≥ 150 mg/dl, &
 - e) HDL-C < 40 mg/dl for men, < 50 mg/dL for women.

All the study subjects were selected according to inclusion criteria. The Clinical data were collected from personal interview and systemic examination of subjects. After conducting interview and physical assessment for each eligible study participants, they had undergone different investigations like,

Blood Serology: HBsAg, Anti-HCV

Biochemical Examination: Fasting blood sugar, post-prandial blood sugar, fasting lipid profile, liver function tests.

Radiological Examination: Ultra-sonography whole abdomen.

Inclusion Criteria

1. Patients categorized to metabolic syndrome as per NCEP: ATP III criteria.
2. Age 18 years to 70 years.
3. Non-alcoholic.
4. Hepatitis B & C non-reactive.
5. Willing to participate in the study.

Exclusion Criteria

1. Subjects not fulfilling the NCEP: ATP III criteria for metabolic syndrome
2. Age < 18 years and > 70 years.
3. All known cases of chronic liver diseases (including viral hepatitis, autoimmune hepatitis, alpha 1 – antitrypsin deficiency), hepatobiliary infectious disease, and biliary tract disease.

4. Patients with de-compensated liver diseases.
5. Unwillingness.

All newly diagnosed Metabolic syndrome patients fulfilling inclusion criteria, who came for routine check-up in AGMC & GBPH, Agartala, were selected as study subjects. The selected study subjects were explained about the study plan, risk and benefits in detail. All study subjects were at first divided into male and female. They were also divided into three age groups depending on their respective ages i.e. 18-33 years, 34-49 yrs. and 50-70 years age group. Presence of co-morbidities like, cardiovascular disease (CVD), cerebro-vascular accident (CVA), and chronic kidney disease (CKD), and peripheral vascular disease (PVD) were also noted down and categorized accordingly.

Baseline Measurements

After detailed history taking, physical examination was done on each and every subject with special emphasis on anthropometric measurements like height, weight, waist and hip circumference, body mass index (BMI) and finally blood pressure measurement. All study subjects were divided into three categories as per their BMI i.e. normal weight (BMI: < 23 Kg/M), overweight (BMI > 23 but < 25 Kg/m) and lastly obese (BMI > 25 Kg/m)

Statistical Analysis

Analysis of results was carried out by means of the statistical package for the social sciences (SPSS) version 20. A descriptive statistic frequency, Chi-square test, Fisher’s exact test and lastly binary logistic regression analysis were performed to compare the variables with the disease population. P value < 0.05 considered significant.

RESULTS

This cross-sectional study was carried out at Agartala Government Medical College & GB Pant Hospital between January 2016 to June 2017. A sample size of one hundred twenty-three (123) was used here.

Sl. No.	Age Group	Number of Cases	Percentage (%)
1.	18-33 Yrs.	20	16.3
2.	34-49 Yrs.	36	29.3
3.	50-70 Yrs.	67	54.5
4.	Total	123	100.0

Table 1. Frequency Distribution of Age Groups

In this study all cases were categorized into three age groups as per their ages. Group 1 (between 18-33 yrs.) consists of 20 cases (16.3%), group 2 (between 34-49 yrs.) consists of 36 cases (29.3%), and finally group 3 (between 50-70 yrs.) consists of maximum number of cases i.e. 67 (54.4%) cases among 123 samples.

Sl. No.	Gender	Frequency	Percentage (%)
1.	Male	65	52.8
2.	Female	58	47.2
3.	Total	123	100.0

Table 2. Frequency Distribution of Gender (n=123)

Out of 123 cases 52.8% (65/123) were male and 47.2% (65/123) were female. Male: female ratio was 1.12:1

Sl. No.	Comorbidity	Frequency	Percentage (%)
1.	No Comorbidity	50	40.7
2.	CVD	45	36.6
3.	CVA	15	12.2
4.	PVD	4	3.3
5.	CKD	9	7.3
6.	Total	123	100.0

Table 3. Frequency Distribution of Various Co-Morbidities in The Study Population (n=123)

In the present study among 123 study cases, 45 (36.6%) cases had history of cardiovascular disease (CVD), 15(12.2%) had history of cerebro-vascular accident (CVA) in their past, 4 (3.3%) had history peripheral vascular disease (PVD) and lastly 9 (7.3%) had evidence of chronic kidney disease (CKD). 50 patients i.e. 40.7% cases did not have history of any co-morbidities. From the study CVD was the commonest co-morbidity.

Sl. No.	Liver Disease	Frequency	Percentage (%)
1.	Present	74	60.2
2.	Absent	49	39.8
3.	Total	123	100.0

Table 4. Frequency Distribution of Liver Disease Among Metabolic Syndrome (MS) Cases (n=123)

Here in the above-mentioned study population, out of 123 cases of metabolic syndrome liver disease was present in 60.2% (74/123) cases & was absent in 39.8% (49/123) cases.

Sl. No.	Spectrum	Frequency	Percentage (%)
1.	No Hepatic Abnormality	49	39.8
2.	Raised Transaminase	20	16.3
3.	NAFLD	42	34.1
4.	Nash Related Cirrhosis	12	9.8
5.	Total	123	100.0

Table 5. Spectrum of Hepatic Abnormalities in Study Group (n=123)

Out of 123 cases in the study population, non-alcoholic fatty liver disease (NAFLD) was present in 34.1% (42/123) and raised transaminase level was present in 16.3% (18/123) cases. In 39.8% (49/123) cases no hepatic abnormality was detected. From this study NAFLD was the most common liver disease spectrum among all 123 cases.

Sl. No.	Observation	Frequency	Percentage (%)
1.	No Abnormality Detected	69	56.1
2.	Fatty Liver Grade 1	25	20.3
3.	Fatty Liver Grade 2	12	9.8
4.	Fatty Liver Grade 3	5	4.1
5.	Cirrhosis	12	9.8
6.	Total	123	100.0

Table 6. Frequency Distribution of Ultra-Sonography Findings in MS Patients (n=123)

Out of 123 patients of metabolic syndrome who underwent ultra-sonography individually, fatty liver grade 1 was found on 20.8% (25/123) cases, fatty liver grade 2 in 9.8% (12/123) cases, fatty liver grade 3 in 4.1% (5/123) cases and lastly cirrhosis was found in 9.8% (12/123) cases again. 56.1% (69/123) cases were sonographically normal.

DISCUSSION

This cross-sectional observational study was accomplished with the help of one hundred twenty-three (123) randomly selected newly diagnosed metabolic syndrome patients following strict inclusion criteria & was not having any known liver diseases from before. In this study group 52.8% were male & rest others were female. Out of 123 MS patients, mean age of the study population was 50.5 ± 13.1 (SD) years and most of them were from 50-70 yrs age group i.e. 54.5% (67/123) which is comparable to Gupta R et al.⁵

In the present study most of the cases were overweight (51.2%) i.e. BMI = 23-25 Kg/m² & 36.6% were obese i.e. BMI >25 Kg/m² which is comparable with Kumar S, et al (50.8%).⁶ From the above study it was evident that the disease burden was slightly higher in females than males (30.9% vs. 29.3%). Though in most of the literatures from various parts of India & over-seas had reported male preponderances.⁷

As evident from the present study, the prevalence of overall liver diseases among 123 cases were 60.2% (74/123), which is showing a very high prevalence among the study population. In this study Non-alcoholic fatty liver disease (NAFLD), which was here confirmed and diagnosed on the basis of ultrasonography examination was the most commonly observed component of the liver disease spectrum and comprised of 34.1% (42/123) of the total study population. It was followed by raised transaminase level accounting 16.3% and lastly NASH related cirrhosis which was 9.8% Eckel RH, et al.¹

In the present study 58.5% cases of dyslipidaemia, 73.0% cases of raised total cholesterol (TC), 85.1% cases of raised TG & lastly 81% cases of low HDL-C levels had liver disease among the study population. Presence of dyslipidaemia, raised total cholesterol (TC) and low HDL-C were having significant statistical co-relation with liver disease prevalence (p < 0.05) noted by Bajaj S et al.⁸ As per the present study, presence of comorbidities were having statistically significant association with presence of liver

disease ($p < 0.05$) in the study population, which is also observed in Bang KB et al.⁹

CONCLUSION

This study was conducted over one hundred twenty-three (123) recently diagnosed randomly selected metabolic syndrome patients, for the presence of liver disease.

This study has revealed some interesting facts about liver disease occurrence in this region and its various clinico-biochemical associations. Almost all the observations of this study was in accordance with the similar studies conducted earlier.

A very high prevalence i.e. 60.2% of liver disease namely transaminasemia (raised transaminase level), NAFLD & NASH related cirrhosis had been observed in this current study. NAFLD was the most commonly observed liver disease spectrum among the study group (34.1%). The observed proportion of NAFLD is comparable to western population. Serum transaminasemia & NASH related cirrhosis were marginally higher in this particular study compared to studies done in other parts of India.

Females were having a bit higher prevalence of liver disease than males in this study, going against the finding observed in most of the other studies. Almost all the components of metabolic syndrome were more in the disease group than the non-disease group. Most common co-morbidity observed in this study among MS patients was CVD. Statistically significant correlation was observed between liver disease and factors like BMI, dyslipidaemia, raised total cholesterol, low HDL-C, AST, ALT, GGT levels in the study population. Though literatures had reported strong association between raised TG, DM, raised WC with the presence of liver disease among metabolic syndrome patient, in this study no such correlations were noted. In the course of the study, various literatures from different authors across the globe were referred. Much work has been done in this field from abroad and India equally, more studies are waiting for publication, further experimental and follow-up studies are needed to elucidate the

pathomechanism of various spectrums of liver disease in metabolic syndrome patients and utility of various non-invasive investigations to predict liver abnormality early in this group.

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