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PREVALENCE OF NONALCOHOLIC FATTY LIVER DISEASE IN OVERWEIGHT ADULTS OF RURAL AREA AND ITS CLINICAL AND BIOCHEMICAL CORRELATION

Biochemistry

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ABSTRACT

Nonalcoholic fatty liver disease (NAFLD) is defined as presence of fat in the liver either on imaging or on liver histology after exclusion of secondary causes of fat accumulation, i.e., significant alcohol consumption, certain medications, and other medical conditions. It ultimately progresses to hepatic fibrosis, cirrhosis and liver failure. NAFLD is one of the most common chronic liver diseases worldwide and is a significant cause of morbidity in all age groups. Prevalence of NAFLD is estimated to be around 9-32% in the general population of India with a higher incidence among the obese. In this study total 60 overweight patients selected from general medicine outdoor and indoor patient. Correlation of NAFLD in overweight adults with Clinical and biochemical parameters like Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Fasting blood glucose, Triglycerides, Total cholesterol, High-density lipoprotein was analyzed. NAFLD show positive significant correlation with BMI (P=0.001), WAIST SIZE (P=.004), HIP LEVEL SIZE (.005), and show no significance with other biochemical parameters.

KEYWORDS

Nonalcoholic fatty liver disease, Alcoholism, Imaging studies, Liver biopsy, Steatosis, Fibrosis

1. INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is defined as presence of fat in the liver either on imaging or on liver histology after exclusion of secondary causes of fat accumulation, i.e., significant alcohol consumption, certain medications, and other medical conditions.[1] It ultimately progresses to hepatic fibrosis, cirrhosis and liver failure.[2]

NAFLD is one of the most common chronic liver diseases worldwide and is a significant cause of morbidity in all age groups.[3] Prevalence of NAFLD is estimated to be around 9-32% in the general population of India with a higher incidence among the obese[4] Due to rising trends of obesity throughout the world[5], it is becoming crucial to investigate prevalence of comorbidities and their association with obesity.

The modern epidemic of this disease indicates that investigation into other components of the disease is needed. NAFLD usually presents without any signs and symptoms. No single test is diagnostic of NAFLD, but a series of blood tests, imaging procedures and liver tissue examinations are performed to exclude other causes and pinpoint the diagnosis. Due to this asymptomatic nature and lack of specific and sensitive diagnostic tests of NAFLD, study of accurate clinical and biochemical correlates is required for a routine protocol for NAFLD screening and detection at an early age. This may be useful in identifying those with potentially silent progressive liver disease and allow timely interventions for control of the disease.

The information on NAFLD in rural areas is limited and there is a need for further research regarding the burden and risk factors of NAFLD in rural areas, as few studies indicate a high prevalence despite obvious difference in lifestyle from urban populations.[6]

2. MATERIAL AND METHOD:

2.1 Ethical clearance: This study was carried out in the Department of Biochemistry in collaboration with department of Medicine at Bhagat Phool Singh Government Medical College, Khanpur Kalan, Haryana, from 1st June to 31st July 2019. The institutional ethical clearance was obtained from Ethical Committee of the college.

2.2 Study population: The study was conducted on the rural population falling in the catchment area of this hospital. A sample of convenient 60 overweight patients attending general medicine outdoor and indoor patient services was taken. Written informed consent for voluntary participation was taken from each patient. Confidentiality of patient data will be maintained. Patients of ages 18-55 years, of either gender, with Body Mass Index (BMI) more than 23 (according to the revised Asia-Pacific BMI recommendations by WHO) [7], and willing to participate was included in the study, through purposive sampling.

Exclusion criteria:

a. Alcohol intake of more than 20 g/day for females and more than 30 g/day for males
b. Have previously diagnosed diabetes mellitus; or have obesity due to an endocrine or genetic disorder or have previously diagnosed chronic liver disease.

2.3 Data collection procedures and instruments: The diagnosis of NAFLD was made on the basis of abdominal ultrasonography performed using curvilinear probe (2-5 Hz), identifying ultrasonographic features as bright hepatic echoes, increased hepatorenal echogenicity and vascular blurring of portal or hepatic vein.[8] Hepatitis B surface antigen (HBsAg and anti-hepatitis C virus (anti-HCV) antibodies was assayed in adults who are diagnosed with fatty liver.

2.4 Clinical Parameters: Weight and height of the sample was measured to the nearest 0.1 kgs and 0.5 cms respectively, and BMI calculated using the formula weight (kg)/height $(m)^2$. Waist and hip circumferences were measured using non-stretchable tape according to WHO guidelines.[9] Body fat percentage was estimated by using non-invasive digital body composition analyzer available in the central research laboratory of the institute. Central blood pressure parameters were assessed by noninvasive cardiovascular risk analysis system that is digital periscope in the central research laboratory.

2.5 Biochemical Parameters: Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Fasting blood glucose, Triglycerides, Total cholesterol, High-density lipoprotein levels were estimated by Roach Modular P 800 automated clinical analyzer, for

which 5 ml of fasting venous sample was obtained after a 08 h overnight fast.

2.6 Quality control: Internal and external quality control of convenient samples was done as per standard operative procedures (SOPs) of the Department of Biochemistry.

2.7 Statistical analysis: The collected was entered in Excel spreadsheet. Mean and standard deviation was calculated for quantitative data. Percentages and proportions were calculated for qualitative data. Chi-square test will be used for categorical variables. Pearson correlation will be found out between BMI and NAFLD, considering P value <0.05 as statistically significant. Correlation and regression models will be compared for accuracy and precision.

OBSERVATION AND RESULTS:

A total 60 overweight adult patients were included in the study. Mean age of overweight adult patients was 41±11.96 yr. Mean weight 79.68±14.95, mean height 160.39±8.17, mean BMI 30.96±5.11, mean waist size 102±7.86 cms, mean hip level size 106.75±7.86 cms**.** In 60 overweight adult patients, 13(21.7%) has no fatty liver 25 (41.7%) has Grade 1 (Mild), 17(28.3%) has Grade 2 (Moderate) and 05 (8.33%) has Grade 3 (severe) fatty liver on USG.

Parameters	N	Mean ± SD or n (%)	Clinical and biochemical correlates of NAFLD in overweight adult (P value)
Age	60	41±11.96	
Weight	60	79.68±14.95	0.015
Height	60	160.39±8.17	0.576
BMI	60	30.96±5.11	0.001
Waist	60	102±7.86	0.004
Hip	60	106.75±7.86	0.005
Fatty liver on USG No fatty liver (Grade 0) Mild (Grade 1) Moderate (Grade 2) Severe (Grade 3)	60 13 25 17 05	21.7% 41.7% 28.3% 8.3%	
Urea	60	25.71±8.42	0.330
Creatinine	60	1±0.00	
Calcium	60	9±.66	0.069
Phosphorus	60	3.64±.621	0.866
Triglycerides	60	148.75±59.63	0.862
Cholesterol	60	185.64±30.10	0.178
HDL	60	39.89±10.92	0.235
LDL	60	106.07±35.01	0.744
VLDL	60	35.04±15.03	0.808
SGOT	60	54.46±65.25	0.232
SGPT	60	71.54±69.31	0.219
TP	60	7.04±.57	0.202
ALB	60	4±.57	0.589
GLB	60	3.04±.42	0.288
GLUCOSE	60	91.61±8.36	0.941

Biochemical parameters

In 60 overweight adult patients the mean Urea 25.71±8.42, mean Creatinine 1±0.00, mean Calcium 9±.66, mean phosphorus 3.64±.621, mean triglyceride 148.75±59.63, mean cholesterol 185.64±30.10, mean HDL 39.89±10.92, mean LDL 106.07±35.01, mean VLDL35.04±15.03, mean SGOT 54.46±65.25, mean SGPT 71.54±69.31, mean TP 7.04±.57, mean Alb 4±.57, mean Glb 3.04±.42, mean Glucose was 91.61±8.36.

Correlation of NAFLD in overweight adults with Clinical and Biochemical parameter

In the present study, NAFLD show positive significant correlation with BMI (P=0.001), WAIST SIZE (P=.004), HIP LEVEL SIZE (.005), and show no significance with other biochemical parameters.

4. DISCUSSION:

In India, the prevalence of NAFLD in the general population varies from 10% to 30%, the lowest figures being from rural areas of West Bengal and the highest from urban population of Chennai. The present USG based study showed 41.7% has Grade 1 (Mild), 28.3% has Grade 2 (Moderate) and 05 8.33% has Grade 3 (severe) fatty liver in overweight adults in rural population, and shows positive significant correlation with BMI (P=0.001), WAIST SIZE (P=.004), HIP LEVEL SIZE (.005). Study done by **Vandana jain et al.** shows a high prevalence of NAFLD (62.5%) in the overweight /obese adolescents. BMI, WC BF percent, insulin resistance and level of ALT and AST ware positively associated with high risk of NAFLD in adolescent, Shows same observation. **Harsimran Singh et al.** reported positive significant correlation with waist circumstance, mean BMI, mean serum triglyceride, mean serum HDL and mean serum FBS with NAFLD group.

5. CONCLUSION:

This study showed that NAFLD in nearly two thirds of the overweight adult patients in rural population. The clinical and biochemical parameters associated with higher risk of NAFLD were higher BMI, WC and HIP Level size. Screening for NAFLD should be incorporated in the evaluation of all overweight adults, especially if one or more of the risk markers are present.

6. REFERENCES

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