International Journal of Community Medicine and Public Health
Naik LP et al. Int J Community Med Public Health. 2026 Jan;13(1):256-258
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20254434

Original Research Article

Prevalence of non-alcoholic fatty liver disease using surrogate indices among adults attending a tertiary care hospital in Eastern India

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Received: 05 December 2025
Revised: 26 December 2025
Accepted: 29 December 2025

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ABSTRACT

Background: Non-alcoholic fatty liver disease (NAFLD) has emerged as the most common chronic liver disorder worldwide and represents the hepatic manifestation of metabolic syndrome. In India, the burden of NAFLD is increasing rapidly due to rising prevalence of obesity, diabetes and sedentary lifestyles. Imaging-based diagnosis is resource-intensive, making surrogate indices useful for large-scale screening. To estimate the prevalence of NAFLD using fatty liver index (FLI) and to identify associated metabolic risk factors among adults attending a tertiary care hospital.

Methods: A hospital-based cross-sectional study was conducted at Hitech Medical College and Hospital, Bhubaneswar, over six months. Adults aged ≥30 years were enrolled. Anthropometric measurements and biochemical parameters were recorded. FLI was calculated using body mass index, waist circumference, serum triglycerides and gamma-glutamyl transferase levels. FLI ≥60 was considered diagnostic of NAFLD. Statistical analysis included descriptive statistics and multivariate logistic regression.

Results: Among 210 participants, the prevalence of NAFLD was 32.4%. NAFLD was significantly associated with obesity, diabetes mellitus, dyslipidemia and hypertension. Obesity and diabetes remained independent predictors on multivariate analysis.

Conclusions: Nearly one-third of adults had NAFLD as detected by surrogate indices. FLI is a simple, cost-effective tool that can be used for opportunistic screening in routine clinical practice.

Keywords: Diabetes mellitus, Fatty liver index, India, Metabolic syndrome, Non-alcoholic fatty liver disease, Obesity

INTRODUCTION

NAFLD encompasses a spectrum of liver disorders characterized by excessive hepatic fat accumulation in the absence of significant alcohol consumption.[1] NAFLD affects approximately 25-30% of the global population and has become the leading cause of chronic liver disease.[2] In India, the prevalence of NAFLD ranges from 9% to 32%, even among non-obese individuals.[3] NAFLD is strongly associated with obesity, type 2 diabetes mellitus, dyslipidemia and metabolic syndrome.[4] Early identification is crucial as NAFLD can progress to cirrhosis and hepatocellular carcinoma.[5] However, ultrasonography and liver biopsy are not feasible for population-level screening. Surrogate indices such as the FLI provide a validated, non-invasive alternative for identifying individuals at high risk of NAFLD.[6] The present study aimed to estimate the prevalence of NAFLD using FLI and to assess its determinants in a tertiary care setting.

METHODS

Study design

This study was a hospital-based cross-sectional study.

Study place

The study was conducted in the Hitech Medical College and Hospital, Bhubaneswar, Odisha.

Study duration

The study period was of six months between 1st April 2024 and 30th November 2024.

Study population

Adults aged ≥30 years attending the Medicine outpatient department.

Inclusion criteria

It includes adults aged ≥30 years who consented to participate.

Exclusion criteria

It includes known chronic liver disease, significant alcohol intake (>20 g/day for men, >10 g/day for women), pregnancy and critically ill patients.

Sample size calculation

Using the formula $n=Z^2pq/d^2$, assuming prevalence (p) of NAFLD as 30%, q=70%, absolute precision (d)=6% and Z=1.96, the calculated sample size was 224. Considering feasibility, a minimum of 210 participants were included.

Data collection

Socio-demographic data, anthropometry, blood pressure, fasting blood glucose, lipid profile and GGT levels were recorded.

Operational definition

FLI was calculated using standard formula. FLI ≥60 indicated NAFLD.

Statistical analysis

Data were analysed using SPSS version 20. Chi-square test and multivariate logistic regression were applied. A p value <0.05 was considered statistically significant.

RESULTS

A total of 210 participants were studied, with a mean age of 46.9±10.8 years. Males constituted 56.2% of the study population.

The prevalence of NAFLD using FLI was 32.4% (68/210). NAFLD prevalence increased significantly with increasing BMI and presence of diabetes and dyslipidemia. As shown in Table 1, more than one-third of the study population had diabetes mellitus (34.3%), while 41.9% were hypertensive. Obesity (BMI≥25 kg/m²) was present in 36.2% of participants. These findings highlight a substantial burden of metabolic comorbidities among adults attending the tertiary care hospital, which are known contributors to NAFLD.

Table 2 demonstrates that 32.4% of participants had FLI≥60, suggestive of NAFLD, while 67.6% had FLI values below the diagnostic cutoff. This indicates that nearly one in three adults in the study population had probable NAFLD when assessed using a surrogate index. On multivariate logistic regression analysis (Table 3), obesity emerged as a strong independent predictor of NAFLD (AOR=3.2, 95% CI: 1.7–6.1, p<0.001). Diabetes mellitus was also independently associated with NAFLD (AOR=2.6, 95% CI: 1.3–5.0, p=0.004). These findings indicate that individuals with obesity and diabetes had a significantly higher likelihood of developing NAFLD, even after adjusting for confounding variables.

Table 1: Socio-demographic and clinical characteristics (n=210).

Variable	Frequency	%
Male	118	56.2
Diabetes Mellitus	72	34.3
Hypertension	88	41.9
Obesity (BMI ≥25)	76	36.2

Table 2: Prevalence of NAFLD using FLI.

FLI Category	Frequency	%
FLI ≥60 (NAFLD)	68	32.4
FLI <60	142	67.6

Table 3: Multivariate logistic regression for NAFLD.

Variable	AOR	95% CI	P value
Obesity	3.2	1.7–6.1	<0.001
Diabetes mellitus	2.6	1.3–5.0	0.004

DISCUSSION

The present study demonstrates a high prevalence of NAFLD among adults attending a tertiary care hospital. The observed prevalence is consistent with urban Indian studies.[3,7] Obesity and diabetes mellitus emerged as strong independent predictors of NAFLD, highlighting

the metabolic basis of the disease.[4,5] The use of FLI enabled identification of high-risk individuals without the need for imaging. The hospital-based design limits generalizability; however, the findings emphasize the need for routine NAFLD screening in NCD clinics.[8-10]

Several longitudinal and biopsy-based studies have shown progressive disease course of NAFLD leading to cirrhosis and hepatocellular carcinoma, emphasizing early detection. Asian populations show distinct epidemiological trends with rising obesity-related NAFLD burden. The close association between NAFLD, metabolic syndrome and cardiovascular disease further strengthens the need for opportunistic screening in routine practice.[11-13]

CONCLUSION

Nearly one-third of adults had NAFLD as detected by surrogate indices. FLI is a practical and cost-effective screening tool that can be integrated into routine clinical practice for early identification of NAFLD.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Naik LP, Rath M, Sunandini D, Sahu SP. Prevalence of non-alcoholic fatty liver disease using surrogate indices among adults attending a tertiary care hospital in Eastern India. Int J Community Med Public Health 2026;13:256-8.