ORIGINAL ARTICLE

Proportion of Non-Alcoholic Fatty Liver Disease and Its Risk Factors among Sedentary Workers of a Tertiary Care Centre: Camp-Based Findings

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ABSTRACT

Background: A growing public health problem is non-alcoholic fatty liver disease (NAFLD), especially in sedentary workers. The purpose of this study was to estimate the proportion of sedentary tertiary care hospital staff who had NAFLD and related risk factors. **Methods:** In North India, a tertiary care facility held a cross-sectional screening camp for sedentary employees. Fibrosis was evaluated using liver stiffness measurement (LSM), while steatosis was evaluated using the ultrasound attenuation parameter (UAP). Data on socio demographics, lifestyle, and comorbidities were collected by a self-designed questionnaire filled by the investigator. All participants were on fasting before testing. **Results:** Among 211 participants (83.4% male; mean age 34.5 ± 7.11 years), advanced fibrosis (F3–F4) was detected in 10.4% and severe steatosis (S3) in 26.5%. Steatosis grade was significantly associated with age and gender. On multivariable analysis, age independently predicted severe steatosis (30–39 years: AOR 2.76, p = 0.013; ≥40 years: AOR 4.60, p = 0.009), while gender and other factors were not significant. UAP-based steatosis grades were associated with LSM-based fibrosis stages (p = 0.006). No missing data were observed. **Conclusions:** A substantial burden of NAFLD-related fibrosis and steatosis was detected among sedentary workers. Workplace-based screening and lifestyle interventions are recommended.

KEYWORDS

NAFLD; Sedentary Workers; Fibrosis; Steatosis; Screening; India

INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) affects nearly 25–30% of the global population and is a leading cause of chronic liver disease worldwide (1). Its spectrum ranges from simple steatosis to non-alcoholic steatohepatitis, progressive fibrosis, cirrhosis, and hepatocellular carcinoma (2). The prevalence of NAFLD has risen sharply with increasing obesity, diabetes, and sedentary lifestyles (3). In India, NAFLD prevalence ranges from 9% in rural to 32% in urban populations (4). Sedentary occupational groups, including administrative and healthcare staff, are at increased risk due to physical inactivity, irregular dietary habits, and stress (5). Sedentary behavior, long working hours, and studies among Indian IT workers indicate a high NAFLD burden (6-8). Older age and metabolic risk factors are commonly linked with NAFLD (9). However, data from Indian occupational cohorts, particularly healthcare workers, remain limited (7,16). Early detection is essential, as lifestyle modification can reverse NAFLD in initial stages (10). Transient elastography

offers a non-invasive method to assess liver stiffness (LSM) and steatosis (UAP) (11).

Aim: To estimate the proportion of NAFLD among sedentary hospital employees in North India.

Objectives: To assess associations of NAFLD with demographic, lifestyle, and metabolic factors, and to identify predictors of advanced fibrosis and severe steatosis**.**

MATERIAL & METHODS

Study design and setting: This cross-sectional, descriptive study was conducted as a single-day workplace screening camp at a tertiary care hospital in North India on 28th July 2025, in observance of World Hepatitis Day. The camp was organised during routine working hours following prior notification to all departments. Hepatic steatosis and liver fibrosis were assessed using transient elastography (Fibro Touch FT-100), with steatosis quantified by the ultrasound attenuation parameter (UAP) and fibrosis assessed by liver stiffness measurement (LSM). Diabetes mellitus and hypertension were analysed as independent, non-mutually exclusive comorbidities.

Ethical Approval: The present study was conducted as part of a broader IEC-approved research project undertaken for a postgraduate thesis titled "Prevalence of NAFLD in urban slums of Rishikesh – A Community based Cross-Sectional study". Ethical approval was obtained from the Institutional Ethics Committee, All India Institute of Medical Sciences (AIIMS), Rishikesh (IEC approval No.: 281/IEC/PGM/2024). The workplace screening activity and data analysis reported in this manuscript were performed under the scope of the approved protocol. The study was conducted in accordance with the Indian Council of Medical Research (ICMR) ethical guidelines, and written informed consent was obtained from all participants prior to enrolment.

Participants: Sedentary employees of the institute aged ≥18 years, including administrative staff, nursing staff, support staff, technical/engineering staff, and security personnel, were invited to participate in the screening camp. Participants were recruited using a convenience sampling approach following prior notification to all departments one week before the camp. Approximately 405 employees were invited, of whom 220 attended the camp. A total of 211 participants provided written informed consent and were included in the analysis; nine individuals were excluded due to a history of pre-existing liver disease.

Pre-existing liver disease was identified based on self-reported history of viral hepatitis, chronic liver disease, or ongoing hepatology treatment. This was an exploratory workplace screening study, and therefore formal sample size calculation was not performed, with the final sample size determined by operational feasibility during the screening camp.

Data collection: Sociodemographic and occupational characteristics, self-reported history of diabetes mellitus and hypertension, alcohol and tobacco use, and dietary preference were recorded using a structured, investigator-designed questionnaire administered through direct interviews. All participants were instructed to remain fasting prior to assessment. Hepatic steatosis and liver fibrosis were assessed using transient elastography (Fibro Touch FT-100), an ultrasound-based device with a single integrated probe. Liver stiffness measurement (LSM) was recorded in kilopascals (kPa), and hepatic steatosis was quantified using the ultrasound attenuation parameter (UAP) expressed in decibels per meter (dB/m). All examinations were performed by a trained operator with prior experience in transient elastography. For each participant, a minimum of 10 valid measurements were obtained, and the median value was used for analysis. Participants were examined in the supine position with the right arm in maximal abduction, and measurements were obtained from the right lobe of the liver through the intercostal spaces, following manufacturer-recommended protocols. Test results were communicated to participants on the same day, along with brief counselling regarding lifestyle modification and further evaluation when indicated.

Fibrosis Stages and LSM Ranges (12): **F0–F1 (No/Mild Fibrosis):** Liver stiffness is less than 7 kPa. This stage indicates no to mild scarring of the liver. **F2 (Moderate Fibrosis**): Liver stiffness ranges from 7.5 to 10 kPa. This stage represents moderate

fibrosis. **F3 (Severe Fibrosis):** Liver stiffness ranges from 10 to 14 kPa. This stage indicates severe fibrosis. **F4 (Cirrhosis):** Liver stiffness is equal to or greater than 14 kPa. This stage signifies cirrhosis, which is advanced scarring of the liver. Participants with intermediate LSM values were classified into the nearest lower fibrosis category as per EASL recommendations.

Hepatic Steatosis Grading and UAP Ranges(13)**: S1 (Mild Steatosis):** The UAP measurement is between 238 and 260 dB/m. This grade denotes a slight buildup of liver fat. **S2 (Moderate Steatosis):** The UAP measurement is between 260 and 290 dB/m. This grade indicates a moderate amount of fat accumulation in the liver. **S3 (Severe Steatosis):** The UAP measurement is equal to or greater than 290 dB/m (up to 400 dB/m). This grade denotes fatty liver disease, which is characterised by a significant buildup of fat in the liver.

Table 1: Operational definitions of NAFLD disease spectrum based on UAP and LSM cut-off values

Disease category (operational)	CAP score (dB/m)	LSM score (kPa)
NAFLD (hepatic steatosis)	≥238	<7
NAFLD with significant fibrosis	≥238	7.1–14
Advanced fibrosis / cirrhosis (LSM-based)	≥238	>14

Statistical analysis: Data were imported into Microsoft Excel (Microsoft 365), cleaned, and analyzed using Jamovi v2.3.28. Descriptive statistics were summarized as mean ± SD or median (IQR) for continuous variables, and frequencies with percentages for categorical variables. Associations between participant characteristics and steatosis or fibrosis grades were assessed using the chi-square test. Univariable and multivariable logistic regression analyses were performed to estimate crude odds ratios (OR) and adjusted odds ratios (AOR) with 95% confidence intervals (CI) for predictors of severe steatosis. A p-value <0.05 was considered statistically significant.

RESULTS

Participant Characteristics

Table 2 presents the demographic and clinical characteristics of the 211 study participants. Most participants were aged 30–39 years (53.6%) and were male (83.4%). Administrative staff constituted the largest occupational group (46.0%). Diabetes mellitus and hypertension were reported by 11.4% and 14.2% of participants, respectively. Alcohol consumption was reported by 27.5%, while tobacco use was infrequent (6.2%). A vegetarian diet was reported by 58.8% of participants.

Table 3 represents the distribution of liver fibrosis stages and hepatic steatosis grades among the study participants. More than half had no or mild fibrosis (F0–F1), while 36.5% had moderate fibrosis and 10.4% had advanced fibrosis (F3–F4). Overall, hepatic steatosis was detected in 67.3% of participants, including 26.5% with severe steatosis.

Table 4 highlights factors associated with NAFLD. The overall proportion was 67.3%, with significant associations for age ($p < 0.001$) and gender ($p = 0.010$). NAFLD was more common among participants ≥30 years and among males.

Association of LSM Fibrosis Score with Participant Characteristics

Table 5 represents the unadjusted and adjusted odds ratios for predictors of NAFLD. Age was significantly associated with NAFLD, with participants aged 30–39 years (AOR 2.76; 95% CI: 1.24–6.14; $p = 0.013$) and ≥40 years (AOR 4.60; 95% CI: 1.47–14.47; $p = 0.009$) having higher odds compared to those aged <30 years. Male gender was associated with NAFLD in unadjusted analysis (OR 2.60; 95% CI: 1.24–5.43), but not after adjustment (AOR 1.87; $p = 0.163$). Other variables, including occupation, alcohol use, diet type, diabetes mellitus, hypertension, and fibrosis stage, were not significantly associated with NAFLD in the adjusted model

Table 6 shows the association between liver stiffness measurement (LSM) fibrosis stages and participant characteristics (N = 211). No statistically significant associations were observed. Participants aged <30 years predominantly had no or mild fibrosis (F0–F1: 68.8%), whereas those aged ≥40 years had a higher proportion of moderate fibrosis (F2: 50.0%) and advanced fibrosis (F3–F4: 12.4%). Among participants aged 30–39 years, most were classified as F0–F1 (53.1%) or F2 (34.5%) ($p = 0.102$). Females were more frequently classified in the F0–F1 category compared with males (71.4% vs. 49.4%), while advanced fibrosis (F3–F4) was uncommon in both sexes (female: 2.9%; male: 12.0%) ($p = 0.076$).

With respect to dietary preference, the majority of participants had F0–F1 fibrosis in both mixed diet (57.5%) and vegetarian diet groups (50.0%), with small proportions reaching F3 or F4 stages ($p = 0.294$).

Participants with diabetes showed lower proportions of F0–F1 fibrosis (41.7%) and higher proportions of moderate to advanced fibrosis (F2–F4: 58.3%) compared with non-diabetics (F0–F1:

54.5%; F2–F4: 45.5%) (p = 0.517). Similarly, hypertensive participants had a higher proportion of moderate to advanced fibrosis (F2–F4: 63.3%) compared with non-hypertensives (F2–F4: 44.2%), although this was not statistically significant (p = 0.161).

Tobacco users had a lower proportion of F0–F1 fibrosis (38.5%) and a relatively higher proportion of advanced fibrosis (F4: 15.4%) compared with non-users (F0–F1: 54.0%; F4: 3.0%), but this difference did not reach statistical significance (p = 0.138).

Table 7 presents the association between ultrasound attenuation parameter (UAP) categories and participant characteristics (N = 211). Statistically significant associations were observed for age group (p = 0.001) and gender (p = 0.020). Participants aged <30 years were predominantly classified as normal (56.3%), whereas those aged 30–39 years showed a higher proportion of severe steatosis (S3: 32.7%). Among participants aged ≥40 years, higher UAP categories were more frequent, with 34.0% classified as S1 and 26.0% as S3.

Gender differences were evident, with females more commonly classified as normal (51.4%) and having lower proportions of severe steatosis (S3: 8.6%) compared with males, among whom severe steatosis was more frequent (S3: 30.1%).

No statistically significant associations were observed between UAP categories and smoking status (p = 0.899), alcohol consumption (p = 0.282), or dietary preference (p = 0.812). Participants with diabetes showed a higher proportion of S1 steatosis (41.7%) compared with non-diabetics (18.2%), although this difference did not reach statistical significance (p = 0.064). Similarly, no significant association was observed between UAP categories and hypertension status (p = 0.464).

Table 2: Frequencies of Demographic and Clinical Characteristics among the study participants(N=211).

Variable	Category	n	%
Age Category	<30	48	22.7
	30–39	113	53.6
	>40	50	23.7
Gender	Female	35	16.6
	Male	176	83.4
Occupation	Support staff	31	14.7
	Security Staff	16	7.6
	Technical/Engineering staff	20	9.5
	Administrative Staff	96	45.5
	Nursing Staff	48	22.7
Comorbidity	Diabetes Mellitus	24	11.4
	Hypertension	30	14.2
Alcohol Use	No	117	72.5
	Yes	58	27.5
Smoking/Tobacco Use	No	198	93.8
	Yes	13	6.2
Type of Diet	Mixed (meat/fish)	87	41.2
	Pure vegetarian	124	58.8

Note: Percentages based on N = 211 unless otherwise stated.

Table 3: Distribution of liver fibrosis stages and hepatic steatosis grades based on transient elastography findings (N = 211)

Variable	Category	n	%
LSM fibrosis stage	F0–F1 (No/Mild fibrosis)	112	53.1
	F2 (Moderate fibrosis)	77	36.5
	F3 (Severe fibrosis)	14	6.6
	F4 (Cirrhosis)	8	3.8
Hepatic steatosis grade (UAP categories)	Normal	69	32.7
	Mild (S1)	44	20.9
	Moderate (S2)	42	19.9
	Severe (S3)	56	26.5

Note: Liver fibrosis was assessed using liver stiffness measurement (LSM, kPa), and hepatic steatosis was assessed using ultrasound attenuation parameter (UAP, dB/m) obtained by transient elastography. Percentages are calculated based on the total sample size (N = 211).

Table 4: Factors Associated with NAFLD (N = 211)

Variable	Category	NAFLD Present, n (%)	NAFLD Absent, n (%)	p Value
Age category	< 30	21 (43.8)	27 (56.3)	<0.001
	30–39	82 (72.6)	31 (27.4)	
	> 40	39 (78.0)	11 (22.0)	
Gender	Female	17 (48.6)	18 (51.4)	0.01
	Male	125 (71.0)	51 (29.0)	
Occupation	Technical/ Engineering staff	12 (60.0)	8 (40.0)	0.849
	Support Staff	19 (61.3)	12 (38.7)	
	Security Staff	11 (68.8)	5 (31.2)	
	Admin Staff	66 (68.8)	30 (31.2)	
	Nursing Staff	34 (70.8)	14 (29.2)	
Alcoholic	Yes	44 (75.9)	14 (24.1)	0.103
	No	98 (64.1)	55 (35.9)	
Smoking/Tobacco	Yes	10 (76.9)	3 (23.1)	0.553†
Use	No	132 (66.7)	66 (33.3)	
Comorbidity	Diabetes	19(79.2)	5 (20.8)	0.188
	Hypertension	22(73.3)	8(26.7)	0.447
Dietary Preference	Mixed	62 (71.3)	25 (28.7)	0.304
	Pure veg.	80 (64.5)	44 (35.5)	

Note: NAFLD = Nonalcoholic fatty liver disease. Fisher's Exact test was used for Smoking/Tobacco due to small cell counts; †Fisher's Exact p-value reported.

Table 5: Predictors of NAFLD: unadjusted and adjusted odds ratios from logistic regression analysis (N=211)

Predictor	Category (Reference)	Crude OR	95% CI	Adjusted OR	95% CI	p value
Age category	<30 years (Ref.)	1.00	—	1.00	—	—
	30–39 years	**3.40**	1.68–6.88	**2.76**	1.24–6.14	**0.013**
	≥40 years	**4.56**	1.89–10.98	**4.60**	1.47–14.47	**0.009**
Gender	Female (Ref.)	1.00	—	1.00	—	—
	Male	**2.60**	1.24–5.43	1.87	0.77–4.50	0.163
Occupation	Technical/Engineering (Ref.)	1.00	—	1.00	—	—
	Security staff	1.47	0.37–5.86	1.50	0.32–7.07	0.605
	Administrative staff	1.47	0.54–3.96	1.56	0.53–4.56	0.411
	Nursing staff	1.62	0.54–4.81	2.47	0.75–8.13	0.134
	Support staff	1.06	0.33–3.33	1.47	0.40–5.32	0.556
Alcohol use	No (Ref.)	1.00	—	1.00	—	—
	Yes	1.76	0.89–3.50	1.18	0.54–2.62	0.670
Type of diet	Vegetarian (Ref.)	1.00	—	1.00	—	—
	Mixed (meat/fish)	1.36	0.75–2.47	1.14	0.59–2.24	0.684
Diabetes mellitus	No (Ref.)	1.00	—	1.00	—	—
	Yes	1.98	0.71–5.54	1.43	0.40–5.17	0.583
Hypertension	No (Ref.)	1.00	—	1.00	—	—
	Yes	1.40	0.59–3.32	0.55	0.17–1.77	0.317
LSM fibrosis stage	F0–F1 (Ref.)	1.00	—	1.00	—	—
	F2	1.25	0.68–2.30	1.05	0.53–2.05	0.877
	F3	3.60	0.77–16.88	2.62	0.51–13.43	0.246

Note: OR and AOR are presented with 95% CI. Reference categories are OR = 1. p < 0.05 was considered statistically significant. OR, odds ratio; AOR, adjusted odds ratio; CI, confidence interval; LSM, liver stiffness measurement.

Table 6: Association of LSM Fibrosis Score with Participant Characteristics (N = 211)

Variable	Category	F0–F1	F2	F3	F4	p Value
Age Group	<30	33 (68.7%)	13 (27.1%)	1 (2.1%)	1 (2.1%)	0.102
	30–39	60(53.1%)	39 (34.5%)	9 (8.0%)	5 (4.4%)	
	≥40	19 (38.0%)	25 (50.0%)	4 (8.0%)	2 (4.0%)	
Gender	Male	87(49.4%)	68(38.6%)	14 (8.0%)	7 (4.0%)	0.076

	Female	25 (71.4%)	9 (25.7%)	0 (0.0%)	1 (2.9%)	
Occupation	Security Staff	7(43.8%)	7(43.8%)	1(6.2%)	1(6.2%)	0.736
	Technical/Engineering staff	11(55.0%)	7(35.0%)	1(5.0%)	1(5.0%)	
	Administrative staff	46(47.9%)	39 (40.6%)	8(8.3%)	3(3.1%)	
	Nursing staff	31(64.6%)	12(25.0%)	4(8.3%)	1(2.1%)	
	Support staff	17(54.8%)	12(38.7%)	0(0.0%)	2(6.5%)	
Dietary	Mixed	50 (57.5%)	28 (32.2%)	4 (4.6%)	5 (5.7%)	0.294
Preference	Pure veg	62 (50.0%)	49 (39.5%)	10 (8.1%)	3 (2.4%)	
Comorbidity	Diabetic	10(41.7%)	10(41.7%)	3(12.4%)	1(4.2%)	0.517
	Non-Diabetic	102(54.5%)	67(35.8%)	11(5.9%)	7(3.8%)	
	Hypertensive	11(36.7%)	14(46.7%)	4(13.3%)	1(3.3%)	0.161
	Non-Hypertensive	101(55.8%)	63(34.8%)	10(5.5%)	7(3.9%)	
Smoking/Toba	Yes	5 (38.5%)	5 (38.5%)	1 (7.7%)	2 (15.3%)	0.138
cco Use	No	107 (54.0%)	72(36.4%)	13 (6.6%)	6 (3.0%)	

Note. LSM = Liver Stiffness Measurement. Values are frequencies with row-wise percentages in parentheses. Chi-square test used for comparisons.

Table 7: Association of UAP Final Category with Participant Characteristics (N = 211)

Variable	Category	Normal	S1	S2	S3	p Value
Age Group	<30	27 (56.3%)	8 (16.7%)	7 (14.6%)	6 (12.4%)	0.001
	30–39	31 (27.5%)	19 (16.8%)	26 (23.0%)	37 (32.7%)	
	≥40	11 (22.0%)	17 (34.0%)	9 (18.0%)	13 (26.0%)	
Gender	Female	18 (51.4%)	8 (22.9%)	6 (17.1%)	3 (8.6%)	0.02
	Male	51 (29.0%)	36 (20.5%)	36 (20.5%)	53 (30.0%)	
Occupation	Security Staff	5(31.2%)	3(18.8%)	2(12.5%)	6(37.5%)	0.704
	Technical/Engineering staff	8(40.0%)	3(15.0%)	5(25.0%)	4(20.0%)	
	Administrative staff	30(31.3%)	19(19.8%)	25(26.0%)	22(22.9%)	
	Nursing Staff	14(29.2%)	11(22.9%)	7(14.6%)	16(33.3%)	
	Support Staff	12(38.7%)	8(25.8%)	3(9.7%)	8(25.8%)	
Smoking/Tobacco	Yes	3 (23.1%)	3 (23.1%)	3 (23.1%)	4 (30.7%)	0.899
Use	No	66 (33.3%)	41 (20.7%)	39 (19.7%)	52 (26.3%)	
Alcohol	Yes	14 (24.1%)	11 (19.0%)	14 (24.1%)	19 (32.8%)	0.282
	No	55 (35.9%)	33 (21.6%)	28 (18.3%)	37 (24.2%)	
Comorbidity	Diabetics	5(20.8%)	10(41.7%)	4(16.7%)	5(20.8%)	0.064
	Non-Diabetics	64(34.2%)	34(18.2%)	38(20.3%)	51(27.3%)	
	Hypertensives	8(26.7%)	9(30.0%)	7(23.3%)	6(20.0%)	0.464
	Non-Hypertensives	61(33.7%)	35(19.3%)	35(19.4%)	50(27.6%)	
Dietary	Mixed	25 (28.7%)	18 (20.7%)	21 (24.1%)	23 (26.5%)	0.812
Preference	Pure veg	44 (35.5%)	26 (21.0%)	21 (16.9%)	33 (26.6%)	

Note. UAP = Ultrasound Attenuation Parameter. S1–S3 represent grades of hepatic steatosis.

DISCUSSION

According to this study, sedentary hospital employees had a significant burden of non-alcoholic fatty liver disease (NAFLD) (67.3%). 10.4% of patients had advanced fibrosis (F3–F4), and over one-fourth (26.5%) had severe hepatic steatosis (S3). These findings indicate that NAFLD is not uncommon even in relatively young, working-age adults engaged in predominantly sedentary occupations.

Proportion in this study is much higher than camp-based screening study conducted in Central India which reported a burden of 43.6% using Transient Elastography(14). Similarly, 18.9% of adults had NAFLD, according to a population-based study(15). Another hospital-based investigation among nursing staff in South India documented a 28.7% burden(16). A higher proportion in this study reflects the role of a sedentary lifestyle in NAFLD.

A significant age-related gradient was observed, with increased likelihood of NAFLD among participants aged 30–39 years and ≥40 years relative to younger participants. According to a study by Vishnu et al., risk factors for non-alcoholic fatty liver disease (NAFLD) include age, gender, obesity, diabetes, dyslipidaemia, and metabolic syndrome

(16). Additionally, Singh et al.'s study revealed that men were more likely than women to have NAFLD.(4) Another study reported that lifestyle factors contribute significantly, with sedentary behavior affecting 90% of NAFLD patients and dietary patterns including non-vegetarian diet, fried food and Family history of metabolic syndrome showed positive associations.(17)

Although fibrosis stages did not show significant associations with demographic or lifestyle factors, older participants and tobacco users tended to have a higher proportion of advanced fibrosis.

It is alarming to find fibrosis and steatosis linked to NAFLD in a comparatively youthful, sedentary workforce. Identifying advanced fibrosis in more than 10% of participants highlights the silent progression of liver disease in seemingly healthy adults. From a public health perspective, this underscores the growing burden of NAFLD in India and the need for preventive strategies. For occupational health, the findings emphasise that sedentary workers are a high-risk group who would benefit from workplace-based screening and lifestyle interventions. Clinically, early detection and prompt counselling are made possible by the use of non-invasive instruments like Transient Elastography, which may help stop the development of cirrhosis and lower long-term medical expenses.

Hepatic fat buildup is a hallmark of non-alcoholic fatty liver disease (NAFLD), a serious metabolic condition that can lead to cirrhosis and steatohepatitis(18.)Its development reflects interactions between genetic predisposition, sedentary lifestyle, and metabolic dysfunction, particularly insulin resistance, which drives hepatic lipid deposition and fibrosis progression (19). Physical inactivity further exacerbates risk, while regular exercise improves metabolic function independent of weight loss, partly mediated by myokines such as irisin (19).

Conclusion

Sedentary hospital employees were shown to have a significant proportion of fibrosis and steatosis associated with NAFLD. These results highlight the necessity of workplace-based screening and treatments to encourage healthy living in sedentary work environments.

Recommendation

Regular workplace screening and lifestyle interventions targeting sedentary behavior should be implemented in tertiary care institutions to prevent NAFLD and related metabolic complications.

Limitation of the Study

This study has several strengths, including its focus on an occupational group at high risk due to sedentary behavior. We also utilized non-invasive, validated tools (Transient elastography) to assess both fibrosis and steatosis. However, certain limitations should be noted.

The camp-based, convenience sampling approach may have introduced selection bias, limiting the generalizability of findings to all sedentary workers. The cross-sectional design, aimed at estimating proportion, restricts causal inferences. Data collection through interviewer-administered questionnaires may be subject to recall and interviewer bias. Furthermore, crucial metabolic metrics as lipid profiles, insulin resistance, waist circumference, and body mass index were not evaluated.

The findings highlight the need for workplace-based interventions such as regular health education, structured physical activity programs, and dietary counselling to mitigate NAFLD risk in sedentary workers. Routine screening using non-invasive tools like Transient Elastography could be integrated into occupational health services to enable early detection. Future research should focus on longitudinal studies incorporating metabolic parameters such as BMI, waist circumference, lipid profiles, and insulin resistance to better define risk pathways and disease progression.

Relevance of the Study

This camp-based study estimates the proportion of NAFLD and identifies associated risk factors among sedentary workers in a tertiary care centre, adding evidence on occupational risk in an understudied group.

Authors Contribution

All authors have contributed equally.

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Conflict of Interest

The authors declare no conflict of interest.

Declaration of Generative AI and AI Assisted

TECHNOLOGIES IN THE WRITING PROCESS

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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