

QUANTIFYING THE NEGATIVE IMPACT OF FAST-FOOD CONSUMPTION ON LIVER STEATOSIS AMONG U.S. ADULTS IN THE GENERAL POPULATION

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BACKGROUND

- Fast-food consumption is highly prevalent in the U.S. and associated with diabetes and cardiovascular disease
- Little is known about the impact of fast-food consumption on the risk of nonalcoholic fatty liver disease (NAFLD) or whether its effect on steatosis is different among persons with obesity or diabetes

OBJECTIVE

To examine the relationship between fast food consumption and liver steatosis in the general population and among persons with diabetes and obesity

METHODS

- Cross-sectional analysis was performed of adults (≥20 years) in the U.S. National Health and Nutrition Examination Survey 2017-2018 with valid transient elastography measurements
- Liver steatosis was measured using controlled attenuation parameter (CAP) and treated as a continuous and categorical variable (CAP ≥ 263 decibels/meter)
- Fast food intake was categorized as <20% vs ≥20% of daily caloric intake
- Multivariable linear and logistic regression were used to estimate the associations between liver steatosis (outcome: CAP dB/m) and fast-food consumption
 - Adjusted for age, sex, race-ethnicity, body mass index (BMI), diabetes, sugar-sweetened beverage and coffee consumption, alcohol use, physical activity
- We also assessed for interactions between obesity and diabetes with fast food intake

RESULTS

Table 1. Sociodemographic characteristics of 3,954 NHANES participants from 2017-2018 according to fast-food consumption

Characteristic of participants [% or mean ± SE]	Fast-food consumption <20% (n=2,807)	Fast-food consumption ≥20% (n=1,147)	p-value
Age (years)	51 (0.6)	42 (0.9)	<0.001
Male gender, %	46% (0.01)	53% (0.02)	0.01
Race/ethnicity, %			0.03
White	63% (0.03)	61% (0.03)	
Black	10% (0.1)	15% (0.1)	
Asian	7% (0.1)	5% (0.05)	
Hispanic	16% (0.02)	15% (0.02)	
Poverty income ratio <1, %	12% (0.01)	12% (0.02)	0.96
HEI-2015 composite score	52 (0.7)	45 (1.0)	<0.001
History of alcohol use in survey year, %			0.30
None	24% (0.01)	22% (0.02)	
Low	72% (0.01)	76% (0.02)	
Heavy (>2/day in women, >3/day in men)	4% (0.01)	2% (0.01)	
Sugar-sweetened beverage consumption (>2 beverages per day), %	27% (0.02)	43% (0.03)	<0.001
Coffee consumption (>3 cups per day), %	24% (0.01)	17% (0.02)	0.006
Adequate physical activity	64% (0.02)	65% (0.02)	0.59
BMI (kg/m ²)	29 (0.3)	30 (0.4)	0.006
Diabetic, %	13% (0.01)	11% (0.01)	0.30

Figure. Adjusted mean CAP score by the amount of fast-food consumption per daily caloric intake

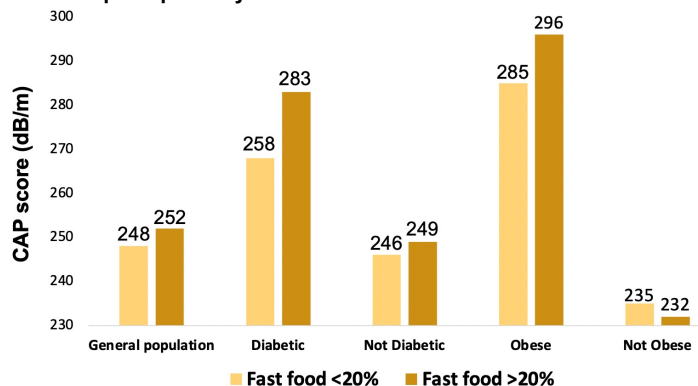


Table 2. Multivariable linear and logistic regression analyses evaluating factors associated with greater liver steatosis (as continuous and categorical measures) among U.S. adults

	Measures of liver steatosis			
	CAP coefficient (SE)	P-value	Odds ratio of CAP ≥ 263 (SE)	P-value
Fast-food consumption ≥20% of total daily caloric intake	4.6 (2.0)	0.04	1.45 (0.1)	<0.001
Age	0.6 (0.1)	<0.001	1.03 (0.004)	<0.001
Female gender	-19.0 (1.5)	<0.001	0.60 (0.04)	<0.001
Race/Ethnicity				
Black	-20.3 (2.9)	<0.001	0.50 (0.1)	<0.001
Asian	16.2 (3.6)	<0.001	2.50 (0.5)	<0.001
Hispanic	7.2 (3.1)	0.03	1.52 (0.2)	0.02
Other	0.2 (4.7)	0.97	1.14 (0.2)	0.52
Diabetes (vs no diabetes)	24.8 (3.9)	<0.001	2.30 (0.4)	0.001
BMI (per point increase)	4.7 (0.2)	<0.001	1.22 (0.02)	<0.001
Sugar sweetened beverages (>2/day)	7.2 (2.4)	0.01	1.60 (0.2)	<0.001
Coffee consumption (>3 cups per day)	0.5 (3.2)	0.88	1.02 (0.2)	0.04
Alcohol use in the prior 12 months (ref: none)				
Low/moderate*	2.4 (2.9)	0.42	1.15 (0.2)	0.41
Heavy**	17.3 (5.4)	0.01	2.21 (0.7)	0.03
Adequate physical activity	-5.8 (2.7)	0.05	0.73 (0.1)	0.08

- There were significant interactions between fast-food intake ≥20% with diabetes (p=0.04) and obesity (p=0.001)
 - Among diabetics, fast-food consumption ≥20% was associated with a 16-unit higher adjusted CAP (297 [CI: 289-306] in ≥20% vs 281 [CI: 273-289] in <20%), compared to only a 3-unit higher CAP among non-diabetics (263 [CI: 259-266] in ≥20% vs 260 [CI: 256-264] in <20%)
 - Among obese persons, fast-food consumption ≥20% was associated with a 11-unit higher adjusted CAP (301 [CI: 294-308] vs 290 [CI: 283-297] compared to a 2-unit lower CAP for non-obese persons (238 [CI: 234-243] vs 240 [CI: 236-245])

CONCLUSIONS

- Fast food consumption is associated with greater liver steatosis
- Steatosis elevations are particularly striking among obese and diabetic persons who consumed fast-food
 - impact of fast-food intake on liver fat is markedly more deleterious in those with underlying metabolic comorbidities
- Targeted nutrition counseling is needed for at-risk populations, including diabetic and obese persons

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