



Sex and Racial Disparities in Cardiovascular Disease Risk and Major Adverse Cardiac and Cerebrovascular Events in NAFLD: A National Inpatient Sample Analysis (2019)

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Introduction

Non Alcoholic Fatty Liver Disease (NAFLD) increases the risk of CVD independently of the conventional cardiovascular risk factors. However, related sex and racial disparities in cardiovascular outcomes remain poorly understood on the large scale. This prompted us to attempt an investigation between the association of NAFLD and major cardiovascular and cerebrovascular events [MACCE] using a nationally representative sample in the US.

Methods and Materials

We curated National Inpatient Sample (2019) for NAFLD hospitalizations stratified by age, sex and race using ICD-10 codes. Baseline characteristics, comorbidities, and MACCE: all-cause mortality, acute myocardial infarction (AMI), cardiac arrest and stroke were compared between groups stratified by sex and race. Multivariate regression analyses were performed adjusting for sociodemographics, hospitalization characteristics and comorbidities.

Table 1. Multivariable Odds of Major Adverse Cardiac and Cerebrovascular Events in NAFLD patients by Age, Sex, and Race, 2019

Categories		MACCE	All cause mortality	Acute MI	Cardiac arrest	Stroke
	18-44	ref	ref	ref	ref	ref
	45-64	2.31 (2.06-2.59)	3.00 (2.42-3.72)	2.23 (1.87-2.66)	2.08 (1.55-2.80)	1.90 (1.52 – 2.38)
	>=65	3.01 (2.61-3.47)	4.13 (3.11-5.48)	2.81 (2.29-3.45)	2.24 (1.52-3.31)	2.58 (1.96-3.39)
		p<0.001	p<0.001	p<0.001	p<0.001	p<0.001
	Male vs Female	1.22 (1.14-1.30)	1.04 (0.92-1.18)	1.35 (1.24-1.48)	1.54 (1.26-1.88)	1.04 (0.91-1.19)
	P-values	<0.001	0.539	<0.001	<0.001	0.579
	White	ref	ref	ref	ref	ref
	Black	1.00 (0.90-1.11)	0.89 (0.72-1.10)	0.95 (0.81-1.11)	1.16 (0.86-1.57)	1.25 (1.03-1.53)
	Hispanic	0.88 (0.79-0.98)	0.69 (0.56-0.85)	0.93 (0.81-1.08)	0.75 (0.55-1.02)	1.07 (0.87-1.31)
	API	1.06 (0.86-1.30)	1.18 (0.82 – 1.89)	1.06 (0.81-1.38)	0.77 (0.42-1.43)	0.99 (0.69-1.42)
	NA	1.14 (0.81-1.61)	1.64 (1.04-2.60)	0.91 (0.53-1.56)	0.74 (0.25-2.15)	0.84 (0.41-1.81)
	Others	1.11 (0.92 -1.34)	0.91 (0.62-1.33)	1.33 (1.06-1.67)	1.05 (0.62-1.78)	0.99 (0.68-1.45)
	P-values	0.125	0.001	0.121	0.272	0.377

MACCE - Major Adverse Cardiovascular and Cerebrovascular Events API - Asian Pacific Islanders NA - Native Americans

Multivariate regression models were adjusted for Age, sex, race, household income quartile, payer status, type of admission, hospital bed size, location/teaching status, region, comorbidities including HTN DM HLD obesity, smoking, PVD, PriorMI PriorPCI PriorCABG, drug abuse, prior stroke/TIA, prior VTE .

Results

Our study included 409,130 NAFLD hospitalizations [median 55 (IQR 43-66) years. The prevalence of NAFLD was higher in females vs males (1.2%), Hispanic (2%), Native Americans (1.9%) vs white. Median age of females was 55 years (IQR 42-67), were often from lowest income quartile, Medicare enrollees, and had non-elective admissions. Females demonstrated lower rates of hypertension, hyperlipidemia, complicated diabetes but higher rates of obesity and uncomplicated diabetes vs. males. Median age of Hispanics was 48 years (IQR 37-60), majority of them belonged to the lowest income quartile, Medicaid enrollees, and underwent non elective admissions. Hispanics exhibited lower frequency of hypertension, hyperlipidemia but higher rates of diabetes and obesity vs. whites. Geriatric patients had higher risk of MACCE (aOR 3.01), all-cause mortality (aOR 4.13), Acute MI (aOR 2.81), Cardiac arrest (aOR 2.24) and Stroke (aOR 2.58) (p< 0.001). Males had greater risk of MACCE (aOR 1.22), AMI (aOR 1.35) and Cardiac arrest (aOR 1.54) (p< 0.001). By race, Native Americans (aOR 1.64) followed by Asian Pacific Islanders(API) (aOR 1.18) had significantly higher odds of all-cause mortality vs whites [Table 1].

Discussion

NAFLD is associated with adverse MACCE especially with increasing age and male sex. Native Americans followed by API race was associated with higher odds of all-cause mortality. This study reiterates the interplay between NAFLD and cardiovascular/cerebrovascular diseases and highlights prevailing sex/racial disparities in outcomes warranting tailored care.