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Concordance Between DASH Diet and Coronary Artery Calcification: Results From the Mediators of Atherosclerosis in South Asians Living in America (MASALA) Prospective Cohort Study

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Introduction: South Asian adults are at high risk for atherosclerotic cardiovascular disease, for which coronary artery calcification is an early predictor. Adherence to the Dietary Approaches to Stop Hypertension diet is a modifiable risk factor that may mitigate the progression of coronary artery calcification and atherosclerotic cardiovascular disease.

Methods: Using data from the Mediators of Atherosclerosis in South Asians Living in America cohort, the authors calculated a Dietary Approaches to Stop Hypertension dietary score (categorized as low, moderate, and high) to examine the associations of Dietary Approaches to Stop Hypertension diet adherence with coronary artery calcification after a 5-year follow up.

Results: The authors found that participants in the high Dietary Approaches to Stop Hypertension category were 41% less likely to have coronary artery calcification score >100 (age-adjusted incidence rate ratio=0.59; 95% CI=0.36, 0.95) than those in the low category; this association was attenuated in multivariable models. Differences were observed by sex. Men in the high Dietary Approaches to Stop Hypertension category were 51% less likely to have coronary artery calcification score >100 (adjusted incidence rate ratio=0.49; 95% CI=0.26, 0.95) and experienced 0.46-fold coronary artery calcification change (fold change=0.46; 95% CI=0.18, 0.90) in multivariable models.

Conclusions: The findings indicate a relationship between Dietary Approaches to Stop Hypertension diet and early predictors of atherosclerotic cardiovascular disease risk among South Asians living in the U.S., particularly men.

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INTRODUCTION

South Asians are more likely to develop subclinical risk factors for atherosclerotic cardiovascular disease (ASCVD) at a younger age than other Asian groups and non-Hispanic Whites,[1] including coronary artery calcification (CAC), which has been identified as a strong predictor of early ASCVD among individuals who may otherwise remain asymptomatic and regarded at low risk for cardiac events.[2] CAC is the accumulation of calcium in the coronary arteries as a result of lipid and cholesterol plaque buildup.[3] The presence and rupture of plaques may reduce blood flow through the coronary arteries, increasing the risk for a cardiac event.[3] Connections between dietary patterns and CAC is not well investigated in large epidemiologic studies, specifically among South Asians.

The Dietary Approaches to Stop Hypertension (DASH) dietary pattern that emphasizes fruits, vegetables, whole grains, nuts and legumes, and low-fat dairy has been identified by the American College of Cardiology and the American Heart Association for the primary prevention of ASCVD.[4] For this study, the authors examined the associations between the DASH dietary pattern and its components and CAC score in the MASALA (Mediators of Atherosclerosis in South Asians in America) cohort, a prospective, multicenter study designed to identify the risk factors of ASCVD among older South Asian adults in the U.S.[5]

METHODS

Study Population

The MASALA study is an ongoing community-based cohort study of South Asian adults aged 40−84 years, free from cardiovascular disease at enrollment, who were recruited from the San Francisco Bay Area or greater Chicago area. Details of this cohort's recruitment, enrollment, design, and methods have been presented elsewhere.[5,6] Examination 1 (baseline) was conducted from 2010 to 2013, and Examination 2 data were conducted 5 years later (2015−2018). The current analyses were approved by the New York University IRB (IRB-FY2021-5009).

Measures

The Dietary Approaches to Stop Hypertension diet score concordance calculation was the exposure variable. Dietary intake data were collected during Examination 1 by trained MASALA study staff using the Study of Health Assessment and Risk in Ethnic (SHARE) food frequency questionnaire (FFQ).[7] The SHARE FFQ is a 163-item interviewer-administered tool validated to assess dietary intake of South Asian adults living in North America. Using the SHARE FFQ raw data, the authors computed the DASH diet concordance score following the Fung et al.[8] method to quantify adherence characterized by high intake of (1) fruit, (2) vegetables, (3) nuts/legumes, (4) low-fat dairy products, and (5) whole grains and low intake of (6) sodium, (7) sugar-sweetened beverages, and (8) red/processed meats. Participants were classified into quintiles according to intake of each component, computing a theoretical DASH diet score ranging from 8 (low concordance) to 40 (high concordance). Total DASH diet concordance score was categorized on the basis of cut off scores consistent with previous studies: ≤20 (low), 21−28 (moderate), and ≥29 (high).[8,9] To our best knowledge, DASH scores have not previously been validated for South Asian adults.

The coronary artery calcium score was the outcome variable**.** Cardiac computed tomography (CT) scans were performed using a gated-cardiac electron-beam CT scanner. Calcified plaque in coronary arteries were identified according to attenuation of >130 Hounsfield units. CAC volume and peak density were reported for each of the 4 major coronary arteries, and the summed score was used. Additional details regarding the CT imaging measurements can be found in a previously published manuscript.[10]

CAC score was assessed according to severity, a CAC score of 0 indicating very low ASCVD risk and a CAC score >100 indicating high risk for ASCVD outcomes.[2,11] For analyses, CAC score at Examination 2 was operationalized as continuous overall CAC score; incident CAC, defined as CAC score=0 at baseline and CAC score >100 after 5-year follow up; CAC presence, CAC score >0 versus score=0; CAC severity, CAC score ≤100 versus >100; and CAC change, calculated as the difference in CAC score between baseline and Examination 2.

In terms of covariates, sociodemographic and health behavior data, including age, gender, percentage of life lived in the U.S., annual family income, education, smoking status, alcohol intake, and physical activity, were collected at Examination 1. Clinical characteristics, including hypertension (blood pressure ≥130/≥85 mmHg), high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, diabetes, and BMI (kg/m^2), collected at Examination 1 were included in final models.

Statistical Analysis

Descriptive statistics (mean and SD for continuous variables; count and percentage for discrete variables) for sociodemographic characteristics, energy intake (kilocalories per day), and health behaviors were computed for the analytic sample and by DASH category. For continuous variables, tests of linear trends across groups were assessed using ANOVA. For categorical variables, between-group differences were evaluated using Pearson's chi-square.

Modified Poisson regression with a robust error variance estimated the incidence rate ratio (IRR) associations of DASH category (low, moderate, high) with incident CAC, CAC presence, and CAC severity. This method is validated for directly estimating rates for dichotomous, common outcomes in prospective studies and useful for modest sample sizes.[12] Negative binomial regression estimated the associations between DASH category and continuous CAC score[13] because 42.5% of the sample had a CAC score of 0, and there was overdispersion of CAC score. The authors modeled CAC change using data from the entire cohort, including those with a CAC score of 0 at both baseline and Examination 2. The authors coded 12 participants with negative change scores as having no CAC change and log transformed change in CAC+1. Consistent with previous literature,[14] the authors used linear regression to estimate the relationship between DASH category and log-transformed change in CAC.

Statistical analyses were performed using STATA 16.1.[15] Potential confounders were identified a priori from a literature review and using causal diagrams.[16] Identified confounders were included in multivariable models. Educational attainment and income were highly correlated ($p<0.0001$). There were 19 participants (3%) missing household income; therefore, the authors adjusted for educational attainment. Final models were adjusted for age, sex, percentage of life lived in the U.S., education attainment, smoking status, alcohol intake, and physical activity (Model 1), with the additional adjustment for hypertension, high-density lipoprotein, low-density lipoprotein, diabetes, and BMI (Model 2) and adjustment for energy intake (Model 3). The authors assessed the direct and indirect effects of hypertension on the causal pathway between DASH category and CAC score using parametric regression models,[17] which were not significant. Because directional differences were identified by sex, the authors stratified analyses. The interaction of DASH category and sex was tested using a multiplicative term with an a priori significance $p<0.10$. These analyses were conducted to determine whether associations between DASH category and CAC score, presence, and severity differed between men and women because sex-specific differences have been reported.[18]

RESULTS

Descriptive characteristics of participants are shown in Table 1. A greater proportion of women were in the high DASH category than men (n=62, 57.4% women, $p<0.0001$). Percentage of life lived in the U.S. was inversely associated with DASH category, with those in the low DASH category living in the U.S. longer (50.7% of life lived in the U.S.) than those in the high DASH category (44.6% of life lived in the U.S., p=0.01). Never smoking, no alcohol intake, and physical activity were all associated with higher DASH category ($p<0.0001$, $p<0.0001$, and p=0.01, respectively).

DASH category was not associated with continuous CAC score, incident CAC, and presence of CAC (Table 2). In age-adjusted models, participants in the high DASH category were 41% less likely to have a CAC score >100 (IRR=0.59; 95% CI=0.36, 0.95; p_{trend}=0.02) and had less CAC change at 5-year follow-up than participants in the low DASH category. These associations were attenuated in multivariable adjusted models, primarily owing to adjustment for sex.

Associations of DASH category and CAC severity and change in CAC differed for men and women (p for interaction=0.03 for both); therefore, models were stratified by sex (Table 3). Among men, in multivariable adjusted models (Model 1), those in the high DASH category were 51% less likely to have a CAC score >100 (adjusted IRR=0.49; 95% CI=0.26, 0.95; p_{trend}=0.03) and had 0.46-fold CAC change (calculated by exponentiating the aβ= −0.91; 95% CI= −1.71, −0.10; p_{trend}=0.02) compared with men in the low DASH category. Women in the high DASH category were 4 times more likely to have a CAC score >100 (adjusted IRR=4.01; 95% CI=0.88, 18.35; p_{trend}=0.03) than those in the low DASH category. DASH category was not associated with change in CAC score among women.

DISCUSSION

In this prospective cohort study, DASH category was not associated with incident CAC, CAC presence, CAC severity, or change in CAC score among all participants in fully adjusted models, although participants in the high DASH category had lower risk of CAC severity and lower change in CAC score at the 5-year follow-up than those in the low category in age-adjusted models. In stratified models, men in the high DASH category had

Table 1. Participant Characteristics by Category of DASH Diet Score Among South Asian Adults in the MASALA Study (N=671)

Characteristic	Total study population (N=671)	DASH score ≤20 (low) (*n*=134)	DASH score 21–28 (*n*=429)	DASH score ≥29 (high) (*n*=108)	*p*-value
Demographics and energy intakes (Examination 1)					
Age, year, mean (SD)	55.3 (9.0)	54.6 (9.6)	55.5 (8.9)	55.7 (8.8)	0.57
Women, *n* (%)	291 (43.4)	36 (26.9)	193 (45.0)	62 (57.4)	<0.0001
Percent of life lived in U.S., mean (SD)	48.6 (16.9)	50.7 (17.5)	49 (17.0)	44.6 (15.0)	0.01
Bachelor's degree or higher, *n* (%)	598 (89.1)	115 (85.8)	384 (89.5)	99 (91.7)	0.32
Income >$100K, *n* (%)	438 (67.2)	88 (66.2)	276 (66.8)	74 (69.8)	0.81
Energy intake, mean (SD)	1,687.2 (497.9)	1,644.5 (494.9)	1,672.5 (512.5)	1,799 (426.2)	0.03
Never smoked, *n* (%)	554 (82.6)	93 (69.4)	360 (83.9)	101 (93.5)	<0.0001
No alcohol intake, *n* (%)	435 (64.8)	59 (44.0)	293 (68.3)	83 (76.9)	<0.0001
Physical activity[a], *n* (%)					0.01
Poor	99 (14.8)	24 (17.9)	64 (14.9)	11 (10.2)	
Intermediate	136 (20.3)	38 (28.4)	82 (19.1)	16 (14.8)	
Ideal	436 (65.0)	72 (53.7)	283 (66.0)	81 (75.0)	
Risk factors for ASCVD (Examination 1)					
Hypertension (≥130/85), *n* (%)	322 (48.0)	66 (49.3)	214 (49.9)	42 (38.9)	0.12
HDL cholesterol, mg/dL, mean (SD)	50 (13.1)	48 (12.6)	50 (13.4)	50 (12.5)	0.22
LDL cholesterol, mg/dL, mean (SD)	111 (32.2)	113 (30.0)	110 (33.9)	109 (28.5)	0.58
BMI, kg/m^2, mean (SD)	25.8 (3.8)	25.9 (3.7)	25.9 (3.9)	25.0 (3.5)	0.11
Diabetes, *n* (%)	160 (23.9)	31 (23.1)	107 (24.9)	22 (20.4)	0.60
Primary outcomes of interest: CAC measurements (Examination 2)					
CAC score, median (IQR)	7 (140.0)	25 (293.0)	7 (134.0)	0 (91.5)	0.22[b]
Incident CAC (>0), *n* (%)	107 (16.0)	19 (14.2)	73 (17.0)	15 (13.9)	0.45
CAC presence (>0), *n* (%)	385 (57.4)	83 (61.9)	249 (58.0)	53 (49.1)	0.12
CAC severity (>100), *n* (%)	197 (29.4)	51 (38.1)	121 (28.2)	25 (23.2)	0.03
CAC change, mean (SD)[c]	2.3 (2.4)	2.7 (2.5)	2.2 (2.3)	2.0 (2.4)	0.07

[a]Typical week's activity survey (poor indicates no activity, intermediate indicates 1–149 minutes of moderate or 1–74 minutes of vigorous activity per week, and ideal indicates ≥150 minutes of moderate or ≥75 minutes of vigorous activity per week.)
[b]Median test; *p*-values were otherwise estimated by ANOVA for continuous variables and Pearson's chi-square for categorical variables.
[c]CAC change was calculated on the basis of the log-transformed change in CAC.
ASCVD, atherosclerotic cardiovascular disease; CAC, coronary artery calcification; DASH, Dietary Approaches to Stop Hypertension; HDL, high-density lipoprotein; LDL, low-density lipoprotein; MASALA, Mediators of Atherosclerosis in South Asians in America.

lower risk of CAC severity and lower CAC change than men in the low DASH category. Contrary to anticipated results, women in the high DASH category were more likely to have CAC score >100 and had lower CAC change than women in the low DASH category. To the authors' knowledge, this study presents the first evidence examining the DASH dietary pattern and CAC.

In contrast with previous studies, DASH category was not associated with CAC in the fully adjusted models[19,20]; however, the authors did observe sex differences in CAC severity and progression.[14,21–24] In analyses of the Multi-Ethnic Study of Atherosclerosis cohort, South Asian men had higher rates of annual CAC progression than Black, Latino, and Chinese American men, whereas there were no differences in CAC progression among South Asian women and other race/ethnic groups.[14,21] In this study, the authors found an association between high DASH category and CAC severity among women, but our sample of women with CAC score >100 was small (*n*=38, 13%). Future studies with larger sample size will help to clarify the relationship between DASH diet and CAC score among women.

A limited number of previous studies have examined the relationship between overall dietary patterns and CAC score, which is necessary to fully characterize the diet–disease relationship.[25] Greater adherence to a starchy veggies, meats, and alcohol dietary pattern was associated with increased risk of CAC presence in a longitudinal study of U.S. adults.[26] Similarly, lower CAC

Table 2. Sequentially Adjusted CAC Score by Category of DASH Score Among South Asian Adults in the MASALA Study (N=671)

CAC scoring	DASH score ≤20 (low) (*n*=134) ref	DASH score 21–28 (*n*=429) β/IRR[b]	95% CI	DASH score ≥29 (high) (*n*=108) β/IRR[b]	95% CI	p_{trend}[a]
CAC score (continuous)						
Age adjusted	0.00	−0.50	−1.01, 0.01	−0.46	−1.13, 0.21	0.11
Model 1[c]	0.00	−0.18	−0.72, 0.35	0.43	−0.29, 1.16	0.23
Model 2[d]	0.00	−0.24	−0.78, 0.29	0.17	−0.53, 0.87	0.63
Model 3[e]	0.00	−0.24	−0.78, 0.29	0.17	−0.55, 0.87	0.68
Incident CAC (at Examination 2)[f]						
Age adjusted	1.00	0.78	0.49, 1.24	0.53	0.27, 1.02	0.06
Model 1[c]	1.00	1.09	0.64, 1.85	0.74	0.35, 1.55	0.45
Model 2[d]	1.00	1.10	0.64, 1.87	0.75	0.35, 1.60	0.51
Model 3[e]	1.00	1.16	0.68, 1.99	0.87	0.40, 1.88)	0.80
CAC presence (0 vs >0)[g]						
Age adjusted	1.00	0.92	0.71, 1.17	0.77	0.54, 1.08	0.14
Model 1[c]	1.00	1.05	0.81, 1.36	0.99	0.68, 1.43	1.00
Model 2[d]	1.00	1.06	0.82, 1.38	1.03	0.71, 1.49	0.84
Model 3[e]	1.00	1.07	0.82, 1.39	1.06	0.72, 1.53	0.75
CAC severity (≤100 vs >100)[h]						
Age adjusted	1.00	0.73	0.52, 1.01	0.59	0.36, 0.95	0.02
Model 1[c]	1.00	0.85	0.60, 1.20	0.79	0.47, 1.32	0.32
Model 2[d]	1.00	0.84	0.59, 1.19	0.83	0.49, 1.40	0.40
Model 3[e]	1.00	0.84	0.59, 1.19	0.84	0.50, 1.41	0.42
CAC change (Examination 1 to Examination 2)[i]						
Age adjusted	0.00	−0.56	−0.97, -0.15	−0.79	−1.33, -0.26	0.003
Model 1[c]	0.00	−0.23	−0.62, 0.16	−0.22	−0.75, 0.30	0.37
Model 2[d]	0.00	−0.24	−0.62, 0.14	−0.16	−0.66, 0.35	0.50
Model 3[e]	0.00	−0.22	−0.60, 0.16	−0.10	−0.61, 0.41	0.65

Note: IRR was for the negative binomial regression model.
[a]*p*-trend calculated by linear regression using 3 categories of DASH diet score as a continuous variable.
[b]β for continuous outcomes; IRR for categorical outcomes.
[c]Model 1: Adjusted for age, sex (male/female), percentage life lived in the U.S., education (bachelors or higher/lower than bachelors), physical activity (ideal, intermediate, poor), smoking (current/former versus never), and alcohol intake (no consumption/any).
[d]Model 2: Model 1 + hypertension (blood pressure ≥130/85), HDL cholesterol, LDL cholesterol, diabetes, and BMI (kg/m^2).
[e]Model 3: Model 2 + energy intakes (kilocalories/day).
[f]Incident CAC defined as CAC 0 at Examination 1 and >100 at Examination 2.
[g]CAC presence is defined by any score >0.
[h]CAC severity is defined by a score >100.
[i]Log of CAC change as the outcome in the linear model; the exponentiated regression coefficient was used to interpret the change from Examination 1 to Examination 2 by DASH category.
CAC, coronary artery calcification; DASH, Dietary Approaches to Stop Hypertension; HDL, high-density lipoprotein; IRR, incidence rate ratio; LDL, low-density lipoprotein; MASALA, Mediators of Atherosclerosis in South Asians in America.

scores were observed among German men and women who reported following a Mediterranean-like diet than among those following an animal fat/alcohol diet.[27] In the Coronary Artery Risk Development in Young Adults study, participants who had a higher animal-based low-carbohydrate diet score (consuming <43% of total energy from carbohydrate per day) had higher risk of CAC progression than those who did not follow a low-carbohydrate diet.[28] Collectively, results from these studies highlight the importance of consuming a diet rich in fiber- and nutrient-dense carbohydrates such as fruits, vegetables, whole grains, and beans and legumes for cardiovascular health. A larger sample may similarly elucidate a relationship between dietary intake and CAC score among South Asians in the U.S.

Table 3. Sequentially Adjusted CAC Presence, CAC Severity, and Continuous CAC Score by Category of DASH Diet Score Stratified by Sex Among South Asian Adults in the MASALA Study (N=671)

CAC scoring	DASH score ≤20 (lowest) ref	DASH score 21–28		DASH score ≥29 (highest)		p_{trend}[a]
		β/IRR[b]	95% CI	β/IRR[b]	95% CI	
Men	(*n*=98)	(*n*=236)		(*n*=46)		
CAC score (continuous)						
Age adjusted	0.00	−0.34	−0.81, 0.14	−0.29	−1.00, 0.42	0.25
Model 1[c]	0.00	−0.40	−0.90, 0.11	−0.34	−1.11, 0.42	0.22
Model 2[d]	0.00	−0.52	−1.03, −0.01	−0.36	−1.12, 0.41	0.17
Model 3[e]	0.00	−0.52	−1.03, −0.01	−0.35	−1.11, 0.42	0.16
Incident CAC (at Examination 2)[f]						
Age adjusted	1.00	1.12	0.61, 2.05	0.80	0.34, 1.85	0.66
Model 1[c]	1.00	1.14	0.60, 2.20	0.77	0.30, 1.97	0.66
Model 2[d]	1.00	1.09	0.56, 2.11	0.73	0.28, 1.92	0.59
Model 3[e]	1.00	1.11	0.57, 2.17	0.81	0.31, 2.17	0.77
CAC presence (0 vs >0)[g]						
Age adjusted	1.00	1.01	0.77, 1.32	0.83	0.54, 1.27	0.50
Model 1[c]	1.00	1.01	0.76, 1.35	0.86	0.54, 1.35	0.62
Model 2[d]	1.00	1.03	0.77, 1.38	0.88	0.55, 1.41	0.75
Model 3[e]	1.00	1.04	0.78, 1.39	0.90	0.57, 1.45	0.82
CAC severity (≤100 vs >100)[h]						
Age adjusted	1.00	0.79	0.56, 1.11	0.50	0.27, 0.91	0.02
Model 1[c]	1.00	0.77	0.53, 1.11	0.49	0.26, 0.95	0.03
Model 2[d]	1.00	0.77	0.53, 1.12	0.53	0.27, 1.02	0.05
Model 3[e]	1.00	0.77	0.54, 1.12	0.53	0.28, 1.04	0.05
CAC change (Examination 1 to Examination 2)[i]						
Age adjusted	0.00	−0.40	−0.90, 0.10	−0.86	−1.61, −0.11	0.02
Model 1[c]	0.00	−0.48	−1.01, 0.05	−0.91	−1.71, −0.10	0.02
Model 2[d]	0.00	−0.40	−0.91, 0.10	−0.77	−1.54, 0.005	0.04
Model 3[e]	0.00	−0.39	−0.89, 0.12	−0.67	−1.45, 0.10	0.07
Women	(*n*=36)	(*n*=193)		(*n*=62)		
CAC score (continuous)						
Age adjusted	0.00	0.53	−0.86, 1.92	1.68	0.19, 3.16	0.01
Model 1[c]	0.00	0.39	−1.03, 1.82	1.56	0.02, 3.09	0.01
Model 2[d]	0.00	0.06	−1.46, 1.58	0.80	−0.97, 2.56	0.25
Model 3[e]	0.00	0.12	−1.45, 1.69	0.88	-0.97, 2.74	0.23
Incident CAC (at Examination 2)[f]						
Age adjusted	1.00	0.97	0.37, 2.52	0.59	0.17, 2.05	0.37
Model 1[c]	1.00	1.10	0.41, 2.95)	0.69	0.19, 2.50	0.53
Model 2[d]	1.00	1.24	0.45, 3.43	0.80	0.22, 2.93	0.68
Model 3[e]	1.00	1.29	0.46, 3.63	0.85	0.22, 3.25	0.76
CAC presence (0 vs >0)[g]						
Age adjusted	1.00	1.19	0.61, 2.31	1.31	0.62, 2.75	0.48
Model 1[c]	1.00	1.19	0.62, 2.84	1.33	0.62, 2.84	0.46
Model 2[d]	1.00	1.16	0.58, 2.31	1.31	0.61, 2.79	0.47
Model 3[e]	1.00	1.17	0.59, 2.34	1.35	0.62, 2.94	0.43
CAC severity (≤100 vs >100)[h]						
Age adjusted	1.00	2.12	0.50, 9.00	3.56	0.80, 15.96	0.05
Model 1[c]	1.00	2.27	0.52, 9.84	4.01	0.88, 18.35	0.03
Model 2[d]	1.00	2.02	0.45, 9.02	4.04	0.87, 18.85	0.02
Model 3[e]	1.00	2.01	0.45, 8.96	3.78	0.80, 17.85	0.04

(*continued on next page*)

Table 3. Sequentially Adjusted CAC Presence, CAC Severity, and Continuous CAC Score by Category of DASH Diet Score Stratified by Sex Among South Asian Adults in the MASALA Study (N=671) (*continued*)

CAC scoring	DASH score ≤20 (lowest) ref	DASH score 21–28 β/IRR[b]	DASH score 21–28 95% CI	DASH score ≥29 (highest) β/IRR[b]	DASH score ≥29 (highest) 95% CI	p_{trend}[a]
CAC change (Examination 1 to Examination 2)[i]						
Age adjusted	0.00	0.19	−0.39, 0.78	0.49	−0.18, 1.17	0.13
Model 1[c]	0.00	0.22	−0.39, 0.82	0.55	−0.15, 1.24	0.10
Model 2[d]	0.00	0.15	−0.44, 0.74	0.53	−0.15, 1.21	0.09
Model 3[e]	0.00	0.14	−0.46, 0.74	0.51	−0.17, 1.20	0.10

Note: IRR was for the negative binomial regression model.
[a]*p*-trend calculated by unadjusted linear regression using 3 categories of DASH diet score as an ordinal variable.
[b]β for continuous outcomes; IRR for categorical outcomes.
[c]Model 1: Adjusted for age, percentage of life lived in the U.S., education (bachelors or higher/lower than bachelors), physical activity (ideal, intermediate, poor), smoking (current/former versus never), and alcohol intake (no consumption/any).
[d]Model 2: Model 1 + hypertension (blood pressure ≥130/85), HDL cholesterol, LDL cholesterol, diabetes, and BMI (kg/m^2).
[e]Model 3: Model 2 + energy intake (kilocalories/day).
[f]Incident CAC defined as CAC 0 at Examination 1 and >100 at Examination 2.
[g]CAC presence is defined by any score >0.
[h]CAC severity is defined by a score >100.
[i]Log of CAC change as the outcome in the linear model; the exponentiated regression coefficient was used to interpret the change from Examination 1 to Examination 2 by DASH category.
CAC, coronary artery calcification; DASH, Dietary Approaches to Stop Hypertension; HDL, high-density lipoprotein; IRR, incidence rate ratio; LDL, low-density lipoprotein; MASALA, Mediators of Atherosclerosis in South Asians in America.

Limitations

The MASALA study cohort is relatively small, which limited the authors' ability to examine the associations between DASH diet concordance and CAC by sex.

CONCLUSIONS

The MASALA study is the first multicenter community-based cohort of South Asian adults living in the U.S., incorporating culturally competent practices to collect data on an under-represented population group in the U.S.[5,6] The SHARE FFQ data allowed the calculation of the DASH diet score using individual food item and quantity reports. The study is further strengthened by its prospective design with 5-year follow-up, utilization of CT imaging to assess CAC score, and inclusion of an FFQ specifically designed and validated for South Asian adults living in North America. Future prospective studies examining the DASH diet pattern and its association with CAC score among a larger sample inclusive of other racial/ethnic groups would help to further characterize the role of diet in CAC presence, severity, and progression.

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