

Dietary Intervention

Dietary and Urinary Metabonomic Factors Possibly Accounting for Higher Blood Pressure of Black Compared With White Americans

Results of International Collaborative Study on Macro-/Micronutrients and Blood Pressure

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Abstract—Black compared with non-Hispanic white Americans have higher systolic and diastolic blood pressure and rates of prehypertension/hypertension. Reasons for these adverse findings remain obscure. Analyses here focused on relations of foods/nutrients/urinary metabolites and higher black blood pressure for 369 black compared with 1190 non-Hispanic white Americans aged 40 to 59 years from 8 population samples. Multiple linear regression, standardized data from four 24-hour dietary recalls per person, two 24-hour urine collections, and 8 blood pressure measurements were used to quantitate the role of foods, nutrients, and metabolites in higher black blood pressure. Compared with non-Hispanic white Americans, blacks' average systolic/diastolic pressure was higher by 4.7/3.4 mmHg (men) and 9.0/4.8 mmHg (women). Control for higher body mass index of black women reduced excess black systolic/diastolic pressure to 6.8/3.8 mmHg. Lesser intake of vegetables, fruits, grains, vegetable protein, glutamic acid, starch, fiber, minerals, and potassium, and higher intake of processed meats, pork, eggs, and sugar-sweetened beverages, along with higher cholesterol and higher Na/K ratio, related to in higher black blood pressure. Control for 11 nutrient and 10 non-nutrient correlates reduced higher black systolic/diastolic pressure to 2.3/2.3 mmHg (52% and 33% reduction in men) and to 5.3/2.8 mmHg (21% and 27% reduction in women). Control for foods/urinary metabolites had little further influence on higher black blood pressure. Less favorable multiple nutrient intake by blacks than non-Hispanic white Americans accounted, at least in part, for higher black blood pressure. Improved dietary patterns can contribute to prevention/control of more adverse black blood pressure levels. (*Hypertension*. 2013;62:1074-1080.) • [Online Data Supplement](#)

Key Words: African American ■ blood pressure ■ eating ■ nutrients

Adverse blood pressure (BP) is an established major risk factor for cardiovascular diseases. Repeated US population surveys, including the International Collaborative Study on Macro-/Micronutrients and Blood Pressure (INTERMAP), document that BP is higher in black (African Americans: AA) than non-Hispanic white Americans (NHWA).¹⁻³ Etiopathogenesis of this BP difference remains unexplained, that is, it continues to be—theoretically and practically—a major unsolved challenge for cardiovascular disease research.

Here, we hypothesize that multiple black–NHWA differences in food/nutrient intake and urinary metabolites account for higher AA BP; we use INTERMAP data to test this hypothesis.³⁻⁶

Methods

Population Samples, Field Methods (1996–1999)

Participants were 369 AA and 1190 NHWA women and men aged 40 to 59 years recruited as 8 stratified random US population samples (Table S1 in the online-only Data Supplement). Participants attended

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4 times—2 visits on consecutive days, 2 further visits on consecutive days on average 3 weeks later.³ Demographic data were obtained by interviewer-administered questionnaire. Height and weight were measured at 2 visits. Each participant provided two 24-hour urine collections; aliquots were air-freighted to the Central Laboratory (Leuven, Belgium) for urinary biochemistry and to Imperial College London for proton nuclear magnetic resonance spectroscopy.⁶ Dietary data were collected and computerized by a certified interviewer using the multipass 24-hour recall method.^{3,7} Institutional ethics committee approval was obtained for each site; all participants gave written informed consent.

BP Measurements

Systolic and diastolic BP (SBP, DBP; first and fifth Korotkoff sounds) were measured twice per visit by a certified technician using a random-zero sphygmomanometer—participant seated for ≥ 5 minutes in a quiet room, bladder empty, arm at heart level.³

Statistical Methods

Measurements per person were averaged for BP and nutrients across the 4 visits; for 24-hour urinary excretions, across the 2 collections.^{3,7} Interethnic differences were assessed for statistical significance by Student *t* test or χ^2 test. Approximate reliability—observed univariate regression coefficient as percent of theoretical true coefficient—was estimated for relevant variables.^{8,9}

Based on AA–NHW differences in dietary and urinary variables, multiple linear regression was used to examine relations of these traits to interethnic differences in BP.^{5,6,10} Model A included age, sex, sample, and an indicator for AA; model B added other nondietary factors; model C added body mass index (BMI). Then each dietary/urinary factor was added to model C separately; percentage reduction from the model C AA–NHW BP difference was calculated to assess the influence of the added variable on higher BP of AA. Finally, dietary/urinary variables were included in combinations to assess joint impact on higher AA BP.

Results

Descriptive Statistics

AA had higher average BP than NHWA and higher prevalence rates of hypertension (Table S2). AA women had higher

average BMI and rates of overweight/obesity than NHWA women. AA and NHWA of both sexes differed in intake of multiple foods/nutrients (Tables S2 and S3).

AA Intake Lower, Foods/Nutrients With Possible Favorable Relation to BP

AA had lower intake of total and raw vegetables, fresh fruits, pasta/rice, total grains, vegetable protein, glutamic acid, starch, fiber, Ca, Mg, P, K, Fe, and nonheme Fe.

AA Intake Higher, Foods/Nutrients With Possible Adverse Relation to BP

AA had higher intake of processed meats, pork, eggs, sugar-sweetened beverages, dietary cholesterol, total sugars, fructose/glucose/sucrose, glycine, and Na/K ratio.

AA intakes were relatively favorable for only a few foods/nutrients:

1. AA intake higher, foods/nutrients with possible favorable relation to BP: fish/fish roe/shellfish, poultry, polyunsaturated fatty acids, polyunsaturated fatty acid/saturated fatty acid ratio, oleic acid.
2. AA intake lower, foods/nutrients with possible adverse relation to BP: cream, cheese, dairy product recipes, and alcoholic beverages.

Urinary Metabolites

The median urinary 600-MHz proton nuclear magnetic resonance spectra for AA and NHWA subsamples are shown in the Figure. Urinary metabolites significantly¹² higher in AA than in NHWA included creatinine, 3-hydroxyisovalerate, *N*-acetyls of glycoprotein fragments, dimethylglycine, lysine, *N*-acetyl neuraminic acid, leucine, dimethylamine, taurine, and 2-hydroxyisobutyrate; metabolites significantly higher in NHWA included trimethylamine, *N*-methyl nicotinic acid, hippurate, and succinate (Table 1). Hippurate and *N*-methyl nicotinic acid as quantified in 24-hour excretions are shown in Table S4.

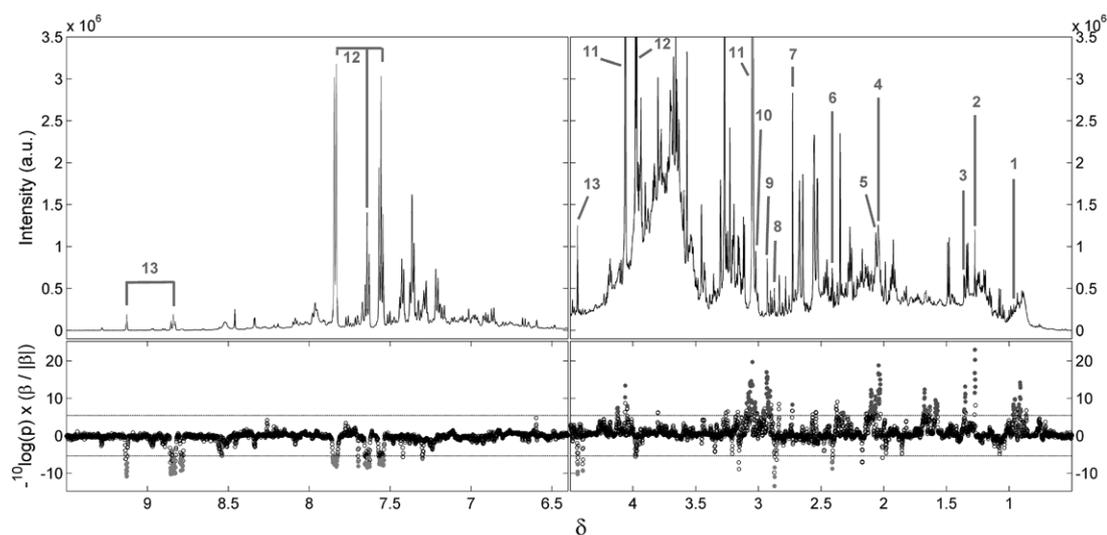


Figure. Median urinary proton nuclear magnetic resonance spectrum of INTERMAP US black and non-Hispanic white American (NHW) participants (top), based on the first urine collection ($n=1455$). Manhattan plot indicating the significant spectral variables (bottom). Metabolites higher in black individuals compared with NHWA are shown in red; metabolites higher in NHWA individuals compared with blacks are shown in blue. 1 indicates leucine; 2, 3-hydroxyisovalerate; 3, 2-hydroxyisobutyrate; 4, *N*-acetyls of glycoprotein fragments; 5, *N*-acetyl neuraminic acid; 6, succinate; 7, dimethylamine; 8, trimethylamine; 9, dimethylglycine; 10, lysine; 11, creatinine; 12, hippurate; and 13, *N*-methyl nicotinic acid.

Table 1. Proton Nuclear Magnetic Resonance–Derived Urinary Metabolites Differing Significantly* Between Black and NHWA Participants, All and by Gender

Metabolites	Chemical Shifts, ppm (Multiplicity)	Minimum <i>P</i> Value†					
		All		Men		Women	
		First Collection	Second Collection	First Collection	Second Collection	First Collection	Second Collection
Higher in blacks (154 men and 184 women)							
Creatinine	3.05 (s); 4.05 (s)	3.8×10 ⁻²⁵	1.8×10 ⁻²⁰	4.4×10 ⁻¹³	1.1×10 ⁻¹¹	5.8×10 ⁻¹⁴	9.3×10 ⁻¹⁰
3-Hydroxyisovalerate	1.27 (s); 2.37 (s)	1.0×10 ⁻²³	4.6×10 ⁻²⁴	4.1×10 ⁻¹³	3.6×10 ⁻¹⁷	1.8×10 ⁻¹¹	4.3×10 ⁻⁹
<i>N</i> -acetyls of glycoprotein fragments	2.02–2.04 (s)	1.6×10 ⁻²²	1.5×10 ⁻¹⁹	3.9×10 ⁻¹²	1.5×10 ⁻⁹	1.4×10 ⁻¹²	3.1×10 ⁻¹²
Dimethylglycine	2.93 (s); 3.72 (s)	5.2×10 ⁻¹⁸	9.7×10 ⁻¹⁸	...	...	4.1×10 ⁻¹⁵	2.2×10 ⁻¹¹
Lysine	3.02 (t)	1.3×10 ⁻⁹	4.2×10 ⁻¹⁵	...	...	...	...
<i>N</i> -acetyl neuraminic acid	2.06 (s)	2.9×10 ⁻¹⁴	3.0×10 ⁻¹¹	4.3×10 ⁻¹⁰	2.7×10 ⁻⁹	...	...
Leucine	0.96 (d)	1.7×10 ⁻¹⁰	3.9×10 ⁻¹¹	...	...	...	...
Dimethylamine	2.73 (s)	3.3×10 ⁻¹⁰	4.7×10 ⁻⁹	4.1×10 ⁻¹⁰	1.7×10 ⁻¹¹	...	...
2-Hydroxyisobutyrate	1.36 (s)	5.3×10 ⁻¹⁰	8.6×10 ⁻⁸	...	...	...	...
Higher in NHWA (594 men and 523 women)							
Trimethylamine	2.87 (s)	2.6×10 ⁻¹⁵	9.5×10 ⁻¹²	9.8×10 ⁻⁸	4.0×10 ⁻⁹	...	...
<i>N</i> -methyl nicotinic acid	4.44 (s); 8.84 (t); 9.13 (s)	3.1×10 ⁻¹³	1.2×10 ⁻¹⁰	4.1×10 ⁻⁸	2.2×10 ⁻⁷	...	...
Hippurate	3.98 (d); 7.55 (t); 7.64 (t); 7.84 (d)	5.9×10 ⁻¹⁰	3.1×10 ⁻⁹	...	...	...	...
Succinate	2.41 (s)	1.5×10 ⁻⁹	4.0×10 ⁻¹⁰	...	...	3.9×10 ⁻⁹	3.4×10 ⁻⁸

d indicates doublet; NHWA, non-Hispanic white Americans; s, singlet; and t, triplet.

*Mean population differences in peak intensity for spectral variables were assessed for statistical significance using family wise error rate <0.01 ($P < 4 \times 10^{-6}$ for group mean population differences by Student *t* test) for the 2 urine collections considered separately.

†Minimum *P* values for mean population differences in peak intensity assigned to a particular metabolite, obtained separately for first and second urine collections, give a ranking of the discriminatory strength of the metabolites.

Partial Correlations

Partial correlation coefficients >0.5 (adjusted for age, sex, sample) were recorded for many pairs of foods/nutrients (Table S5).

Reliability of Data

For foods, 29 of 68 reliability estimates were >50%, without apparent pattern across sex/ethnic strata (Table S6). Nutrient reliability estimates were generally higher than for foods; 75 of 108 were >50%, somewhat lower for AA than for NHWA. Reliability estimates were high for hippurate, *N*-methyl nicotinic acid, SBP, and DBP.

Relation of Foods, Nutrients, and Urinary Metabolites to Higher AA BP

With control for possible nondietary confounders, SBP/DBP was significantly higher for AA than NHWA by 4.7/3.4 mmHg (men) and 9.0/4.8 mmHg (women) (Table S6; row B). With BMI in the model (Table S7; row C), these differences remained about the same for men; for women, they were reduced to 6.8/3.8 mmHg.

Foods Considered Singly

Of 17 foods with significantly different intakes by AA and NHWA, most had only a small influence on higher BP of AA (Table S7).

Nutrients and Urinary Metabolites Considered Singly

Addition of individual nutrients to the regression model generally led to greater influences on SBP and DBP (Table S7) than addition of individual foods; 24-hour urinary K excretion (inversely related to BP and lower in AA than NHWA) produced the largest effect in men, that is, reduction of AA SBP by 1.2 mmHg (26%) and DBP by 0.8 mmHg (24%), but without effect in women. Dietary glycine (% total protein; directly related to BP and higher in AA) had a similar SBP effect in men and the largest effect in women. Inclusion of Ca, Mg, P singly (inversely related to BP and lower in AA than NHWA) produced 0.5 to 0.6 mmHg (>10%) reduction in higher SBP of AA men and qualitatively similar effects for AA women.

With inclusion of urinary hippurate, which is lower in AA men (Table S4) and inversely related to BP, higher SBP and DBP of AA men and women was reduced by only 0.1 mmHg (Table S7). With addition of *N*-methyl nicotinic acid to the model, which is lower in AA than NHWA men and women (reportedly not related to BP), higher SBP and DBP of AA men and women were increased, not decreased.

Foods, Nutrients, and Urinary Metabolites in Combination

With 10 foods considered together (all with significantly less favorable intake by AA than NHWA), effects on higher AA SBP/DBP were modest (Table 2; row D). With 13 nutrients combined (most with significantly less favorable intake

Table 2. Relation of Combinations of Foods/Nutrients/Urinary Metabolites, Significantly Different in Blacks and NHWA, to Higher BP of Blacks than NHWA, by Gender

Model	SBP, mm Hg			DBP, mm Hg		
	BP Difference	Z-Score	% Change From C*	BP Difference	Z-Score	% Change From C*
Men (n=165 blacks, 620 NHWA)						
A: age, sample	5.41	4.40		3.46	3.94	
B: A plus medical history of CVD/diabetes mellitus, family history of hypertension, physical activity, special diet, supplement use	4.68	3.80		3.38	3.84	
C: B plus BMI	4.76	4.04		3.43	4.05	
Combination of foods						
D: C plus raw vegetables, fresh fruit, pasta/rice, total grains, eggs, sugar-sweetened beverages, cream/cheese/ice cream/milk and cheese recipes, pork, processed meats, alcoholic beverages	3.64	3.00	-23.5	2.88	3.28	-16.1
Combinations of nutrients						
E1: C plus vegetable protein, glutamic acid (%kcal), starch, fiber, Ca, nonheme Fe, riboflavin, urinary K, Σ long-chain PFA, dietary cholesterol, glycine (%protein), 14-day alcohol, urinary Na	2.28	1.72	-52.1	2.31	2.41	-32.7
E2: as E1 except removing 14-day alcohol and urinary Na	2.51	1.89	-47.3	2.43	2.53	-29.2
E3: as E1 except glutamic acid as %protein (instead of %kcal)	2.77	2.12	-41.9	2.61	2.75	-24.1
E4: as E1 except Mg instead of Ca	2.41	1.82	-49.4	2.44	2.55	-28.9
E5: as E1 except P instead of Ca	2.39	1.81	-49.9	2.41	2.52	-29.8
E6: as E1 except urinary Na/K ratio instead of urinary K and Na	2.47	1.88	-48.1	2.51	2.63	-27.0
E7: E1 plus Mg, P	2.29	1.72	-52.0	2.33	2.42	-32.2
Combinations of foods/nutrients						
F1: including variables with largest SBP differences for men, D plus E1	2.17	1.62	-54.3	2.17	2.04	-36.7
F2: as F1, excluding variables with partial correlation >0.5†	2.25	1.69	-52.7	2.14	2.21	-37.8
Men with quantitated urinary metabolites (n=146 blacks, 578 NHWA)						
Combinations of nutrients and urinary metabolite variables						
G: as C except based on above n	3.81	3.15		3.12	3.57	
H: G plus hippurate, N-methylnicotinic acid	4.10	3.29	7.6	3.09	3.44	-0.8
I: as E1 except based on above n	2.05	1.51	-46.2	2.46	2.50	-21.1
J: I plus hippurate, N-methyl nicotinic acid	2.44	1.78	-36.0	2.55	2.56	-18.2
Women (n=204 blacks, 570 NHWA)						
A: age, sample	9.66	8.02		5.03	6.52	
B: A plus medical history of CVD/diabetes mellitus, family history of hypertension, physical activity, special diet, supplement use	9.00	7.42		4.83	6.20	
C: B plus BMI	6.76	5.76		3.77	4.87	
Combination of foods						
D: C plus raw vegetables, fresh fruit, pasta/rice, total grains, eggs, sugar-sweetened beverages, cream/cheese/ice cream/milk and cheese recipes, pork, processed meats, alcoholic beverages	6.18	4.74	-8.5	3.58	4.14	-5.2
Combinations of nutrients						
E1: C plus vegetable protein, glutamic acid (%kcal), starch, fiber, Ca, nonheme Fe, riboflavin, urinary K, Σ long-chain PFA, dietary cholesterol, glycine (%protein), 14-day alcohol, urinary Na	5.31	3.82	-21.4	2.76	3.01	-26.8

(continued)

Table 2. Continued

Model	Systolic BP, mm Hg			Diastolic BP, mm Hg		
	BP Difference	Z-Score	% Change From C*	BP Difference	Z-Score	% Change From C*
E2: as E1 except removing 14-day alcohol and urinary Na	5.22	3.78	-22.8	2.61	2.86	-30.9
E3: as E1 except glutamic acid as %protein (instead of %kcal)	5.42	3.90	-19.8	2.78	3.02	-26.2
E4: as E1 except Mg instead of Ca	5.46	3.94	-19.2	2.80	3.05	-25.8
E5: as E1 except P instead of Ca	5.39	3.89	-20.2	2.73	2.98	-27.6
E6: as E1 except urinary Na/K ratio instead of urinary K and Na	5.13	3.69	-24.1	2.65	2.88	-29.7
E7: E1 plus Mg, P	5.40	3.87	-20.2	2.84	3.09	-24.6
Combinations of foods/nutrients						
F1: including variables with largest SBP differences for women, D plus E6	5.38	3.79	-20.4	3.04	3.23	-19.4
F2: as F1, excluding variables with partial correlation >0.5†	5.14	3.68	-24.0	2.83	3.06	-25.0
Women with quantitated urinary metabolites (n=188 blacks, 514 NHWA)						
Combinations of nutrients and urinary metabolite variables						
G: as C except based on above n	6.80	5.48		3.78	4.60	
H: G plus hippurate, <i>N</i> -methyl nicotinic acid	6.92	5.52	1.6	4.01	4.83	6.0
I: as E1 except based on above n	5.37	3.63	-21.1	2.77	2.82	-26.8
J: I plus hippurate, <i>N</i> -methyl nicotinic acid	5.33	3.60	-21.7	2.80	2.86	-26.0

Units for nutrients are %kcal, g/1000 kcal, or mg/1000 kcal; for glutamic acid and glycine, % total protein; for urinary hippurate and *N*-methyl nicotinic acid, mmol/24 h. Z-score=regression coefficient/SE. |Z| ≥1.96, uncorrected $P \leq 0.05$; |Z| ≥2.58, uncorrected $P \leq 0.01$; |Z| ≥3.29, uncorrected $P \leq 0.001$. Σ indicates sum; BMI, body mass index; BP, blood pressure; Ca, calcium; CVD, cardiovascular diseases; DBP, diastolic blood pressure; Fe, iron; K, potassium; Mg, magnesium; Na, sodium; NHWA, non-Hispanic white Americans; P, phosphorus; PFA, polyunsaturated fatty acids; SBP, systolic blood pressure; and SFA, saturated fatty acids.

*For rows H, I, and J, % change from row G.

†Model F2 (men) includes raw vegetables, fresh fruit, pasta/rice, eggs, sugar-sweetened beverages, cream/cheese/ice cream/milk and cheese recipes, pork, processed meats, vegetable protein, glutamic acid (%kcal), riboflavin, urinary K, Σ long-chain PFA, glycine (%protein), 14-day alcohol, urinary Na.

‡Model F2 (women) includes raw vegetables, fresh fruit, pasta/rice, total grains, sugar-sweetened beverages, cream/cheese/ice cream/milk and cheese recipes, pork, processed meats, alcoholic beverages, glutamic acid (%kcal), cholesterol, riboflavin, glycine (%protein), urinary Na/K ratio.

by AA than NHWA), effects on higher AA BP were larger, particularly for men; for example, male SBP/DBP difference reduced to 2.3/2.3 mm Hg (Z-scores, 1.72 and 2.41), as well as a decrease of 2.2/1.1 mm Hg (-52% and -33%; Table 2; row E1). Female AA SBP/DBP differences remained substantial, with nutrient-related smaller effect of 1.5/1.0 mm Hg (-21% and -27%). No significant gender interaction was found (data not tabulated).

Combinations of nutrients and foods yielded little or no additional reduction in higher AA BP (Table 2; row F2). With the 2 quantified urinary metabolites in the model together (without and with nutrients), higher AA SBP/DBP was not reduced (Table 2; rows H, J).

Discussion

The main finding here on higher SBP/DBP of AA than NHWA was that less favorable multiple nutrient intake by AA than NHWA accounted, in part, for higher AA SBP/DBP. These include vegetable protein and its main amino acid (glutamic acid), starch, fiber, K, Ca or Mg or P, nonheme Fe; in addition, dietary cholesterol and glycine.¹¹⁻²⁵

To the best of our knowledge, these INTERMAP findings are unique. The Atherosclerosis Risk in Communities (ARIC) population study, involving >8000 nonhypertensive women

and men aged 45 to 64 years, reported that whites consuming ≥ 3 daily servings of low-fat milk, compared with those consuming <1, had a 2.7 mm Hg smaller SBP increase with 9-year follow-up, an association not prevailing for AA.²⁶ No data were revealed on relations of dietary variables to BP differences between AAs and whites. The CARDIA study reported that with 10-year follow-up, intake of low-fat dairy products was associated with lower incidence of high BP in AA and whites.²⁷ The study did not assess whether these or other foods/nutrients related to higher AA BP. The third National Health and Nutrition Survey (NHANES III; 1988-1994) reported lower serum 25-hydroxy vitamin D in AA than NHWA and an inverse relation of 25-hydroxy vitamin D to BP.²⁸ These differences were estimated to explain about half the greater AA BP prevalence. No dietary data were revealed.

If the INTERMAP findings here are reproducible, supporting the inference that they are etiologically significant, they have important implications, especially need for greater efforts to improve AA nutrition. For example, AA nutrition would be enhanced importantly by adoption of dietary recommendations for prevention/control of adverse BP, used in such studies as the Dietary Approaches to Stop Hypertension (DASH)-low Na trial or the Optimal Macronutrient Intake Trial for Heart Health (OMNIHEART) plus low Na.^{15,16} To

extend their use among AA, specific factors influencing AA diet need to be considered, for example, ethnic traditions, lower average income, and reduced accessibility to modern supermarkets.²⁹ For AA women, there is a particular need to reduce their higher BMI, with known relation to higher BP.

Metabolome-wide association analysis revealed 12 urinary metabolites that differed significantly between AA and NHWA. Hippurate (higher in NHWA) is a gut microbial cometabolite produced by bacterial metabolism of plant phenols^{30,31}; hippurate was related inversely to BP in INTERMAP participants.⁶ Observed differences in dimethylamine and dimethylglycine (both higher in AA) also likely relate to interethnic microbial differences.³³ Creatinine and guanidinoacetate (involved in creatinine metabolism) were higher in AA than NHWA. Creatinine excretion is related to muscle turnover³⁴; these metabolite differences could reflect greater AA physical activity and muscle mass. Lower AA excretion of *N*-methyl nicotinic acid, a product of nicotinic acid/nicotinamide metabolism, could reflect lower AA dietary intake of niacin and tryptophan (observed; data not tabulated). Trimethylamine (lower in AA) is linked to dietary choline-induced atherosclerosis³⁵; this difference could reflect lower AA dietary intake of B-complex vitamins.

Multiple nutrients accounted only in part for higher AA BP. This may reflect regression dilution bias and other limitations in the nutrient data, despite their quality.^{5,9} In this regard, 2 previous INTERMAP investigations—on higher BP of less educated Americans, and higher BP of northern than southern Chinese—showed that multiple nutrients accounted completely for higher BP.^{13,25} Thus, the fact here that multiple foods/nutrients/metabolites apparently accounted only in part for higher AA BP suggests that other traits may operate, for example, in utero influences, early-life dietary patterns, psychosocial factors, and genetic factors.^{36–40}

Study Strengths

Findings here are solidly based, with participants from 8 diverse US random samples and dietary/metabolite/BP data collected by standardized, quality-controlled repetitive methods.

Study Limitations

Data are cross-sectional, subject to random regression dilution bias despite multiple measurements, and—in regard to the dietary data to nonrandom biases inherent in the methodology.⁹

Perspectives

Delineation of factors responsible for the more adverse BP patterns of AA compared with other Americans is a major, long-term, unresolved research challenge. Its importance relates not only to the need to overcome this inequality in health of AA. It also stems from the likelihood that resolving this problem will clarify understanding on the etiopathogenesis of epidemic prehypertension/hypertension in all strata of the population. The INTERMAP data reported here show that about one fourth (SBP, women) to one half (SBP, men) of higher BP of AA is attributable to less favorable intake of multiple nutrients by AA, and that greater obesity among AA

women also is a significant factor. Improved eating patterns can help prevent/control adverse AA BP patterns.

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Disclosures

None.

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Novelty and Significance

What Is New?

- To the best of our knowledge, the data here are the first reported on multiple foods/nutrients/urinary metabolites that apparently account, at least in part, for the more adverse blood pressure patterns of blacks compared with non-Hispanic white Americans.

What Is Relevant?

- These data point the way to specific dietary enhancements for the prevention/control of adverse BP patterns in blacks.

Summary

Data here from the population-based US samples of the International Collaborative Study on Macro-/Micronutrients and Blood Pressure (INTERMAP) study support the conclusion that the inordinately high rates of prehypertension/hypertension, common among blacks, can be ameliorated by improved nutrition.