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Ethnicity, Education, and Blood Pressure in Cuba

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The causes of variation in hypertension risk by ethnicity and educational level are not well understood. To gain further insight into this issue in a nonindustrialized country, a population-based sample of 1,667 persons aged 15–74 years was recruited in Cienfuegos, Cuba. In this 2001–2002 study, interviewers classified 29% of participants as Black or mulatto and 71% as White. Educational attainment was stratified at the median number of school years. Compared with White women, non-White women had higher blood pressures (3.0/1.7, systolic blood pressure/diastolic blood pressure) and a higher prevalence of hypertension (24%, 95% confidence interval: 20, 28 vs. 15%, 95% confidence interval: 12, 18). Among men, no differences in blood pressure were observed by ethnicity. Men with a lower level of education had a 14% lower risk of hypertension compared with men above the median. However, women with a lower level of education had a 24% increase in risk. The effect of education was equally strong among Whites alone and when occupation was used for stratification. No variation was observed for body mass index or self-reported health behaviors by ethnicity or education. The narrower ethnic gradient in hypertension prevalence than seen in North America and the gender-specific social status effect, in the context of relatively equal living conditions, suggest that the influence of psychosocial stressors may be specific to cultural contexts.

blood pressure; body mass index; Cuba; education; ethnic groups; health behavior; hypertension; stress

Abbreviations: CI, confidence interval; DBP, diastolic blood pressure; SBP, systolic blood pressure.

Individual exposures, such as obesity and dietary patterns, have thus far provided the most useful insights into the causal matrix that leads to hypertension. In addition to these physical or behavioral attributes, a variety of demographic characteristics also exert a major influence on the risk of hypertension, including most prominently male gender, social status, and race/ethnicity (1–3). Unfortunately, the mechanistic significance of these latter associations is much less clear-cut, and the intervening pathways remain ill defined. Although these demographic categories can be proxies for lifestyle attributes, as a rule only a modest proportion of the effect on blood pressure of social class and racial/ethnic groups can be captured by variables such as overweight and salt intake (4–6).

Measures of social status, such as education and occupation, have provided information about the risk of hypertension in a range of social contexts; however, the magnitude and even the direction of the effect vary (7–9). Because social status organizes so many aspects of a person's life, the array of factors that are potential candidates to mediate these effects cannot be easily delimited and ranges from activity patterns to psychosocial stressors. Race/ethnicity is an even more problematic category, given the potential confounding between biologic and social factors (10–15). Wide variation in hypertension prevalence has been observed among European populations (e.g., Europe vs. North America) as well as African-origin populations (e.g., west Africa, the Caribbean, and North America) (16, 17). This

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pattern is inconsistent with the usual emphasis on the role of genetics in setting population risk. The primary role of the environment in leading to variation within these broadly defined racial/ethnic groups in turn leads directly to the inference that social factors could in the same way account for differences between racial/ethnic groups within societies such as the United States.

Given the difficulties in characterizing habitual lifestyle factors such as diet, descriptive epidemiology has contributed relatively little to our understanding of causal processes in hypertension in recent years. Because long-term exposures cannot be manipulated for experimental purposes in humans, and because social status, ethnicity, and environmental factors are correlated, there are no effective ways to eliminate confounding from studies of race/ethnicity and blood pressure. A social setting in which institutional racism and overt discrimination did not exist and members of all ethnicities and occupations enjoyed similar opportunity would at least provide a useful setting in which to test hypotheses regarding factors that influence racial/ethnic variation. Although not free of racial differentials, Cuba has made substantial progress toward social equality and the reduction of a racial hierarchy; our previous report from Cuba demonstrated a narrow gap between persons of primarily European and African descent (18). Methodological limits were apparent in that study, however, and no measures of social status were included. Accordingly, we reexamined the current distributions of blood pressure and the frequencies of hypertension in a population sample including a broader range of sociodemographic factors.

MATERIALS AND METHODS

Survey design and conduct

Cienfuegos is located on the southern coast of Cuba near the center of the island and has the smallest population of any Cuban province (www.infomed.sld.cu (in Spanish)). The cardiovascular mortality burden in Cienfuegos is not different from what is observed in the national data (19). Health care in the province is organized in a centralized system and is based on neighborhood clinics staffed by a family physician and a nurse. Screening for hypertension has been a major focus of the health system, and virtually all adults have had their blood pressure measured.

With assistance from the Department of Statistics, a two-stage, stratified probability sample was selected from the urban area of Cienfuegos to provide 180 persons in six gender-specific, 10-year age groups of 15–74 years. The sampling design aimed to recruit 2,160 individuals with equal probability of having been drawn from each of the age-gender strata. For global estimations, weights were used for each strata, and sample estimates were adjusted to the Cienfuegos city resident adult population of 94,723 individuals. The field work and data collection was completed in 2001–2002 as the baseline of a local project derived from the ''Conjunto de Accioines para la Reduccion Multifactorial de Enfermedades No transmisibles'' (''CARMEN'' (multiple risk factor interventions to reduce noncommunicable diseases)) (20), a Pan American Health Organization initiative to prevent and control noncommunicable diseases.

The survey protocol incorporated portions of a questionnaire developed in the Pan American Health Organization project for risk factor surveillance and intervention for noncommunicable diseases (20). The participation rate in the clinical examination was 77.9 percent. After extensive training with audiotapes and competence testing using the double-headed stethoscope (21), blood pressure was measured three times at the same sitting by using a mercury manometer; analyses were based on the mean of the last two readings. No terminal digit was assigned more than 25 percent of the values, suggesting an excellent measurement technique. Data were collected by self-report on a variety of health-related conditions. Height and weight were measured with participants in light street clothing, and an extensive questionnaire was administered by professional interviewers. Blood pressure was measured by certified nurses, and medication use was verified by the physician, who examined the pill bottles.

Assignment to the categories of White ($n = 1{,}179$), Black ($n = 203$), and mulatto ($n = 285$) was made by trained professional interviewers who had participated in the most recent national census. Because of small numbers, the categories of Black and mulatto were combined in the primary analyses. Education was dichotomized at ''preuniversitario'' and above, roughly equivalent to more than high school in the US and European systems. Among persons actively employed, administrative and technical jobs were compared with service and manual work.

In a secondary analysis to compare the relative rates of hypertension prevalence in US Blacks and Whites, we accessed the public-use tapes of the National Health and Nutrition Examination Survey 1999–2002, made available from the National Center for Health Statistics, Hyattsville, Maryland. A subset of the data restricted to the age groups present in the Cuban survey was then used to provide contemporary estimates of hypertension patterns among Blacks and Whites in the United States.

Analysis strategy

Descriptive analysis was conducted of means and frequencies by gender and skin-color group. Hypertension was defined as a systolic blood pressure (SBP) of $\geq$140 mmHg, a diastolic blood pressure (DBP) of $\geq$90 mmHg, or current treatment with antihypertensive agents. ''Control in the population'' was defined as the percentage of all hypertensives with a SBP of $<$140 mmHg and a DBP of $<$90 mmHg, irrespective of whether they had been previously diagnosed or whether treatment had been recommended. ''Control in treated patients'' was defined as the number of treated patients achieving the same goal (i.e., blood pressure $<$140/90 mmHg) divided by the number of patients on treatment. Body mass index was calculated as weight in kilograms divided by height in meters squared. Ninety-five percent confidence intervals, taking into account the sampling design, were calculated for prevalences. Logistic models were used to calculate the odds ratios of prevalence estimates

TABLE 1. Descriptive characteristics of the population sample, by ethnicity and gender, Cienfuegos, Cuba, 2001–2002

	White				Black			
	Men ($n = 521$)		Women ($n = 658$)		Men ($n = 228$)		Women ($n = 260$)	
	Value	95% CI*	Value	95% CI	Value	95% CI	Value	95% CI
Age (years) (mean (standard deviation))	45 (16)		45 (16)		43 (15)		41 (15)	
Systolic blood pressure (mmHg)	120.8	118.4, 123.2	112.2	110.1, 114.2	120.5	117.0, 124.0	114.9	111.9, 118.0
Diastolic blood pressure (mmHg)	75.5	73.8, 77.2	70.4	68.8, 71.9	77.3	75.6, 79.1	71.4	69.0, 73.7
Hypertension (%)†	23.0	18.0, 28.1	15.1	12.1, 18.1	22.4	15.2, 29.7	24.2	19.9, 28.4
Body mass index (kg/m^2)	24.3	23.7, 24.9	25.1	24.7, 25.5	23.7	23.0, 24.5	25.2	24.4, 26.0
Obesity (body mass index $\geq$30) (%)	8.3	4.4, 12.2	14.3	12.2, 16.4	6.1	1.2, 10.9	14.3	9.8, 18.7
Waist circumference (cm)	85.1	83.3, 86.8	82.0	81.0, 82.9	81.9	80.7, 83.1	81.3	79.6, 82.9
Current smoker (%)	40.6	36.7, 44.5	21.8	17.9, 25.7	35.9	29.3, 42.5	32.2	24.4, 39.9
Diabetic (%)‡	2.9	1.7, 4.1	3.7	2.4, 5.0	1.8	0.2, 3.4	4.4	1.7, 7.1
Education: more than high school (%)§	62.8	56.2, 69.5	61.6	53.8, 69.4	53.5	47.2, 59.2	53.4	44.1, 62.8
Occupation: administrative/technical (%)¶	36.3	27.7, 44.9	34.2	29.2, 39.2	33.1	27.0, 39.3	29.9	22.4, 37.3
Service employee and worker (%)	45.3	37.1, 53.5	19.6	17.1, 22.0	53.7	48.3, 59.2	26.4	21.7, 31.1

* CI, confidence interval.
† Systolic blood pressure/diastolic blood pressure $\geq$140/90 mmHg or currently receiving drug treatment.
‡ Diagnosed by a physician.
§ "Preuniversitario and universitario."
¶ Among those employed.

adjusting for multiple confounding variables by using Stata 8.0 software (Stata Corporation, College Station, Texas).

RESULTS

The descriptive characteristics of the four ethnic-gender groups are presented in table 1. Crude prevalences (percentages) of hypertension, for both genders combined, were 18.1 (95 percent confidence interval (CI): 14.6, 21.7) for Blacks and 23.8 (95 percent CI: 18.8, 28.8) for Whites. No ethnic differences were noted in measures of ponderosity (body mass index and waist circumference) in the corresponding gender pairs. Educational attainment and occupational status were modestly lower in Blacks. No age-adjusted blood pressure differences were observed for men ($p > 0.2$); however, for Black women compared with White women, SBP was 3.0 mmHg higher and DBP was 1.7 mmHg higher ($p < 0.05$) (table 2). After age-gender adjustment, mean SBP was 1.7 mmHg higher among Blacks in the total sample, and DBP was 1.6 mmHg higher; both of these differences were statistically significant ($p < 0.01$). In a secondary analysis, blood pressure was calculated for Whites, mulattos, and Blacks separately. For males, no differences among the three groups were seen, whereas mulatto and Black females had identical blood pressures, both higher than those of Whites (i.e., SBP was 3 mmHg higher and DBP was 1 mmHg higher than in White women). Age-specific trends in SBP and DBP were essentially identical for Black men and White men; however, slightly higher values were seen among Black compared with White women beginning at age 25 years (data not shown).

Logistic models were used to account for potential confounders in comparisons of hypertension prevalence across racial/ethnic groups. After adjustment for age for men and women combined, the odds ratio for hypertension, Blacks versus Whites, was 1.64 (95 percent CI: 1.57, 1.71) (table 3). Other variables in the data set associated with blood pressure and/or hypertension in at least one group included education, body mass index, waist circumference, alcohol intake, and physical activity. In the fully adjusted model, the odds ratio for Black versus White men was 1.36 (95 percent CI: 1.27, 1.45) and for Black versus White women, it was 2.91 (95 percent CI: 2.72; 3.11); for both genders combined, the odds ratio was 1.84 (95 percent CI: 1.75, 1.92). Three interaction terms were examined after including terms for the main effect, ethnicity $\times$ gender, ethnicity $\times$ education, and gender $\times$ education; all three terms achieved statistical significance ($p < 0.05$), although the odds ratios were low ($<$1.22). To provide a context for interpreting these results, we performed the same analyses with data from the most recent National Health and Nutrition Examination Survey (1999–2002). Adjustment was restricted to age, given uncertainty about the comparability of

TABLE 2. Blood pressure adjusted for age, by ethnicity and gender, Cienfuegos, Cuba, 2001–2002

	No.	White		No.	Black		*p* value
		Mean	95% CI*		Mean	95% CI	
Systolic blood pressure (mmHg)							
Men	521	121.5	119.2, 123.7	228	121.0	117.5, 124.5	0.147
Women	658	112.2	110.1, 114.2	260	114.9	111.8, 117.9	0.000
Total	1,179	115.6	113.6, 117.6	488	117.3	114.2, 120.3	0.000
Diastolic blood pressure (mmHg)							
Men	521	76.6	75.0, 78.1	228	78.0	75.6, 80.4	0.000
Women	658	69.9	68.0, 71.9	260	71.4	69.0, 73.7	0.000
Total	1,179	72.4	70.6, 74.2	488	74.0	71.8, 76.1	0.000

* CI, confidence interval.

the measurement scales for other factors; the odds ratio for hypertension in the United States for both genders combined, Blacks versus Whites, was 2.41 (95 percent CI: 1.90, 2.93).

A high level of awareness and treatment of hypertension was observed in the population (table 4). The percentages of hypertensive Black women and White women who were currently being treated were equivalent (table 4). Awareness of hypertension was somewhat lower for Black men compared with White men, however. The percentage of treated patients whose blood pressures were less than 140/90 mmHg was also somewhat lower among Black men compared with their White counterparts, although the confidence intervals for these estimates were wide. The odds ratios, adjusted for age for both genders combined, Blacks versus Whites, for the rate of treatment and the rate of control were 1.08 (95 percent CI: 1.00, 1.16) and 1.13 (95 percent CI: 1.02, 1.24), respectively.

The effect of education and occupation on hypertension prevalence was gender specific. For men in the lower half of the educational distribution, the age-adjusted prevalence was 22.7 (95 percent CI: 16.0, 29.4) compared with 23.8 (95 percent CI: 17.0, 30.6) for those in the upper half (age-adjusted odds ratio = 0.76, 95 percent CI: 0.72, 0.81). Conversely, for women, the prevalence among less well educated participants was 26.7 (95 percent CI: 20.6, 32.8) compared with 11.6 (95 percent CI: 8.3, 14.8) for those with more education (age-adjusted odds ratio = 1.24, 95 percent

TABLE 3. Age- and risk-factor-adjusted prevalence (%) of hypertension* among Blacks and Whites, Cienfuegos, Cuba, 2001–2002

	No.	Prevalence	95% CI†	Crude OR†	95% CI	Adjusted‡ OR	95% CI	Adjusted§ OR	95% CI
Total	416	19.9	16.1, 23.6						
Men	200	23.4	17.2, 29.5	1.37	1.32, 1.42	1.53	1.47, 1.59	1.73	1.65, 1.82
Women	216	17.7	14.8, 20.7	1.00		1.00		1.00	
Blacks	140	23.8	18.8, 28.8	1.33	1.28, 1.38	1.64	1.57, 1.71	1.84	1.75, 1.92
Whites	276	18.1	14.6, 21.7	1.00		1.00		1.00	
Men									
Blacks	59	23.2	15.0, 31.5	0.97	0.91, 1.02	1.10	1.04, 1.17	1.36	1.27, 1.45
Whites	141	23.4	17.9, 28.9	1.00		1.00		1.00	
Women									
Blacks	81	24.1	19.8, 28.3	1.80	1.70, 1.90	2.63	2.47, 2.80	2.91	2.72, 3.11
Whites	135	15.0	12.1, 18.0	1.00		1.00		1.00	

* Systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg or currently taking antihypertensive medication.

† CI, confidence interval; OR, odds ratio.

‡ Adjusted for age.

§ Adjusted for age, gender, education, body mass index, waist circumference, alcohol intake, and physical exercise.

TABLE 4. Awareness, treatment, and control of hypertension, by ethnicity and gender, Cienfuegos, Cuba, 2001–2002

	White				Black			
	Men ($n = 521$)		Women ($n = 658$)		Men ($n = 228$)		Women ($n = 260$)	
	%	95% CI*	%	95% CI	%	95% CI	%	95% CI
Aware of hypertension	73.0	66.4, 79.6	85.2	78.3, 92.1	61.1	38.2, 83.7	86.7	77.1, 96.3
Treated for hypertension	48.9	38.2, 59.6	73.0	64.3, 81.8	46.3	22.1, 70.5	69.5	54.6, 84.4
Control among the treated†	61.2	46.5, 75.9	67.9	56.4, 79.3	57.5	37.5, 77.5	68.1	57.1, 79.2
Control in the population‡	29.9	20.8, 39.0	49.6	38.6, 60.6	26.6	10.0, 43.3	47.3	38.2, 56.5

* CI, confidence interval.
† Percentage of treated hypertensives whose blood pressure was <140/90 mmHg.
‡ Percentage of all hypertensives who were treated and whose blood pressure was <140/90 mmHg.

CI: 1.16, 1.32). This finding was consistent across the whole age range (figure 1) and persisted when the analysis was restricted to Whites only (i.e., 0.72 for men and 1.55 for women). Similar associations were apparent for occupational status (men, low vs. high: 20.6, 95 percent CI: 14.0, 27.3 vs. 25.3, 95 percent CI: 17.2, 33.2; women, low vs. high: 18.3, 95 percent CI: 14.9, 21.6 vs. 11.9, 95 percent CI: 7.4, 16.4). No variation in body mass index was observed by education or occupation. Likewise, there was no variation in self-reported use of salt at the table or the frequency with which fruits and vegetables were eaten.

DISCUSSION

The findings presented here from Cuba offer a series of contrasts to the established epidemiologic pattern of blood pressure by ethnicity and social status. Consistent with our previous report, the ethnic differential in blood pressure and hypertension prevalence was somewhat smaller than in the United States (19). For example, the difference in SBP between US Blacks and Whites aged 35–44 years was 7 mmHg (National Health and Nutrition Examination Survey 1999–2002, unpublished analysis) (22) compared with 3 mmHg in Cuba. Although differential treatment could play a role, the impact would be very small in this age range. The odds ratio for the age-adjusted prevalence of hypertension in the United States was also higher than what was observed in Cuba (2.4 vs. 1.6), and the confidence intervals did not overlap. Unfortunately, we could not compare a fully adjusted model because data on covariates were not collected in a standardized manner from both groups. Since the boundary between "Black" and "White" can be difficult to define in many Caribbean and Latin American societies, we acknowledge that differing degrees of admixture could exist in Cuba and the United States. However, no gradient was apparent by "mulatto" and "Black" in Cuba.

A social status effect, whether based on education or on occupational status, was also apparent. In addition, a prominent feature of these data was an apparent gender interaction that was observed with both ethnicity and social status. Even though Black men and White men had similar blood pressures, Black women were at higher risk. The social status gradient also varied by gender, being positive in men (higher status, higher prevalence) but reversed in women. Contrary to findings in many other contexts, Blacks and less-educated participants were not more obese nor did they have a higher prevalence of diabetes. Another unusual finding observed in these data was an increase in the relative odds of hypertension among Blacks after adjustment for covariates. Because hypertension is mediated by factors normally found in association with lower socioeconomic status, and because Blacks in the United States are overrepresented in lower socioeconomic status groups, adjustment in the United States for social context tends to reduce the estimated relative risk. That effect was not observed in this analysis (age-adjusted odds ratio = 1.6; odds ratio after risk factor adjustment = 1.8). This result occurred because

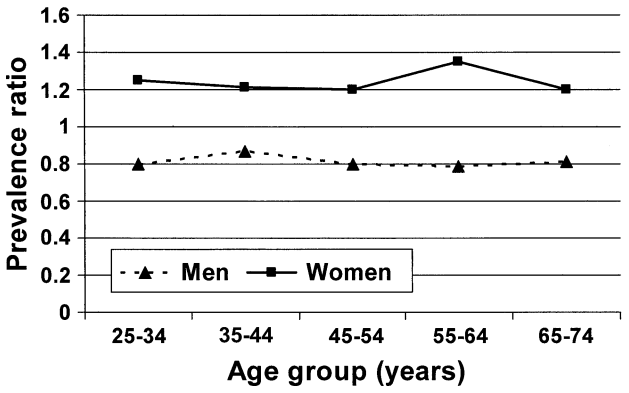

FIGURE 1. Ratio of the age-specific prevalence of hypertension for persons with low vs. high levels of education, by gender, Cienfuegos, Cuba, 2001–2002.

TABLE 5. Prevalence (%) of hypertension among Blacks and non-Blacks in Latin America and the Caribbean versus the United States, 2001–2002

Country (reference no.)	Men			Women		
	Black	Non-Black	RR*	Black	Non-Black	RR*
Brazil (22)†	14.0	12.0	1.16	18.0	12.1	1.49
Trinidad (23)‡	33.3	25.3	1.32	28.3	27.7	1.02
Cuba (18)	51.4	43.8	1.17	42.3	40.8	1.04
Cuba§	23.2	23.4	0.99	24.1	15.0	1.61
United States¶	35.0	24.4	1.43	34.2	19.3	1.77

* RR, Black:non-Black rate ratio.
† Black = weighted average of "Black" and "mulatto."
‡ Non-Black = East Indian.
§ Present study.
¶ Third National Health and Nutrition Examination Survey. Health United States. Hyattsville, MD: US Department of Health and Human Services, 1998:281.

many of the covariates (e.g., body mass index) varied to only a limited degree among the race/ethnicity or education strata in the Cuban sample.

The relative risk of hypertension among African-origin versus European-origin populations has been the focus of numerous epidemiologic and clinical investigations over the last 50 years. Survey data in the United States have documented higher blood pressures and a greater frequency of hypertension among Black adults since the 1930s (1). More limited and less consistent data have emerged from the Caribbean, South America, and the United Kingdom (23–25). As summarized in table 5, the differences involving persons of African descent and other ethnic groups are narrowest in the non-US samples (average rate ratio, men plus women, non-United States = 1.2; United States = 1.6). Given the practical difficulty of testing the "nature versus nurture" question by using statistical adjustment, the reduced gradient in Brazil and Cuba represents an alternative means of testing of the null hypothesis. However, we acknowledge that the current data on this question are not conclusive given the small sample size for most of the Latin American and Caribbean studies. In this context, it is also worth noting that hypertension prevalences in eastern and northern Europe are considerably higher than those found for US Blacks (26–28), further supporting the role of environmental exposures as the primary cause of differences in prevalence among populations.

Perhaps the most unusual feature of the data presented here is the pattern of gender effects. Although the blood pressure differences among women by ethnicity were modest (3 mmHg systolic and 1 mmHg diastolic), the hypertension prevalence differential was substantial (15 percent vs. 24 percent). Likewise, the education/occupation effect was reversed by gender. None of these associations was confounded by ethnicity since they were at least as strong among Whites, and the education differential by ethnicity was small. Although the confidence intervals for some of the point estimates in the individual comparisons overlapped, the overall pattern was consistent and suggests that the socially mediated processes follow gender-specific pathways. A variety of psychological models have been proposed to explain social strata gradients, including status incongruity, "John Henryism," and personality or coping traits (7, 8, 29). We have no data based on any of these measures, however, and can only posit differences in family, work, or broader social relationships that impact differentially on men and women. As commonly observed elsewhere, men had higher blood pressures and more hypertension, particularly during middle age. Whether this finding reflects some underlying "biologic" process or social conditioning is also unknown at this time.

Since ethnicity and education are taken, at least in part, to be proxy measures of large-scale social processes, their effect on hypertension risk can be specific to the context in which they are studied. The definition of ethnicity varies among societies, and we applied the designation of ethnicity to reflect the confounding of cultural and biologic factors. Social status measures have been variously shown to have a positive, negative, or U-shaped relation to cardiovascular risk in societies across the range of economic development (7–9). To our knowledge, relatively little research has been conducted on ethnicity and education/occupation variation in health-related factors in Cuba, and there are limited precedents on which to base inferences from this study. Cuba has made substantial progress toward overcoming racial stigmatization and discrimination and maintains a high degree of equality in material living conditions among various sectors of society (30). The historical roots of racial tolerance in Cuba date back to the wars of independence, when the crucial role played by Black soldiers helped lay the foundation for a policy of greater racial inclusion in the new republic (30, 31). This process was further amplified during the period following the 1959 Cuban revolution (30, 32, 33). External evidence of this phenomenon is apparent in the low rate of migration of Afro-Cubans to the United States (34, 35). Nonetheless, as indicated by our data, the gap in social status has not been closed. We had no objective measures of racial discrimination in this survey and have no information about the potential impact of material versus psychological factors. Furthermore, even though there may be small absolute differences in social status in Cuba,

the possibility remains that relative differences are actually what count.

This study suffers from several important limitations that influence interpretation of the results. Given the modest sample size, statistical estimates of differences for some subgroups are not particularly robust. Selective nonparticipation could have biased the results, although the rate of 78 percent is currently higher than in most similar surveys in the United States. Social status could be defined in only abstract, general terms; information about purchasing power, material assets, lifestyle, and so forth, would have given more meaning to these categories. Finally, the extent to which Cuba represents an alternative social formation where the consequences of social hierarchy are different from those observed in class-based societies is difficult to quantify. Educational barriers have been eliminated and, on the basis of standard measures, a high degree of equality exists in income (36). However, the difficulty in applying such standards to Cuba becomes apparent when it is recognized that essentially all basic necessities are provided at minimal cost and the additional goods and services that circulate are very limited.

In conclusion, we have confirmed relatively narrow blood pressure/hypertension differences among persons of Black and White ethnicities in the Caribbean and have documented a social status effect that is gender specific. These findings reinforce the conclusion that the influences of sociodemographic factors are context specific. These data additionally support the idea that Black:White blood pressure differences in the United States and Europe could be the result of poorly measured environmental factors.

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