The Prevalence of Cardiovascular Risk Conditions and Awareness Among a Latino Subgroup: Dominicans in Northern Manhattan

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Objective: To determine the prevalence of cardiovascular risks and identify early opportunities for prevention among Dominican adults residing in New York City.

Study Design and Methods: A cross-sectional survey was conducted among a convenience sample of Dominicans recruited through extensive outreach in the community. All participants were interviewed and received an anthropometeric and laboratory examination pertaining to cardiovascular risk.

Results: 17% had diabetes; another 20% had impaired fasting glucose or impaired glucose tolerance; 56% had high cholesterol levels; 41% had hypertension upon examination; 75% were either overweight or obese. The Dominican diagnosed diabetes prevalence significantly exceeded comparable rates among US Latinos dominated by Mexican Americans, while their hypertension prevalence exceeded both US Latino and African American rates. Dominicans were more obese than either US Latino or African Americans, but they had the lowest proportion with high cholesterol. While >80% had a clinical encounter in the last 12 months, 29% were unaware that they had diabetes; 39% did not know they had hypertension, and 50% were unaware of their high cholesterol levels.

Conclusions: The prevalence of cardiovascular risk conditions among Dominicans in New York is higher than the rate for US Latinos for selected but not all conditions. In addition, many missed opportunities exist for prevention and early diagnosis. Future research and cardiovascular risk prevention programs need to pay attention to differences of cardiovascular risk among Latino subgroups. (*Ethn Dis*. 2008;18:342–347)

Key Words: Latino, Cardiovascular Risk, Diabetes, Hypertension, Obesity, Hypercholesterolemia, High Cholesterol

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Introduction

While we often aggregate US Latinos into one group, they are heterogeneous, including persons of different races, >19 countries of origin, and multiple generations of residence in the United States.[1] This mix of genetic, cultural, and environmental influences is likely to lead to diverse cardiovascular risk and mortality among Latino subgroups.[2–7]

Disaggregating the Latino population and assessing cardiovascular risk profiles among distinct subgroups is critical at this juncture, considering the burgeoning Latino population[1] and concomitant rise in the prevalence of obesity and diabetes.[8–11] The Dominican population is one of the fastest growing Latino subgroups,[12–13] making it imperative to understand to what extent their health risk is distinct from other Latino subgroups. There are several reasons why the Dominican cardiovascular risk might differ from other Latinos. Dominicans encompass multiple racial origins, with 10% White, 15% Black, and the rest mixed.[14] The gene pool of Dominicans differs from other Latino groups in the United States,[16] with a more mixed origin, including African (54%), Native American (33%), and European origins (12%).[15] These proportions are different from other Latino groups in the United States. Unlike the Native American gene clusters, the African and European gene clusters are much more frequently associated with obesity and diabetes in the Dominican population.[15] In addition to this potential genetic influence, Dominicans differ from other Latinos in their socioeconomic profile. Larger proportions of Dominicans have female-headed households than Mexican Americans; they are more likely to be recent immigrants; and they have lower per capita income than Cubans or Puerto Ricans.[17–18]

Based on the available data on genetic compositions and socioeconomic constraints, we hypothesized that Dominicans would have a higher cardiovascular risk burden than other Latino groups. Therefore, our study had the following objectives: 1) to determine whether or not the prevalence of diabetes and other cardiovascular risk factors among Dominicans differs from the comparable risks observed nationally for Latinos and African Americans and 2) to determine the rate of risk awareness among Dominicans who have cardiovascular risk conditions.

Methods

We conducted a cross-sectional study of Dominican adults aged ≥18 years residing in northern Manhattan, New York, in 2003–2004. The study was approved by the Columbia University Medical Center institutional review board.

Subjects and Recruitment

Census data on place of birth and information from community organizations were used to identify 20 major locations in northern Manhattan with high concentrations of Dominicans. Participants were recruited by using various methods including the distribution of information flyers, articles in local Spanish media, collaboration with community-based, social and religious

organizations, and outreach to neighborhoods, train stations, and local business establishments. The sample was recruited on a first-come, first-serve basis. An incentive of $25 was offered to individuals who completed the interview, the physical, and laboratory examinations.

The study recruited 902 individuals, of whom 785 were Dominican. Study participants were recruited from community-based organizations (22%), local businesses (26%), taxi companies (18%), street outreach efforts (18%), referral from non-relative respondents (18%), primary care clinic waiting areas (6%), and health fairs (4%). The source of recruitment was missing for 8% of the respondents.

Instruments and Measures

After written informed consent was obtained, participants were interviewed. Sociodemographic measures included age, place of birth, ethnicity and Latino subgroup, education, income, and employment. Excluding house chores, if participants reported at least one hour of physical activity per week, they were classified as active. They were asked if they had health insurance coverage and the time since their last clinical encounter. Participants were asked if a healthcare professional had ever told them that they had diabetes or high blood sugar, borderline diabetes, borderline hypertension, high blood pressure or hypertension, high cholesterol, or a heart attack or stroke.

After the initial interview, blood pressure was recorded with a digital monitor (Omron model HEM 907-XL ESH validated) as the average of three separate measurements taken one minute apart with the left arm at the heart level in the sitting position. Height and weight were measured with a standing scale. Individuals were classified as overweight if their body mass index (BMI) was 25–29 kg/m^2 and as obese if they had a BMI $\geq$30 kg/m^2. Fasting plasma glucose (FPG) and hemoglobin A1c (HbA1c) proportions[19] were measured at a LabCorp laboratory on blood samples collected after $\geq$8 hours of fasting. If there was no reported diabetes diagnosis, we also performed a two-hour oral glucose tolerance test (2-h OGTT). HbA1c levels >6% are considered abnormal. We assessed total cholesterol, triglyceride, low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol levels from the fasting blood samples.

Participants were assigned a risk status on the basis of their self-reported diagnoses or the results of the clinical examination. If participants had no previous diabetes diagnosis and normal FPG and 2-h OGTT values, they were classified as normal. Individuals with no history of diabetes were classified as having undiagnosed diabetes if they had a single elevated value of either FPG or 2-h OGTT or both.[20] We distinguished impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) results according to the recommendation of the 2003 Expert Committee on the Diagnosis and Classification of Diabetes.[20] Participants were classified as hypertensive if they previously had been told that they have high blood pressure or if the clinical examination revealed a systolic blood pressure $\geq$140 mm Hg, a diastolic blood pressure $\geq$90 mm Hg, or both. Individuals were classified as having high cholesterol if they had a self-reported history of high cholesterol or if their total cholesterol was $\geq$200 mg/dL. They were classified as having dyslipidemia if any lipid value was abnormal according to the National Cholesterol Education Program (NCEP) guidelines for low-risk individuals.[21]

Statistical Analysis

The data collected were cleaned and entered into a single database using SPSS/PC (version 13.0 SPSS, Inc, Chicago, Ill). Continuous variables were assessed by comparing means with the independent samples *t* test. Cardiovascular risk status was measured as a dichotomous variable (no/yes for the specified characteristic). These dichotomous variables were analyzed by using univariate statistical methods. Age-adjusted rates were calculated with the US 2000 standard population distribution by age, as published by the National Center for Vital Statistics.[22] Finally, we compared the diabetes and glycemia levels of the Dominican study population to levels reported for Mexican and African American populations, by the National Health and Nutrition Examination Survey 1999–2000 (NHANES IV).[11,23–26] Statistically significant differences were assessed by using the two sample *t* test, and *P* values <.05 were considered significant. Since, the NHANES 1999–2000 did not include OGTT and the NHANES III measured OGTT for participants aged $\geq$40 years only, we limited our comparison of IGT to the NHANES III and the same age group.[23]

RESULTS

Sociodemographic Characteristics

Table 1 shows the study sample was split evenly by sex and averaged 46 years of age. Their current employment rate was similar to the nationally reported rate for Dominicans (45%) and lower than the rate for US Latinos (68%).[17] An estimated one-third had less than nine years of education, comparable to the estimates among Dominicans in the nation (38%) and among all US Latinos (40%).[17] The median income was less than half the income ($29,624) reported for all Dominicans in the US and less than one-third the income ($35,929) reported for US Latinos.[17] However, 46% in our study did not report their income.

More than half of the study participants had health insurance, a little less than the coverage rate for US Latinos (68%).[18] However, despite the low level of insurance coverage, a high proportion (84%) of the sample had a clinical encounter in the prior year.

Table 1. Characteristics of a convenience sample of Dominican adults in New York City (*N*=785)

Characteristic	Value
Mean age (years)	46
Born in the Dominican Republic (%)	95
Female (%)	50
Education <9 years (%)	34
Currently employed (%)	46
Median household income ($)	13,000
Mean years living in United States	16
Married (%)	51
Has health care insurance (%)	60
Medicare/Medicaid (if insured) (%)	75
Physically active (%)	23
Mean FPG (mg/dL)	102
Mean 2-hour OGTT (mg/dL)	356
Mean systolic blood pressure (mm Hg)	129
Mean diastolic blood pressure (mm Hg)	79
Mean BMI (kg/m^2)	29

FPG= fasting plasma glucose, OGTT = oral glucose tolerance test, BMI = body mass index.

Cardiovascular Risk Profile

Table 2 shows the unadjusted prevalence of cardiovascular risks among the study sample. We found a high combined rate of undiagnosed and diagnosed diabetes (17%); including rates for IGT or IFG, the prevalence of abnormal glucose metabolism was 37%. Almost all (90%) of those with diagnosed diabetes had HbA1c >6%; 69% had levels ≥7% or more, implying poor glucose control. Among the undiagnosed, 71% had HbA1c levels >6%, with 48% at ≥7% (data not shown).

Most (80%) of those with FPG level in the diabetes range had been told that they have diabetes or borderline diabetes. The rate of awareness was similar (81%) among individuals who have both elevated FPG and HbA1c ≥6%. However, only 13% of those individuals with IGT or IFG were aware that they have borderline diabetes.

Just under half (41%) of the participants had combined diagnosed or undiagnosed hypertension. Two-thirds (63%) of those with diagnosed hypertension had elevated blood pressure on examination.

Table 2 demonstrates the low awareness rate of hypertension; close to two-thirds (63%) of the individuals who had blood pressure ≥140/90 mm Hg and only 6% with prehypertension reported being told that they have borderline hypertension or hypertension.

More than half (56%) of the study participants had combined diagnosed or undiagnosed hypercholesterolemia (Table 2). Of those who had diagnosed hypercholesterolemia, 64% had high total cholesterol. Regardless of diagnosis, 45% of our population had high cholesterol and 65% had a dyslipidemia. Only half were aware that they had high cholesterol.

Lastly, 75% of the study sample was obese or overweight. However, 41% of those who were overweight and 14% of those who were obese did not consider themselves overweight.

Table 2. Unadjusted prevalence and awareness of cardiovascular risk conditions among a convenience sample of Dominican adults in New York City (*N*=785)

Cardiovascular Risk Profile	Prevalence %	Awareness* %
Glycemia classification		
Diagnosed and undiagnosed diabetes	17	72
Diagnosed diabetes	12	–
FPG ≥126 mg/dL	11	80
IGT/IFG	20	13
Blood pressure classification		
Diagnosed and undiagnosed hypertension	41	61
Diagnosed hypertension	29	–
Blood pressure ≥140/90 mm Hg	30	63
Hyperlipidemia		
Diagnosed and undiagnosed hypercholesterolemia	56	–
Dyslipidemia†	65	–
Overall total cholesterol ≥200 mg/dL	45	50
Overall total cholesterol ≥240 mg/dL	14	60
Weight classification		
Overweight (BMI >24 kg/m^2)	42	59
Obese (BMI >29 kg/m^2)	33	86

FPG = fasting plasma glucose, IGT= impaired glucose tolerance, IFG = impaired fasting glucose, BMI = body mass index.

* Awareness is measured as having knowledge of the risk condition upon examination.

† Dyslipidemia includes total cholesterol ≥200 mg/dL or triglycerides >150 mg/dL or high-density lipoprotein cholesterol <40 mg/dL or low-density lipoprotein cholesterol >189 mg/dL.

Comparison of Dominicans to National Mexican American and African American Population

Table 3 shows that the age-adjusted prevalence of cardiovascular risk factors among Dominicans in our study was higher than the rate among Mexican

Table 3. Age-adjusted cardiovascular risk profiles by ethnicity (Dominican, Mexican Americans, African American)

Metabolic Index	Dominicans (%)	Mexican Americans (%)*	*P* value	African Americans (%)*	*P* Value
Diagnosed diabetes	13.0	10.4	<.001	11.0	.199
Undiagnosed diabetes	3.4	3.0	.582	3.6	.703
Diagnosed and undiagnosed diabetes	15.9	13.4	<.001	14.6	.077
IGT (age ≥40 only)	18.5	20.2	.488	14.0	.032
IFG	16.7	31.6	<.001	17.7	<.001
Total cholesterol ≥200 mg/dL	44.1	49.0	.006	42.0	.232
Hypertension by exam	30.8	19.1	<.001	23.6	<.001
Overweight or obese by BMI	75.8	73.4	.12	69.6	<.001
Obesity by BMI	58.2	34.4	<.001	39.9	<.001

IGT = impaired glucose tolerance, IFG = impaired fasting glucose, BMI = body mass index.
* Comparison data from the National Health and Nutrition Examination Survey (NHANES) IV, except for IGT data, which are from NHANES III.

Americans for some and lower or no different for others.[11,23–26] While Dominicans had a significantly higher rate of diagnosed diabetes than Mexican Americans ($P<.001$), the difference in the rates for undiagnosed diabetes was not statistically significant.[22] Further, the prevalence of IFG among Dominicans was significantly lower than among Mexican Americans (16.7% vs 31.6%, $P<.001$).[11] However, the difference in the prevalence of IGT was not statistically significant. (18.5% vs20%, $P=.488$).[23] The Dominicans had a significantly higher prevalence of high blood pressure[24] ($P<.001$) and obesity[26] ($P<.001$) but were less likely to have hypercholesterolemia[25] ($P=.005$) than Mexican Americans.

Dominicans also differed from African Americans on some but not all cardiovascular risks (Table 3). The two populations had similar rates of diagnosed and undiagnosed diabetes[11] and of hypercholesterolemia[25] ($P=.199$, $P=.703$, $P=.232$, respectively). However, the rates of IFG[11] or IGT[23] were lower among Dominicans than among African Americans ($P<.001$ and $P=.032$, respectively). The prevalence of hypertension among Dominicans was significantly higher than the rate among African Americans[24] (30.8% vs 23.6%, $P<.001$), and Dominicans were more obese than the African American population ($P<.001$).[26]

DISCUSSION

Compared with the overall US Latino population, which is dominated by Mexican Americans, the Dominicans in our study had a high burden with a unique pattern of cardiovascular risk conditions, with high levels of diabetes (17%), hypertension (41%), hypercholesterolemia (56%), and obesity (33%). They also had high prevalence of preclinical diabetes (IGT/IFG) and prehypertension conditions, for which screening and early intervention might delay onset of disease. Yet, awareness of risk among our sample was low. While this may be due to several factors not addressed in our study, the high rate of healthcare visits generally and specifically for the groups with IGT/IFG and prehypertension in the previous year implies the quality (not the proximity) of the interface with the healthcare system contributes to the low rates of awareness.

The patterns of clinical and preclinical cardiovascular risk conditions among our sample did not match the comparable rates for Mexican American or African American populations. The nonuniformity of risk estimate patterns between the Dominican and Mexican American populations underscores the importance of caution when generalizing risk estimates to all Latino subpopulations. The similarity of some of the cardiovascular risk estimates between Dominican and African American suggests mixed racial and genetic pressures among the Dominican subgroup. Further research might identify the combination of genetic, environmental, and cultural factors that contribute to unique patterns of cardiovascular risks.

These estimates of cardiovascular risk conditions and awareness in our study are not without limitations. The major limitation is the representativeness of our sample. Since individuals and sampling sites were not randomly selected, we might have excluded certain segments of the population. To offset potential exclusions, we conducted street outreach in local transportation hubs during rush hours and offered study activities in the evenings and on weekends. To the extent that these measures failed to capture all economic and social groups, our study cannot be generalized to the entire US Dominican population. We are fairly confident, however, that our estimate of diabetes is reasonably representative, as it is similar to the rate found by the New York City community health survey for Washington Heights/Inwood, where our study was conducted[29] as well as in a nearby Bronx community also containing many Dominicans; both surveys used random selection.[30]

We also might have upwardly biased the estimates for undiagnosed diabetes by using a one-time FPG value and for hypertension by using a one-time mea-

surement of blood pressure (albeit three readings at that single measurement).[27] However, the high rate of abnormal HbA1c among those with FPG values in the diabetes range confirms a dysregulation in glucose metabolism. While a one-time measurement might overestimate hypertension, the comparison with the NHANES 1999–2000, which used similar methods remains valid. [28]

Another limitation is the influence of incentives. The offer of free medical examination might have been particularly attractive to the 40% of the study sample who lacked health insurance and who might have considered themselves at high risk for diabetes and other conditions, spuriously giving us high estimates. We do not think this was a serious problem, because more than half (56%) of the participants in our study rated their health as good to excellent, and 39% rated their health as fair and only 5% rated their health as poor. Also, more individuals who lacked health insurance reported having good-to-excellent health (67% vs 51%). The self-rating of health as fair or good (43%) was actually slightly higher than in a comparable random sample of Dominicans in the south Bronx.[30] The influence of the monetary compensation offered to participants might overestimate or underestimate our value or give us a relative representation of the community; 90% of the participants accepted and cashed the vouchers.

In conclusion, our study highlights the need for careful assessments of cardiovascular risk patterns within distinctive Latino groups. We have shown that Dominicans in New York have higher prevalence for some but not all cardiovascular risk conditions than the Mexican American population that dominates the US Latino average. For some conditions, the Dominicans were closer in their risk profile to African Americans than to the US Latinos. Further, many were unaware of their conditions. This underscores the need for greater outreach to all Latino groups for the assessment and treatment of cardiovascular risk conditions, as well as more creativity in integrating outreach and program strategies across minority populations.

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REFERENCES

1. US Census Bureau (2000). Annual estimates of the population by sex, race and Hispanic or Latino Origin for the United States: April 1, 2000 to July 1, 2004. Available at: http://census.gov. Accessed 7/23/2007.
2. Johnson NJ, Backlund PD, Sorlie E, et al. Mortality by Hispanic status in the United States. *JAMA*. 1993;270(20):2464–2468.
3. Becker TM, Wiggins C, Key CR, et al. Ischemic heart disease mortality in Hispanics, American Indians, and non-Hispanic Whites in New Mexico, 1958–1982. *Circulation*. 1988;78:302–309.
4. Liao Y, Cooper RS, Cao G, et al. Mortality patterns among adult Hispanics: findings from the NHIS 1986 to 1990. *Am J Public Health*. 1998;88(2):227–232.
5. Abraido-Lanza AF, Dohrenwend BP, Ng-Mak DS, et al. The Latino mortality paradox: a test of the ''salmon bias'' and healthy migrant hypotheses. *Am J Public Health*. 1999;89(10):1543–1548.
6. Hunt KJ, Williams K, Resendez RG, et al. All-cause and cardiovascular mortality among diabetic participants in the San Antonio Heart Study. Evidence against the 'Hispanic paradox.' *Diabetes Care*. 2002;26(9):1557–1563.
7. Palloni A, Arias E. Paradox lost: Explaining the Hispanic adult mortality advantage. *Demography*. 2004;41(3):385–415.
8. Centers for Disease Control and Prevention. *National Health and Nutrition Examination Survey 1999–2000 data files*. Available at: http://www.cdc.gov/nchs/about/major/nhanes/NHANES99_00.htm. Accessed 7/23/2007.
9. Mokdad AH, Ford ES, Bowman BA, et al. Diabetes trends in the US: 1990–1998. *Diabetes Care*. 2000;23:1278–1283.
10. Flegal K, Carroll MD, Ogden CL. Prevalence and trends in obesity among US adults, 1999–2000. *JAMA*. 2002;288:1723–1727.
11. Cowie CC, Rust KF, Byrd-Holt DD, et al. Prevalence of diabetes and impaired fasting glucose in adults in the US population: National Health and Nutrition Examination Survey 1999–2002. *Diabetes Care*. 2006;29:1263–1268.
12. US Census Bureau. *American Community Survey. Selected Population Profile Dominican (Dominican Republic)*. Available at: http://factfinder.census.gov. Accessed 7/23/2007.
13. US Census Bureau. *Current Population Survey, March 1998 and March 2000*. Dominicans in the United States. Available at: http://www.census.gov. Accessed: 05/13/08.
14. Duany J. Reconstructing racial identity: ethnicity, color, and class among Dominicans in the United States and Puerto Rico. Race and national identity in the Americas. *Latin American Perspectives*. 1998;25(3):147–172.
15. Tajima A, Hamaguchi K, Terao H, et al. Genetic background of people in the Dominican Republic with or without obese type 2 diabetes revealed by mitochondrial DNA polymorphism. *J Hum Genet*. 2004;49:495–499.
16. Martínez-Cruzado JC, Toro-Labrador G, Viera-Vera J, et al. Reconstructing the population history of Puerto Rico by means of mtDNA phylogeographic analysis. *Am J Phys Anthropol*. 2005;128(1):131–155.
17. US Census Bureau. *2005 American Community Survey. Selected Population Profile in the United States*. Available at: http://www.census.gov. Accessed 6/14/2007.
18. DeNavas-Walt C, Proctor BD, Lee CH. *Income, Poverty, and Health Insurance Coverage in the United States: 2004*. US Census Bureau, Current Population Reports. Washington: Government Printing Office; 2005. p. 60–229.
19. Little RR. National glycohemoglobin standardization program (NGSP) perspective. *Clin Chemistry Lab Med*. 2003;1191–1198.
20. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. 2003;26(Suppl 1):S5–S20.
21. Pasternack RC. Report of the Adult Treatment Panel III. Review of the 2001 National Cholesterol Education Program guidelines on the detection, evaluation and treatment of elevated cholesterol in adults. *Cardiology Clinics*. 2003;393–398.
22. Anderson RN, Rosenberg HM. Age standardization of death rates: implementation of the year 2000 standard. *Natl Vital Stat Rep*. 1998:47(3).

23. Harris MI, Flegal KM, Cowie CC, et al. Prevalence of diabetes, impaired fasting glucose, and impaired glucose tolerance in US adults: the Third National Health and Nutrition Examination Survey, 1988–1994. *Diabetes Care*. 1998;21:518–524.
24. Qureshi AI, Suri MF, Kirmani JF, et al. Prevalence and trends of prehypertension and hypertension in United States: National Health and Nutrition Examination Surveys 1976 to 2000. *Med Sci Monit*. 2005; 11(9).
25. Ford ES, Mokdad AH, Giles WH, Mensah GA. Serum total cholesterol concentrations and awareness, treatment, control of hypercholesterolemia among US adults: findings from the National Health and Nutrition Examination Survey, 1999 to 2000. *Circulation*. 2003;107:2185–2189.
26. Flegal KM, Carroll MD, Ogden CL, Johnson CL. Prevalence and trends in obesity among US adults, 1999–2000. *JAMA*. 2002;288: 1723–1727.
27. Pickering TG, Hall JE, Appel LJ, et al. Recommendations for blood pressure measurement in humans and experimental animals. *Circulation*. 2005;111:697–716.
28. National Health and Nutrition Examination Surveys. Physician Examination Procedure Manual. Blood Pressure, Heart Rate and Pulse Measurements. P.4.1–4.11 January 2003. Available at: http://www.cdc.gov/nchs/data/nhanes/nhanes_03_04/PE.pdf. Accessed 7/7/2007.
29. Karpati A, Lu X, Mostashari F, et al. The health of Inwood and Washington Heights. *NYC Community Health Profiles*. 2003;1(24): 1–12.
30. Liao Y, Tucker P, Okoro CA, Giles WH, et al. REACH 2010 surveillance for health status in minority communities—United States, 2001–2002 surveillance summaries. *MMWR*. 2004;53(SS06):1–36.

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