Comparison of Diabetes Control Among Haitians, African Americans, and Non-Hispanic Whites in an Urban Safety-Net Hospital

VARSHA G. VIMALANANDA, MD, MPH[1]
JAMES L. ROSENZWEIG, MD[1]
HOWARD J. CABRAL, PHD, MPH[2]
MICHELE M. DAVID, MD, MPH, MBA[3]
KAREN E. LASSER, MD, MPH[4,5]

OBJECTIVE — To compare diabetes care and outcomes among Haitians, African Americans, and non-Hispanic whites.

RESEARCH DESIGN AND METHODS — We analyzed data from 715 Haitian, 1,472 African American, and 466 non-Hispanic white adults with diabetes using χ^2 testing and multiple logistic regression.

RESULTS — Haitians had a higher mean A1C than African Americans (8.2 ± 1.9 vs. 7.7 ± 2.0%) and non-Hispanic whites (7.5 ± 1.7%) (both $P < 0.0001$). There was no difference in completion of process measures. Haitians were more likely than non-Hispanic whites to have elevated LDL cholesterol or blood pressure. Macrovascular complications were fewer among Haitians than African Americans (adjusted odds ratio 0.35 [95% CI 0.23–0.55]), as were microvascular complications (0.56 [0.41–0.76]). Haitians also had fewer macrovascular (0.32 [0.20–0.50]) and microvascular (0.55 [0.39–0.79]) complications than non-Hispanic whites.

CONCLUSIONS — Haitians have worse glycemic control than African Americans or non-Hispanic whites. Future research and interventions to improve diabetes care should target Haitians as a distinct racial/ethnic group.

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There are 531,000 black individuals of Haitian ancestry living in the U.S. (1). We identified no studies of diabetes care or outcomes in this population. Thus, it is unclear whether Haitians, like African Americans, have a higher mean A1C (2), receive less recommended testing (3), or have higher rates of retinopathy (4), nephropathy (5), or lower extremity amputations (6) than whites. We analyzed data from primary care clinics in the largest safety-net hospital in Massachusetts in order to compare diabetes care and outcomes among Haitians, African Americans, and non-Hispanic whites.

RESEARCH DESIGN AND METHODS

— We conducted an observational study of subjects with diabetes who received primary care at Boston Medical Center, an urban safety-net hospital with academic primary care practices. The Boston University Medical Center institutional review board approved the study protocol. We included individuals who had at least one primary care visit yearly between 1 August 2007 and 1 August 2009, were ≥20 years old, carried a diagnosis of diabetes by ICD-9-CM billing code 250.XX or by presence on the medical record problem list, and who self-identified as either Haitian, African American, or non-Hispanic white.

The percentage of patients with poor glycemic control (A1C >9%) (7) was our primary outcome measure. Process measures included yearly testing of A1C, LDL cholesterol, and urine microalbumin in patients without nephropathy (8). We ascertained diabetic complications by ICD-9-CM codes or presence on the problem list, although we defined nephropathy as an estimated glomerular filtration rate <60 ml/min, urinary albumin-to-creatinine ratio ≥30 mg/g, or a history of kidney transplant or dialysis.

We used SAS statistical software (version 9.1; SAS Institute, Cary, NC), performing cross-tabulations with χ^2 tests where appropriate and multiple logistic regression to analyze race/ethnicity as a predictor of outcomes. Each regression model included age, sex, language, insurance type, number of primary care visits over 2 years, and having at least one visit to an endocrinologist over 2 years. In models of complication risk, we also controlled for BMI, hypertension diagnosis, and having ever smoked. We assessed each model for interactions between race/ethnicity and either sex or higher health care utilization. A similar analysis was performed to compare English- and non-English–speaking Haitians.

RESULTS

— We identified 2,653 subjects, including 715 Haitians, 1,472 African Americans, and 466 non-Hispanic whites. Thirty-two percent of Haitians were English-speaking. Haitians were of similar mean age to African Americans (58.8 ± 12.0 vs. 57.8 ± 12.5 years) and non-Hispanic whites (59.8 ± 11.8 years), but had a lower mean BMI compared with both African Americans (30.8 ± 6.0 vs. 33.8 ± 8.0 kg/m^2, $P < 0.05$) and non-Hispanic whites (33.4 ± 8.0 kg/m^2, $P < 0.05$). A history of smoking was signifi-

From the [1]Department of Medicine, Section of Endocrinology, Diabetes and Nutrition, Boston Medical Center, Boston University School of Medicine, Boston, Massachusetts; the [2]Department of Biostatistics, Boston University School of Public Health, Boston, Massachusetts; the [3]Department of Medicine, Women's Health Research Unit, Boston Medical Center, Boston University School of Medicine, Boston, Massachusetts; the [4]Department of Medicine, Section of General Internal Medicine, Boston Medical Center, Boston University School of Medicine, Boston, Massachusetts; and the [5]Department of Social and Behavioral Science, Boston University School of Public Health, Boston, Massachusetts.
Corresponding author: Varsha G. Vimalananda, varsha.vimalananda@bmc.org.
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Table 1—*Intermediate outcomes and diabetic complications by race/ethnicity*

	Haitians	African Americans	*P**	aOR (95% CI)†‡	Non-Hispanic whites	*P*§	aOR (95% CI)‖‡
n	715	1,472			466		
Intermediate outcome measures							
A1C >9% (%)	24	18	0.003	1.43 (1.04–2.00)	15	0.0002	1.67 (1.11–2.50)
LDL ≥100 mg/dl (%)	29	30	0.61	1.08 (0.80–1.45)	19	<0.0001	1.85 (1.28–2.63)
BP ≥140/80 mmHg (%)¶	51	45	0.01	1.07 (0.81–1.43)	33	<0.0001	1.85 (1.30–2.50)
Diabetic complications							
Macrovascular#	20	38	<0.0001	0.35 (0.23–0.55)	42	<0.0001	0.32 (0.20–0.50)
Microvascular**	46	59	<0.0001	0.56 (0.41–0.76)	61	<0.0001	0.55 (0.39–0.79)

**P* value for Haitians versus African Americans. †Adjusted odds ratio for Haitians versus African Americans. ‡Odds ratios adjusted for age, sex, language (English speaking/non-English speaking), and insurance type (Medicaid or Free Care, Medicare, private, and other insurance), number of primary care visits over 2 years, and having at least one endocrinologist visit over 2 years. Models for complications are additionally adjusted for BMI, diagnosis of hypertension, and ever having smoked. §*P* value for Haitians versus non-Hispanic whites. ‖Adjusted odds ratio for Haitians versus non-Hispanic whites. ¶This quality measure selected on the basis of clinical trials, which show a reduction in coronary heart disease events, stroke, and nephropathy with blood pressure <140/80 mmHg (9). #Macrovascular complications include coronary artery disease, congestive heart failure, ischemic stroke, peripheral vascular disease, and lower extremity ulcers. **Microvascular complications include retinopathy, nephropathy, and neuropathy. aOR, adjusted odds ratio; BP, blood pressure.

cantly less common among Haitians compared with African Americans (52 vs. 85%, $P < 0.05$) and non-Hispanic whites (77%, $P < 0.05$). Compared with African Americans, Haitians had lower health care utilization as measured by number of primary care visits over 2 years (9.2 ± 4.7 vs. 9.8 ± 5.9, $P < 0.05$) and the likelihood of having an endocrinologist visit (16 vs. 26%, $P < 0.05$).

The mean A1C was higher among Haitians than among African Americans (8.2 ± 1.9 vs. 7.7 ± 2.0%, $P < 0.0001$) and among non-Hispanic whites (7.5 ± 1.7%, $P < 0.0001$), and the higher risk of poor glycemic control among Haitians persisted after adjustment (Table 1). In the unadjusted analysis, Haitians had a higher risk of poor blood pressure control compared with both groups and a higher risk of poor LDL cholesterol control compared with non-Hispanic whites. After adjustment, these differences persisted in the comparison with non-Hispanic whites only. Rates of process measure completion were comparable across groups. The prevalence of retinopathy was similar across groups, but all other complications were less common among Haitians. Compared with African Americans, Haitians had lower adjusted odds ratios for macrovascular and microvascular complications (0.35 [95% CI 0.23–0.55] and 0.56 [0.41–0.76], respectively). These risks were also lower among Haitians than they were among non-Hispanic whites (0.32 [0.20–0.50] and 0.55 [0.39–0.79]). In the analysis of nephropathy alone, we found that Haitians fared better than both African Americans (0.56 [0.39–0.80]) and non-Hispanic whites (0.47 [0.31–0.70]). Creole- or French-speaking Haitians had better LDL cholesterol control than English-speaking Haitians, but in the adjusted analysis there were no differences in other outcomes. There were no significant interactions between ethnicity and either sex or health care utilization.

CONCLUSIONS — Haitians had similar rates of completed process measures but worse glycemic control compared with both African Americans and non-Hispanic whites in an urban safety-net hospital. The higher mean A1C among Haitians was evident in both the unadjusted and adjusted analyses, as were the worse lipid and blood pressure control among Haitians compared with non-Hispanic whites. Despite these findings, the rates of diagnosed and documented complications were lower in the Haitian group than in either comparison group.

We identified no other studies of diabetes care and outcomes in Haitians which with to compare these findings. Our results suggest that that worse glycemic control among Haitians may not be attributable to a language barrier or lower health care utilization. Patient-level factors, such as consumption of a traditional high-carbohydrate Haitian diet, or provider- and systems-level factors, such as limited cultural competency, may contribute to worse glycemic control among Haitians.

The finding of lower complication rates among Haitians is surprising in light of intermediate outcome measures that are worse than or similar to the comparison groups. One possible explanation is a shorter duration of diabetes among Haitians, but we cannot exclude detection bias or a higher loss to follow-up among this group. That nephropathy was also less common in Haitians is an interesting finding, because this complication was assessed primarily by results of lab testing and presence of serious complications and thus was less subject to underdiagnosis and underdocumentation.

Worse glycemic control is associated with higher risk of hypoglycemia and symptomatic hyperglycemia, and the frequency of complications among Haitians may worsen with increasing acculturation, obesity, and prevalence of diabetes. Future interventions to prevent diabetes-related morbidity and mortality and reduce health disparities should target Haitians and address the unique features of Haitian culture that may affect the course of diabetes care.

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References

1. 2006–2008 American Community Survey 3-year estimates. Table S0201. Selected population profile in the United States: Haitian [Internet], 2008 Washington, DC, U.S. Census Bureau. Available from http://factfinder.census.gov. Accessed 25 May 2010
2. Kirk JK, D'Agostino RB Jr, Bell RA, Passmore LV, Bonds DE, Karter AJ, Narayan KM. Disparities in HbA1c levels between African-American and non-Hispanic white adults with diabetes: a meta-analysis. Diabetes Care 2006;29:2130–2136
3. Schneider EC, Zaslavsky AM, Epstein AM. Racial disparities in the quality of care for enrollees in Medicare managed care. JAMA 2002;287:1288–1294
4. Harris MI. Racial and ethnic differences in health insurance coverage for adults with diabetes. Diabetes Care 1999;22:1679–1682
5. Perneger TV, Brancati FL, Whelton PK, Klag MJ. End-stage renal disease attributable to diabetes mellitus. Ann Intern Med 1994;121:912–918
6. Carter JS, Pugh JA, Monterrosa A. Non-insulin-dependent diabetes mellitus in minorities in the United States. Ann Intern Med 1996;125:221–232
7. National Committee for Quality Assurance (NCQA). *HEDIS 2009: Healthcare Effectiveness Data and Information Set*, vol. 2, *Technical Specifications*. Washington, DC, NCQA, 2008
8. National Quality Forum. *National Voluntary Consensus Standards for Adult Diabetes Care: 2005 Update: A Consensus Report*. Washington, DC, National Quality Forum, 2006
9. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ; National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; National High Blood Pressure Education Program Coordinating Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA 2003;289:2560–2572