National Prevalence of Lifestyle Counseling or Referral Among African-Americans and Whites with Diabetes

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BACKGROUND: Modifiable risk factors such as diet and physical activity contribute to racial disparities among patients with diabetes. Despite this, little is known about how frequently physicians provide counseling or referral to address these risk factors, or whether such rates differ by patient race.

METHODS: We analyzed cross-sectional data from the 2002–2004 National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey. We used logistic regression to investigate the relationship between counseling/referral for nutrition or exercise and patient factors, provider factors, and geographic location, with a focus on whether counseling rates were independently associated with patient race.

RESULTS: Overall, counseling/referral for nutrition occurred in 36% of patient visits and counseling/referral for exercise occurred in 18% of patient visits. After adjusting for patient, physician, and practice characteristics, there was no statistically significant association between race and counseling/referral for nutrition (odds ratio for African-Americans compared to whites [OR] 1.00, 95% confidence intervals [CI] 0.71–1.41) or for exercise (OR 0.74, CI 0.49–1.11). Significant predictors of counseling/referral for both lifestyle interventions included younger patient age, private insurance, and treatment by a primary care provider.

CONCLUSIONS: Rates of lifestyle modification counseling/referral were similarly low among African-Americans and whites in this national study. Our results highlight a need for interventions to enhance physician counseling for patients with diabetes, particularly those at high-risk for diabetes-associated morbidity and mortality, such as racial/ethnic minorities.

KEY WORDS: diabetes; race & ethnicity; practice variation; patient education; disparities.

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INTRODUCTION

Diabetes is increasingly common and accounts for a significant degree of morbidity and mortality in the United States.¹ Although diabetes poses considerable burden among persons of all races, African-Americans bear a disproportionate burden of diabetes compared to whites, including a higher incidence and prevalence of disease, worse diabetes control, higher rates of diabetic complications, and worse control of co-morbid conditions (e.g., dyslipidemia, hypertension and obesity).^{1–4}

The reasons for these disparities are complex and include patient, provider and health system-level factors.⁵ For example, lower utilization of health-promoting behaviors (e.g., healthy diet and exercise) among African-Americans⁶ can contribute to diabetes disparities and reflect patient-level factors such as cultural beliefs or access to safe recreational facilities,^{7–8} physician-level factors such as skill at lifestyle counseling,⁹ and health system-level factors such as the availability of nutritionists and regional practice variation.

While patient-level barriers to lifestyle modification have been investigated as potential sources of health disparities,¹⁰ less attention has been given to physician-level factors. This is important because lifestyle modification through nutrition and exercise can improve diabetes outcomes,^{11–13} and there is some evidence that primary care-based counseling can enhance lifestyle modification.¹⁴ Yet, studies have documented the underuse of lifestyle modification counseling in ambulatory care settings.^{15–18}

There has been little exploration of whether counseling frequency varies by patient race, and there is conflicting evidence within this literature. For example, one study reported that African-Americans were more likely to receive lifestyle counseling,¹⁵ while another study of obese persons reported statistical trends for whites to receive such counseling more often.¹⁸ We are unaware of prior research exploring similar variations in physician practice patterns among patients with diabetes.

We sought to provide a more current assessment of national patterns of physician counseling or referral for nutrition and

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Table 1. Characteristics of Patient Visits, with Bivariate Comparisons by Race (N=6852)*†

	Total	White	African-American	Other‡	Bi-variate p-value§
Age (yrs)					0.02
18–44	9.3	9.1	9.9	10.5	
45–64	40.0	37.9	49.8	39.0	
65–74	25.5	25.9	24.0	25.9	
>75	25.3	27.2	16.3	24.7	
Gender					<0.01
Female	54.5	53.0	63.0	50.9	
Male	45.5	47.0	37.0	49.1	
Insurance type					<0.001
Private	39.5	39.8	38.7	37.8	
Medicare	45.3	47.5	37.3	38.2	
Other	15.2	12.7	24.1	24.0	
Number of diabetes complications					0.07
0	75.4	74.2	80.6	77.3	
1 or more	24.6	25.8	19.4	22.7	
Co-morbidity (Charlson score)					<0.001
0	11.5	13.2	5.1	6.6	
1	73.0	72.0	76.6	77.0	
2 or more	15.5	14.8	18.2	16.4	
Number of diabetes co-morbidities					0.02
0	57.4	59.8	46.1	56.9	
1	32.5	31.0	39.8	31.5	
2 or more	10.2	9.2	14.1	11.6	
Visit w/ established primary care provider (PCP)					0.13
Yes	62.1	60.9	68.2	61.8	
No	37.9	39.1	31.8	38.2	
Provider type					0.10
Physician + other allied health care provider (e.g., nurse practitioner)	34.8	33.2	37	48.6	
Physician only	65.2	66.8	63	51.4	
Specialty type					0.03
Subspecialist	36.6	39.2	32.1	33.4	
Primary care	63.4	60.8	67.9	66.6	
Visit reason					0.61
Acute or perioperative care	33.1	32.5	34.2	37.8	
Chronic or preventive care	66.9	67.5	65.8	62.2	
Number of patient visits in past year					0.02
0–2	63.1	61.7	65.4	65.0	
3 or more	30.1	32.0	24.7	25.5	
Region					<0.001
Northeast	20.1	21.1	16.5	10.0	
Midwest	23.9	26	16	11.2	
South	39.7	38	41.6	9.3	
West	16.4	14.9	26	69.5	

*percentages reflect weighted patient visits

†percentages may not total 100% due to unavailable data

‡includes Asians, Native Hawaiian/Other Pacific Islanders, and American Indians/Alaskan Natives

§comparing all three racial categories

exercise in clinic visits for patients with diabetes, using a large nationally representative survey of outpatient visits in the United States. We were particularly interested in whether there were variations in practice patterns between visits by African-Americans and whites.

METHODS

Data and Participants

We used the 2002–2004 National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS). Conducted by the National Center for Health Statistics (NCHS), these datasets utilize multi-stage probability designs to sample non-federally employed US physicians working in outpatient settings. Patient visits during a randomly selected week are sampled for participating

physicians each year, and physicians complete NAMCS encounter forms detailing clinical services provided, medications, diagnoses and patient demographics. Visit weights were calculated for each patient visit based on the sampling rates of physician practices and patient visits, and adjusted for non-response. Statistical aggregation using these visit weights allows extrapolation so that practice patterns and the volume of patient visits can be estimated at a national level.

We included visits with a diagnosis of diabetes, as defined by International Classification of Diseases-9-Clinical Modification (ICD-9) codes for diabetes (250.00 – 250.91 and 362). We were interested in the practice patterns of physicians who care for adult populations, and consequently limited our sample to patient visits by persons aged 18 years and older. The focus of this study was on potential differences in the care between African-Americans and non-Hispanic whites. Because Hispanic status was categorized as an ethnicity rather than a race,

Table 2. Predictors of Nutrition Counseling or Referral

	National estimates (millions)	Percent counseled or referred	Bivariate p-value	Adjusted OR, 95% CI
Race			0.09	
Non-Hispanic white	102.1	35.1		Referent
African-American	21.5	40.9		1.00 (0.71, 1.41)
Other [†]	7.3	49.3		1.54 (0.80, 3.00)
Age (yrs)			<0.001	
18–44	12.2	41.8		Referent
45–64	52.4	42.4		0.83 (0.56, 1.23)
65–74	33.4	36.0		0.87 (0.55, 1.37)
>75	33.1	27.2		0.70 (0.43, 1.15)
Gender			0.79	
Women	71.3	36.6		Referent
Men	59.6	37.2		0.95 (0.79, 1.14)
Insurance type			<0.001	
Private	51.7	44.2		Referent
Medicare	59.3	30.5		0.66 (0.49, 0.89) [§]
Other	19.9	37.0		0.69 (0.52, 0.92) [‡]
Number of diabetes complications			<0.001	
0	98.7	42.9		Referent
1 or more	32.2	18.5		1.25 (0.78, 2.02)
Co-morbidity (Charlson score)			<0.001	
0	15.1	5.8		Referent
1	95.6	43.2		4.45 (2.18, 9.04)
2 or more	20.3	30.4		4.18 (1.90, 9.19)
Number of diabetes co-morbidities			<0.001	
0	75.1	27.7		Referent
1	42.5	46.9		1.51 (1.22, 1.87)
2 or more	13.4	57.2		2.09 (1.45, 3.00)
Visit w/ established primary care provider (PCP)			<0.001	
No	49.6	19.2		Referent
Yes	81.3	47.6		1.73 (1.10, 2.74) [‡]
Provider type			0.09	
Physician + other allied health care provider	85.3	34.1		Referent
Physician only	45.6	42.1		1.44 (0.98, 2.11)
Specialty type			<0.001	
Subspecialist	47.9	18.9		Referent
Primary care	83.0	47.6		1.92 (1.08, 3.39) [‡]
Visit reason			0.23	
Acute or perioperative care	43.3	34.3		Referent
Chronic or preventive care	87.6	38.2		1.15 (0.87, 1.53)
Number of visits in past year			0.001	
0–2	82.6	41.6		Referent
3 or more	39.4	29.0		0.85 (0.66, 1.11)
Region			0.43	
Northeast	26.3	34.6		Referent
Midwest	31.2	32.6		0.95 (0.61, 1.49)
South	52.0	38.9		1.19 (0.73, 1.93)
West	21.5	41.2		1.27 (0.79, 2.04)

*National estimates extrapolated from estimated percentages

[†]includes Asians, Native Hawaiian/Other Pacific Islanders, and American Indians/Alaskan Natives

[‡]p<0.05, [§]p<0.01, ^{||}p≤0.001

consistent with the U.S. Census, we excluded all Hispanics from the study.

Outcomes and Statistical Methods

We first conducted descriptive analyses of the patient visits, and then compared the proportions of demographic characteristics among the different racial groups (African-American, white and 'other') using Chi-squared tests of proportions. We defined our outcome variables as "counseling/referral for nutrition" or "counseling/referral for exercise" as documented by the NAMCS encounter form. Physicians marked boxes for "diet/nutrition" or "exercise" if the service was either provided (counseling) or ordered (referrals) during the patient visit.

Using Chi-squared tests of proportions, we then examined the bivariate association between patient-level factors (race, age, gender, insurance type, diabetes complications, co-morbid illnesses), physician-level factors (visit with established primary care physician [PCP], specialty type, provider type), clinical care characteristics (reason for visit, frequency of patient visits, clinic visit duration) and a health system-level characteristic (geographical location), and each outcome of interest. We defined 'visit with established PCP' as whether the patient was seen by their established primary care provider (vs. a covering physician) during the clinic visit. Physician 'specialty type' dichotomized physicians into primary care fields (internal medicine, geriatrics, family practice, general practice) or subspecialties. We dichotomized provider type into

Table 3. Predictors of Exercise Counseling or Referral

	National estimates* (millions)	Percent counseled or referred	Bivariate p-value	Adjusted OR, 95% CI
Race			0.41	
Non-Hispanic white	102.1	18.4		Referent
African-American	21.5	17.8		0.74 (0.49, 1.11)
Other†	7.3	28.5		1.37 (0.70, 2.71)
Age (yrs)			<0.001	
18–44	12.2	26.4		Referent
45–64	52.4	21.7		0.62 (0.39, 0.96)‡
65–74	33.4	17.9		0.64 (0.40, 1.02)
>75	33.1	12.7		0.51 (0.28, 0.91)‡
Gender			0.19	
Women	71.3	17.7		Referent
Men	59.6	20.3		1.09 (0.85, 1.40)
Insurance type			<0.001	
Private	51.7	24.0		Referent
Medicare	59.3	14.6		0.70 (0.47, 1.05)
Other	19.9	18.3		0.69 (0.47, 1.00)‡
Number of diabetes complications			<0.001	
0	98.7	22.9		Referent
1 or more	32.2	6.6		1.03 (0.64, 1.68)
Co-morbidity (Charlson score)			<0.001	
0	15.1	2.0		Referent
1	95.6	23.4		4.91 (1.65, 14.59)§
2 or more	20.3	10.3		3.35 (1.00, 11.19) ‡
Number of diabetes co-morbidities			<0.001	
0	75.1	12.0		Referent
1	42.5	25.0		1.72 (1.28, 2.31)¶
2 or more	13.4	38.1		2.88 (1.82, 4.55)¶
Visit w/ established primary care provider (PCP)			<0.001	
No	49.6	9.1		Referent
Yes	81.3	24.8		1.46 (0.87, 2.43)
Provider type			0.14	
Physician + other allied health care provider	85.3	16.7		Referent
Physician only	45.6	22.9		1.49 (0.91, 2.45)
Specialty type			<0.001	
Subspecialist	47.9	8.4		Referent
Primary care	83.0	25.2		1.84 (0.95, 3.53)
Visit reason			0.51	
Acute or perioperative care	43.3	17.7		Referent
Chronic or preventive care	87.6	19.5		1.08 (0.77, 1.52)
Number of visits in past year			0.14	
0–2	82.6	20.6		Referent
3 or more	39.4	16.3		1.04 (0.75, 1.45)
Region			0.06	
Northeast	26.3	14.4		Referent
Midwest	31.2	14.8		1.06 (0.56, 2.00)
South	52.0	21.3		1.65 (0.89, 3.06)
West	21.5	24.7		1.89 (1.08, 3.28)‡

*National estimates extrapolated from estimated percentages

†includes Asians, Native Hawaiian/Other Pacific Islanders, and American Indians/Alaskan Natives

‡ $p < 0.05$, § $p < 0.01$, ¶ $p \leq 0.001$

physician-only care versus care provided by a physician and another allied health care provider (e.g., nurse practitioner). Since we were primarily interested in assessing differences between African-Americans and non-Hispanic whites, we combined the other race categories (Asian, Native Hawaiian/Other Pacific Islander, American Indian/Alaska Native) together in our analyses even though those racial groups are diverse. We measured diabetes complications as a count of renal, ophthalmic, neurological, or peripheral vascular disease diagnoses based on ICD-9 codes. Co-morbid illness was measured using both a modified Charlson index,¹⁹ to assess overall health status and short-term mortality, and an index of diabetes co-morbid conditions to assess the burden of diabetes-related chronic disease and accumulated cardiovascular

risks. We included the diabetes co-morbid conditions of hypertension, dyslipidemia, obesity, atherosclerosis and coronary artery disease as identified from ICD-9 codes. All analyses accounted for the survey sampling design through incorporation of sampling strata and clusters, as well as weights that adjusted for differential probability of selection. Specifically, we used the ultimate cluster design variables, CSTRATM and CPSUM, which apply to both surveys. Standard errors were computed using the Taylor linearization method.²⁰ Statistical analyses were performed using Stata 9.0 (StataCorp LP, College Station, TX, 2007).

Finally, we used logistic regression to examine the multivariate association between each predictor variable and our outcome of interest. Because our primary goal was to assess

the effectiveness of the covariates in predicting physician counseling/referral patterns (rather than building the most efficient model), we retained all covariates in the final model because of their conceptual significance. However, we compared the goodness of fit of models including only statistically significant covariates with the full model. We used STATA 9.0 for all analyses and defined statistical significance as $p < 0.05$.

RESULTS

There were 6852 patient visits in our study sample; nearly two-thirds were made by non-Hispanic whites (69%), 26% by African-Americans and 5% by persons racially categorized as "other" (Table 1). The majority of patient visits (85%) were by persons with private insurance or Medicare as their primary insurance source, and 75% of the patients had no documented diabetes complications. Differences exist by race for most of the demographic characteristics of the patient visits, including age, gender, insurance, diabetes complications, comorbid illnesses, diabetes comorbidities, provider type, number of visits and geographic location. Overall, nutrition referrals or on-site counseling occurred in 37% of patient visits (an estimated 48.4 million visits) and counseling for exercise occurred in 19% of visits (an estimated 24.9 million visits).

Bivariate Predictors of Counseling/Referral

In the bivariate analysis, race was not associated with the receipt of lifestyle modification counseling/referral (Tables 2, 3). Predictors of nutrition counseling/referral in a patient visit included age, insurance type, diabetes complications, co-morbid illness, being seen by the patient's established PCP, being seen by a primary care physician (rather than a subspecialist) and the number of patient visits in the prior year ($p < 0.001$ for each covariate) (Table 2). For example, compared with those with no diabetes-related comorbid illnesses, patient visits for persons with two or more such co-morbidities had statistically higher rates of nutrition counseling/referral (57% vs. 28%, $p < 0.001$).

Predictors of exercise counseling/referral included age, insurance type, diabetes complications, co-morbid illness, being seen by the patient's established PCP, and being seen by a primary care physician (rather than a subspecialist) ($p < 0.001$ for each covariate) (Table 3).

Multivariate Predictors of Counseling/Referral

After adjusting for potentially confounding covariates, African-Americans had similar rates of counseling/referral as Whites for both nutrition (OR 1.00, 95% CI 0.71–1.41) and exercise (OR 0.74, CI 0.49–1.19) (Tables 2, 3). We also found that select racial subpopulations (e.g., older African-Americans) also had similar rates of counseling in their clinic visits (data not shown).

There were, however, greater rates of counseling/referral for nutrition during visits made by persons with private insurance or with more co-morbid conditions, or who were being seen by a primary care physician (vs. subspecialist) or their established PCP (vs. a covering physician) (Table 2). Patient visits by persons who were younger, had private insurance, had more co-morbid conditions or lived in the western region of the USA had a greater likelihood of counseling/referral for exercise

(Table 3). Patient visits for persons with a moderate degree of co-morbid illnesses (as measured by a Charlson index of 1) had the highest odds of both nutrition and exercise counseling/referral, in comparison to patient visits by persons with a lower degree of co-morbid illness (index of 0) and patient visits by persons with a higher degree of co-morbid illness (index of 2 or more) (Tables 2, 3).

DISCUSSION

National guidelines from expert panels and major health organizations, such as the US Preventive Services Task Force and American Diabetes Association, recommend behavioral counseling to promote healthy eating and physical activity, especially for patients with diabetes and other cardiovascular risk factors.^{21,22} In this nationally representative study, we found low rates of physician counseling/referral for nutrition and exercise in primary care visits among patients with diabetes. To our knowledge, this is the first study to assess primary-care based lifestyle counseling patterns since the release of the 2001 report 'The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity'.²³ Despite increased national attention on lifestyle modification to reduce the prevalence of obesity and obesity-related diseases such as diabetes, our findings were comparable to studies that reported nutrition counseling rates of 35%–45% and exercise counseling rates of 25%–30% before the release of the Surgeon General's report.

We were particularly interested in whether physician counseling/referral patterns varied by patient race. To our knowledge, this is the first study that explores such potential variation among patients with diabetes. Our unadjusted and adjusted analyses did not identify any racial differences in the receipt of counseling/referral for lifestyle modification. The absence of such a disparity is reassuring, but raises the question of whether equity in diabetes processes of care is an appropriate goal given the pernicious racial disparities in diabetes outcomes. Some have argued that 'African-American race' itself is a predictor of worse diabetes outcomes (and a proxy for unmeasured covariates such as provider trust and cultural barriers), independent of other clinical and demographic factors.²⁴ As such, public health targeting of high-risk groups, such as African-Americans, for lifestyle modification in both clinical and community settings may help reduce diabetes health disparities.

We did identify several important predictors of physician counseling/referral for lifestyle modification in clinic visits among patients with diabetes, including other patient-level factors (i.e., having private insurance, having an increased number of co-morbid illnesses, and being younger) and physician-level factors (i.e., being seen by a primary care physician and being seen by one's established PCP). By far, co-morbid illness as represented by the Charlson Co-morbidity Index was the strongest predictor of physician behavior; visits by patients with a Charlson co-morbidity index score of 1 had a higher odds of counseling than those by patients with either a score of 0 or a score of 2 or more.

This pattern may reflect the fact that persons with more than one cardiovascular risk factor have multiple triggers for lifestyle modification counseling, yet patients with an overwhelming number of co-morbid conditions may have unaddressed med-

ical needs due to time constraints within the clinical encounter,²⁵ a lower feasibility of lifestyle modification being achieved, and a lower likelihood of modification leading to meaningful changes in diabetes-related morbidity and mortality.

In addition, our findings underscore the importance of primary care physicians and continuity of care to the receipt of lifestyle counseling by patients with diabetes. For example, patient visits to primary care doctors (vs. subspecialist physicians) had a 92% increased odds of having nutritional counseling/referral, and patient visits to established PCPs (vs. covering physicians) had a 73% increased odds of having such counseling/referral services. Although some patients with diabetes are cared for exclusively by endocrinologists, our research lends support to the crucial role of primary care in diabetes management.

Our study also has several limitations. First, since our data were based on physician self-report, rates of counseling may not accurately assess actual practice. In addition, because we do not have information about the appropriateness, content, or intensity of counseling, we were unable to examine whether there were racial differences in the quality of counseling that patients receive. Second, we found lower proportions of clinic visits by vulnerable populations in our sample (e.g., the uninsured and those seeking care at community health centers [CHCs]) than those provided in other national estimates.²⁶ For example, only 1.5% of the patient visits in our study were made at CHCs, in comparison to 4.1% of visits nationally.²⁷ Among CHC visits, 20% were made by African-Americans, in comparison to other estimates of approximately 25%.²⁸ Consequently, our findings may not be generalizable to the most vulnerable African-American patients, who typically receive fewer health services.

Nonetheless, our study has several strengths. First, our data are nationally representative and allow us to draw conclusions about patterns of care throughout the USA. Second, we were able to adjust for important clinical factors, physician characteristics and geographic location, all of which may affect physician counseling/referral practices in the outpatient setting.

CONCLUSIONS

Rates of physician counseling/referral for nutrition and exercise are moderately low in clinic visits by patients with diabetes. Given the potential benefit from lifestyle modification, and evidence supporting the efficacy of primary care-based interventions, there is a need to identify mechanisms to enhance the delivery of nutrition/exercise counseling to patients with diabetes in the outpatient setting. Reassuringly, our study suggests that, among patients with insurance and a secure medical home, differences in physician counseling based on patient race may not exist. Nevertheless, given the greater burden of diabetes among African-Americans and other racial/ethnic minorities relative to whites, efforts are needed to maximize the yield that lifestyle interventions can provide among these populations.

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Conflicts of Interest: None disclosed.

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