Original Reports: Diabetes Across the Generations

Cultural Orientation and Diabetes Self-Care in Low-Income African Americans with Type 2 Diabetes Mellitus

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Objectives: The purpose of the study was to examine the relationships between cultural variables and diabetes self-care behaviors and glycemic control among African Americans with type 2 diabetes.

Design: Cross-sectional survey.

Methods: Questionnaires assessing traditional African-American cultural orientation, ethnic identity, self-identification, and diabetes self-care were administered to a sample of 94 low-income, African-American, inner-city hospital outpatients with type 2 diabetes. Participants were predominantly female (64%), with an average age of 53 years, and most had attained less than or equal to a high school education (66%).

Results: No significant relationships were found among ethnic identity, self-identification, glycemic control, and diabetes self-care behaviors. Traditional African-American cultural orientation was significantly associated with decreased dietary adherence scores ($P<.03$). Increased scores on cultural mistrust were related to decreased dietary adherence scores ($P<.002$). Traditional food practices showed a non-significant trend toward decreased dietary adherence in conjunction with number of dependents and income ($P<.055$).

Conclusions: Traditional African-American cultural orientation was found to be associated with decreased dietary adherence scores in a sample of urban African Americans with type 2 diabetes. Assessment of the cultural orientation of African-American patients has the potential to assist providers in designing culturally tailored, diabetes-specific dietary interventions. (*Ethn Dis*. 2003;13:6–14)

Key Words: African-American, Diabetes Mellitus, Acculturation

Introduction

African Americans are over-represented among type 2 diabetes patients.[1] African Americans over the age of 45 have a 1.4- to 2.4-fold increase in the incidence and prevalence of type 2 diabetes compared to Whites.[1,2] African Americans show higher glycemic levels and higher rates of diabetes-related complications (eg, increased incidence of microalbuminuria and kidney disease, longer duration of kidney disease, greater likelihood of retinopathy, greater incidence of diabetes-related amputations, and greater incidence of end-stage renal disease).[3–9] These complications pose considerable medical and psychosocial challenges for individuals, families, and communities who manage diabetes treatment regimens.

Although health disparities between Whites and minorities are well-documented in the diabetes epidemiologic literature, the mechanisms underlying these trends are less well understood. Genetic models such as the "thrifty gene" have been proposed to account for the increased risk of obesity as well as the differential rates of prevalence of obesity and morbidity from obesity-related conditions found among African Americans.[9–11] Other work has documented disparities in lifestyle behaviors among Whites and African Americans with and without diabetes with respect to exercise[12–13] and high-fat food patterns.[14–15] The extent to which culture may play a role in patient self-care behaviors has received less attention. Culture influences every aspect of the disease experience: the identification of a set of physical or emotional experiences as a "problem," causal attributions about disease, the labeling and experience of symptoms, and formulation of treatment.[16–17] Culture also forms the framework for patient understanding of self-care recommendations, as well as for the daily implementation of these recommendations.[18] Careful assessment of the ethnic-cultural background of research participants is necessary to better understand culture by illness interactions.[19]

The purpose of the present study was to examine the association of cultural variables with self-care behaviors and with glycemic control in a sample of African-American patients with type 2 diabetes. Three variables of cultural orientation were examined in relation to diabetes self-care behaviors: African-American cultural orientation or acculturation, ethnic identity, and ethnic self-identification. Acculturation is defined as culturally related beliefs, attitudes, and practices that are consistent with an individual's ethnic group.[20–22] Such attitudes and practices are proposed to be

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reflective of the individual's ethnic orientation, which may change over time as a function of inter-cultural contact.

Ethnic identity has been defined as the individual's internalization of his ethnic group into overall identity.[23–24] As a component of self-concept, ethnic identity may be manifest in a variety of cultural practices, beliefs, and ethnic pride. Ethnic identity is considered to develop along with an individual's overall identity during adolescence and young adulthood, but to remain relatively stable following identity formation.

Ethnic self-identification is defined as the process of labeling oneself in terms of ethnic group(s). Naming one's group(s) is an index both of the way one perceives oneself, and of the expectations of others.[25–26] Self-identification as a social process of labeling oneself to others may be distinguished from ethnic identity as an intra-psychic construct.[25–26]

Various studies have examined the association of cultural variables and self-care behaviors among African Americans in the general population. Traditional African-American cultural orientation (acculturation) has been associated with increased risk for cigarette smoking, decreased HIV knowledge, increased alcohol abstinence, and increased hypertension.[27–29] Ethnic or cultural identity has been associated with choosing lower fat diets, higher socioeconomic status, non-smoking, increased alcohol abstinence, and higher degree of leisure time activity among African Americans.[30] The relationship between cultural variables and diabetes self-care behaviors has not been explored previously among African Americans with type 2 diabetes. This study contributes to the literature by examining this relationship in a sample of African Americans currently diagnosed with type 2 diabetes, who are at risk for the development or exacerbation of diabetes complications.

METHODS

African-American patients with type 2 diabetes attending primary care or diabetes clinic appointments from 2 medical centers in the northeastern United States were asked to participate in a cross-sectional, interview-based study (N=94) between June 1998 and March 1999. Each medical center serves a substantial African-American patient population, ranging from 17% to 67% of all clinic patients. Patients were eligible for study participation based on the following criteria: adults with a diagnosis of type 2 diabetes mellitus as found in the patient medical record, identified as 'Black' or 'African-American' by hospital racial categorization, and with English as a primary language.

Procedures

Patients meeting study eligibility criteria were identified by clinic staff and the study purpose, procedures, benefits, and potential harm to patients were explained. Informed consent forms were read to and signed by patients who agreed to participate. Patients received $10.00 for their participation. Participants met with the research assistant following their clinic visit or at an alternate date to complete the questionnaires. Appointment times were scheduled as close to the date of contact as possible.

Measures

The following measures were administered to patients who consented to study participation.

Cultural Variables

Measures designed to assess individual orientation to each of these constructs were used in the current study as described below.

African-American Acculturation Scale—33. (AAAS-33)[31] is a 33-item measure of traditional African-American cultural beliefs, values, and practices. Ten domains were measured: Preference for Things African-American (eg, "Most of the music I listen to is by Black artists," 6 items); Religious Beliefs/Practices (eg, "The church is the heart of the Black community," 6 items); Traditional Foods (eg, "I know how long you're supposed to cook collard greens," 4 items); Traditional Childhood (eg, "I went to a mostly Black high school," 3 items); Superstitions (eg, "I avoid splitting a pole," 3 items); Interracial Attitudes/Cultural Mistrust (eg, "IQ tests were set up purposefully to discriminate against Black people," 3 items); Falling Out (eg, "I know what 'falling out' means,'' 2 items); Traditional Games (eg, "When I was a child, I used to play tonk," 2 items); Traditional Family Values (eg, "Old people are wise," 2 items); and Family Practices (eg, "When I was young, my parents sent me to stay with a relative for a few days or weeks," 2 items). Items were rated on a 7-point Likert scale (1=totally disagree; 7=strongly agree). A subscale score for each domain was calculated by summing domain items. All items were summed to form a total score (scale range: 33–231). Higher scores indicated orientation toward traditional African-American culture. The scale has shown acceptable levels of reliability and validity in a validation sample (N=298) drawn from the community.

Cronbach alpha values ranged from .81 for the total scale to .44–.83 for individual subscales.[31]

Multigroup Ethnic Identity Measure. (MEIM)[26] is a 23-item scale designed to measure 4 components of ethnic identity: self-identification; ethnic behaviors and practices; affirmation and belonging; and ethnic identity achievement. Two subscales are computed from the

23 items: Ethnic Identity, comprised of 14 items (eg, "I have a clear sense of my ethnic background and what it means for me"), and Other-Group Orientation, comprised of 6 items (eg, "I don't try to become friends with people from other ethnic groups"). Items are scored on a 4-point scale, with a score of 4 indicating 'strong agreement' and a score of 1 indicating 'strong disagreement.' Items were summed and divided by the number of items in each scale to form mean scores (scale range: 1–4). Higher total scores indicate higher levels of ethnic identity. The scale has shown acceptable levels of reliability and validity in high school and college aged samples (N=136).[26] Cronbach alpha values indicated good internal consistency for the Ethnic Identity (.81–.90) and Other-Group Orientation (.75–.86) subscales for each sample.[26]

Self-Identification. Items measuring ethnic self-identification included in the MEIM and AAAS-33 were used in analyses to measure the construct of Self-Identification. Two open-ended questions were posed at the beginning of the interview for participants to name their primary and secondary ethnic groups ("In terms of your ethnic group, what do you consider yourself to be? If you had to choose a second word or term to describe your ethnic group, what would you say it would be?"). Data from the narrative questions were recorded verbatim. Thirty-two ethnic group labels were generated in response to the narrative ethnic self-identification questions. Labels were analyzed for the presence of themes. Four themes were identified from the 32 labels: *Black American or Derivative* in which the participants referred to their ethnic group as Black, African-American, or Negro; *Mixed Labels* in which participants used 2 or more terms to describe their ethnic origins (eg, Black Hispanic); *National Labels* in which participants identified their ethnic origins in terms of national boundaries (eg, Panamanian); and *Generic Labels* in which participants identified with a term not conventionally used to describe ethnicity (eg, American).

Adherence to Diabetes Self-Care Behaviors

The Summary of Diabetes Self-Care Activities Questionnaire (SDSCA)[32] is a 12-item self-report measure of adherence to self-care behaviors during the preceding 7 days. Five self-care domains were assessed: diet amount (2 items); diet type (3 items); exercise (3 items); self-monitored blood glucose testing (2 items; SMBG); and diabetes medication (1–2 items). Items from this measure are shown in the Appendix. Raw scores for each item were standardized to z scores. Standardized scores for each behavior were then averaged to form subscale scores (scale range: −2.0 to 2.0). The scale has been validated on samples of type 1 and type 2 diabetes patients.[32–33] Internal consistency coefficients have ranged from .55–.91 for dietary amount, adherence to exercise, and adherence to SMBG subscales for both samples.[32]

Disease Variables

Clinical diabetes data were gathered from patient medical records, including diabetes diagnosis, duration of diabetes, prescribed diabetes treatment (eg, insulin alone, oral agents alone, insulin and oral agents, diet controlled), glycated hemoglobin, and number of clinic and emergency room visits in the preceding year. Glycated hemoglobin (HbA_{1c}) was assessed using the agarose gel electrophoresis method.[34] Values were recorded from medical records for the year prior to the study visit. The mean value over that period for each patient was used in analyses.

Demographic Variables

Demographic information was collected to assess patient characteristics, including age, monthly household income, number of dependents, and level of education.

Statistical Analyses

Chi-square and analysis of variance statistics were used to compare group differences for participation, data collection site, and categories of ethnic self-identification. Cronbach alpha correlation coefficients were calculated to evaluate internal scale reliability. Multiple regression analyses were used to examine the association of ethnicity variables, diabetes self-care behaviors, and glycemic control. Age, income, number of dependents, education, and type of treatment were entered into the regression models as covariates. Analyses were conducted using SAS Version 6.12.[35] Alpha levels for planned analyses were set at the $P<.05$ level. In order to account for family-wise error, Bonferroni correction was calculated for post-hoc tests.[36] A corrected alpha level of $P<.005$ was used to assess statistical significance for post-hoc tests. Effect size estimates for multiple regression analyses (f^2) were computed.[37]

RESULTS

A total of 220 African Americans with diabetes were approached, of whom 102 agreed to participate (recruitment rates: 46% Boston Medical Center; 50% Baystate Medical Center). Ninety-four of the 102 consenting patients were diagnosed with type 2 diabetes according to the medical record, and the remainder (N=8) with type 1 diabetes. Analyses were conducted on a total sample of 94 patients with type 2 diabetes. Comparison of participants and non-participants showed no significant differences between the 2 groups by gender (chi-square=.58, P=.44); age (t=.88, P=.37); or patient-endorsed duration of diabetes (t=−.35, P=.72).

The mean age of study participants was 53 years (SD 11.9; range: 25–84). Sixty-four percent of patients were female, and 28% received a high school education, with the largest group of participants receiving some high school or

less (46%). Participants varied in their reports of marital status (single 20.9%, partnered or married 36.3%, divorced/separated 26.4%, widowed 16.5%). Twenty-six percent of participants worked outside the home. The average household monthly income was $905 (SD $668), supporting 2.4 (SD 1.7) people per household. Mean duration of diabetes was 8.8 years (SD 6.6 years). Average glycated hemoglobin values for the year prior to study participation was 8.6% (SD 2.7%; normal range: 4.1%–6.2%). Evaluation of prescribed diabetes treatment indicated that 37.2% were prescribed oral agents alone, 44.7% were prescribed insulin injections, 11.7% were prescribed insulin injections and oral agents, and 6.4% were prescribed dietary recommendations alone. Mean body mass index (kg/m^2) was 32.7 (SD 8.7).

Distribution of self-identified ethnic group names indicated that 75.3% of participants identified themselves as Black-American or a derivative term (eg, African-American). Nineteen percent of participants identified themselves using a national label (eg, Panamanian), and 2.2% and 3.2% identified themselves with mixed (eg, Black-Hispanic) or generic (eg, American) labels, respectively.

In order to assess systematic differences in cultural orientation by country of origin, participants were asked to identify the country of their birth and the country in which they have lived the majority of their lives using items from the AAAS-33. Of the 94 participants, 70.2% (N=66) identified the United States or US territories as the country of their birth. Two percent of participants identified the country of their birth as US territories (eg, Virgin Islands, Puerto Rico). Seventy-eight percent of participants identified the United States as the country in which they had lived the majority of their lives. Individuals born within and outside the United States were compared on mean scores for the AAAS-33 and MEIM. No significant differences on cultural orientation or ethnic identity scores were observed (AAAS total score, t=1.31, P=.20; Ethnic identity, t=1.33, P=.19).

Table 1. Ethnic identity and cultural orientation scores for African Americans with type 2 diabetes

	Number of items	Scale Range	Mean (SD)	Median	Cronbach Alpha	Inter-item Correlations*
MEIM						
Ethnic identity subscale	14	1–4	3.19 (.47)	3.28	.74	—
Other group orientation	6	1–4	3.45 (.55)	3.58	.66	—
AAAS-33						
Total score	33	33–321	141.9 (28.0)	144.0	.79	—
Preference for Black things	6	6–42	21.9 (9.6)	21.6	.77	—
Religious beliefs/practices	6	6–42	32.9 (7.2)	34.0	.61	—
Preparation of traditional food	4	4–28	16.7 (8.1)	16.0	.77	—
Traditional childhood experiences	3	3–21	14.9 (6.2)	15.0	.76	.61
Superstitions	3	3–21	10.9 (5.3)	10.0	.57	.33
Cultural mistrust	3	3–21	8.3 (4.7)	7.5	.64	.37
Falling out	2	2–14	10.5 (3.9)	12.0	.76	.62
Traditional games	2	2–14	7.4 (4.8)	8.0	.64	.47
Family values	2	2–14	11.6 (3.2)	13.0	.60	.44
Family practices	2	2–14	7.0 (4.5)	8.0	.49	.33
SDSCA						
Dietary adherence	5	0 ± 2	.05 (.63)	.15	.75	—
—Dietary amount	2	0 ± 2				.60
—Dietary type	3	0 ± 2				.22
Exercise adherence	3	0 ± 2	.03 (.88)	.15	.85	.66
SMBG adherence	2	0 ± 2	−.12 (.98)	.09	.85	.74

* Inter-item correlations were calculated for subscales with 2–3 items.

Means and standard deviations for the subscales for the MEIM, AAAS-33, and SDSCA are presented in Table 1. Reliability and validity of the MEIM and AAAS-33 subscales were evaluated for use of the measures with patient populations. Cronbach alpha correlation coefficients were calculated for all subscales of the MEIM, AAAS-33, and SDSCA. Subscale reliability was comparable to previously published studies for the MEIM (current alpha range .66–.74 vs 75–.90[26]), AAAS-33 (current alpha range: .49–.79 vs .44–.81[31]), and SDSCA (current alpha range: .57–.85 vs .55–.91[32]).

Differences in patient scores on outcome variables of interest were examined by recruitment site to evaluate whether there were substantial differences in the sample populations. Student t tests were conducted on the MEIM Ethnic Identity and Other-Group subscale, AAAS-33 total score, SDSCA Dietary, Exercise, and SMBG Adherence subscales, and HbA_{1c} values. No significant differences by recruitment site were found; therefore, data from the 2 recruitment sites were combined for all further analyses.

Diabetes Self-Care Behaviors

African-American Cultural Orientation

Direct multiple regression analyses were used to evaluate the association of African-American cultural orientation (AAAS-33 total score) and scores of dietary, exercise, and SMBG adherence. Each self-care subscale was modeled separately. Regression models using SMBG and exercise adherence as the dependent

Table 2. Multiple regression analyses of African-American cultural orientation and dietary adherence among African Americans with type 2 diabetes

Variables	Beta Coefficient	R^2	F value	*P* value
Overall model		.19	2.45	.03*
AAAS total score	−.27	.07‡	5.48	.02*
Age	.26	.06	4.39	.04*
Income	−.15	.02	1.77	.18
Number of dependents	.26	.06	4.26	.04*
Education	.17	.03	2.07	.15
Type of treatment	.14	.02	1.44	.23
Overall model§		.29	4.15	.002†
AAAS cultural mistrust	−.43	.18‡	15.34	.0002†
Age	.27	.06	5.32	.02
Income	−.14	.02	1.78	.18
Number of dependents	.22	.04	3.45	.07
Education	.21	.04	3.51	.07
Type or treatment	.20	.03	3.13	.08
Overall model§		.17	2.13	.055
AAAS traditional foods	−.23	.05	3.82	.055
Age	.28	.06	4.77	.03
Income	−.15	.02	1.58	.21
Number of dependents	.28	.06	4.74	.03
Education	.14	.02	1.33	.25
Type of treatment	.18	.03	2.10	.15

* Significant $P<.05$.
† Significant after Bonferroni correction, $P<.005$.
‡ Squared semi-partial correlations are presented for each of the variables entered into the model.
§ Bonferroni correction was applied to post-hoc analyses of AAAS-33 subscales.

variables were not statistically significant. The association of dietary adherence to the AAAS-33 total score was statistically significant ($F=2.45$, $P<.03$). AAAS-33 total score ($B=-.27$, $P<.02$), age ($B=.26$, $P<.04$), and number of dependents ($B=.26$, $P<.04$) were significant contributors to the model. Results are presented in Table 2. This model accounted for 19% of the variance, yielding a medium effect size ($f^2=.23$) as defined by Cohen.[37]

In order to better characterize the relationship of dietary adherence and African-American cultural orientation, post-hoc multiple regression analyses were conducted for each of the 10 AAAS-33 subscales. Regression models were considered statistically significant at the $P<.005$ level.[36] The cultural mistrust subscale was significantly and inversely associated with dietary adherence scores ($F=4.15$, $P<.0015$). Higher scores on the cultural mistrust subscale were associated with lower scores on dietary adherence. In this model, cultural mistrust ($B=-.43$, $P<.0002$) was the most significant contributor to the model. Twenty-nine percent of the variance was accounted for by the model, with a large effect size ($f^2=.41$).

The association between traditional food preparation and dietary adherence approached significance ($F=2.13$, $P<.055$). In this model, traditional food preparation ($P<.055$), age ($P<.03$), and number of dependents ($P<.03$) were most strongly associated with lower dietary adherence scores. Seventeen percent of the variance was accounted for in this model, indicating a medium effect size ($f^2=.20$).

Ethnic Identity

Separate direct multiple regression analyses were conducted to examine the relationship between ethnic identity and dietary adherence, exercise, and SMBG adherence subscale scores. Age, monthly income, number of dependents, level of education, and type of treatment were entered into the models as covariates. None of the multiple regression models were statistically significant indicating that ethnic identity, as measured by the MEIM Ethnic Identity subscale, was not associated with diabetes self-care behaviors.

Ethnic Self-Identification

Differences between self-identification groups (Black-American, Mixed, National, and Generic) on each of the 3 SDSCA subscale scores (SMBG testing, diet, and exercise adherence) were compared. Primary ethnic self-identification was used to assign membership to ethnic groups. No significant differences were found between primary identification groups on SMBG subscale scores ($F=1.63$; $P<.18$), dietary adherence ($F=2.45$; $P<.07$), or exercise adherence ($F=1.54$; $P<.21$). These results indicated that there were no differences among the four categories of primary self-identification on measures of dietary, exercise, and SMBG adherence.

Glycemic Control

Cultural variables (self-identification, ethnic identity, and African-American cultural orientation) were examined as predictors of average glycated hemoglobin for the year prior to interview. Pearson correlation coefficients were conducted to assess the level of correlation between demographic variables of interest and average HbA_{1c} values during the year prior to interview. Demographic variables examined included: age, education, income, number of dependents, and type of treatment. Age ($r=.28$; $P<.01$) and education level ($r=.23$; $P<.04$) correlated significantly with average HbA_{1c}. Analysis of variance to assess differences between ethnic self label groups demonstrated no significant differences ($F=.98$, $P<.40$). Multiple regression models of ethnic identity and AAAS total score did not indicate that these variables are associated with HbA_{1c}.

DISCUSSION

Examination of the relationship of cultural variables to diabetes self-care behaviors indicated that traditional African-American cultural orientation was associated with lower dietary adherence scores. Examination of the subscales of the AAAS indicated that increased cultural mistrust subscale scores were significantly associated with lower dietary adherence scores in conjunction with age and income. Traditional food preparation showed a trend toward an association with decreased dietary adherence, but did not meet statistical significance ($P<.055$).

The association of traditional cultural orientation with decreased dietary adherence is consistent with previous studies examining the association between African-American acculturation and some health behaviors. Landrine and Klonoff,[27] using the same measure of African-American acculturation, noted an association between traditional acculturation and decreased knowledge about AIDS transmission, increased smoking, and increased hypertension.

Findings from this study are not consistent with those of Airhihenbuwa and colleagues,[30] with respect to ethnic identity and dietary patterns. In that study, ethnic identity was associated with lower dietary fat consumption and higher socioeconomic status in a sample of healthy African Americans presenting for a dietary intervention.[30] In the present study, ethnic identity did not show a statistically significant association with dietary adherence. Differences between the findings of these studies may be attributable to a variety of sources, including differing populations (community vs medical), dietary measures (*Rate Your Plate* vs SDSCA), and socioeconomic status. In addition, there were differences in the use of the MEIM between the present study and the Airhihenbuwa protocol. The authors note that 16 of the original 23 items were selected for Airhihenbuwa's study protocol, with changes made to the wording of the retained items (eg, "my ethnic group" changed to "Black" and positive phrasing of negatively worded items).[30] The extent to which these changes may contribute to differences found in the relationship between cultural variables and dietary patterns is unknown.

These findings suggest that cultural orientation may be an important component in patient reports of adherence to dietary recommendations. The mechanisms underlying this relationship require further elucidation. It is possible that there are a variety of factors that may contribute to the relationship. For example, individuals with more traditional cultural orientation may experience greater levels of stress, which might negatively affect self-care behaviors such as dietary adherence. Landrine and Klonoff[27] noted that traditional cultural orientation has been associated with increased exposure to racial discrimination. It is possible patients with traditional cultural orientation face addition stressors that may affect dietary adherence.

Another potential factor in this association may be the interaction of cultural orientation and socioeconomic resources. It is possible that individuals with a traditional cultural orientation may have access to fewer social and economic resources, thereby contributing to lower levels of dietary adherence. In the current study, total acculturation scores and income were significantly and inversely associated with dietary adherence. Higher levels of income appeared to be associated with decreased dietary adherence in the presence of more traditional acculturation. Education was not a significant covariate. These variables appear to play an important, but not necessarily a central, role in the association with dietary adherence.

A third factor may be patient disclosure. Individuals with more traditional cultural orientation may be more likely to report discrepancies between self-care behaviors and recommendations in a healthcare setting than individuals whose orientation is more congruent with mainstream American culture. In this way, traditional African-American cultural orientation may represent a positive factor in addressing difficulties in self-care. Individuals who maintain a traditional cultural orientation may be more likely to disclose daily dietary habits that do not conform to provider recommendations. Such disclosures may represent a valuable opportunity for providers to address concerns and implementation of recommendations. Further research is needed to examine the potential interaction between cultural orientation and social desirability among low-income African Americans with type 2 diabetes.

Individuals who maintain a traditional cultural orientation may be more likely to disclose daily dietary habits that do not conform to provider recommendations. Such disclosures may represent a valuable opportunity for providers to address concerns and implementation of recommendations.

As noted previously, the traditional food subscale of the AAAS showed a trend toward a significant association with lower dietary adherence scores. Individuals with a greater traditional orientation toward African-American foods acknowledged having more difficulty adhering to dietary recommendations. It is plausible that traditionally oriented

individuals may have more difficulty adhering to dietary recommendations that may be inconsistent with traditional foods or preparation techniques that involve higher levels of fat and salt.[38] Replication of these results with larger sample sizes is necessary to confirm the direction of these findings.

Examination of the relationship of each of the ethnicity variables to glycemic control demonstrated no statistically significant relationships. These analyses were conducted to explore whether ethnicity variables might be directly associated with glycemic control. Previous studies have documented a relationship between race and glycemic control.[3,38] In a study by Auslander and colleagues,[39] race was found to be the single most powerful predictor of glycemic control among low-income African-American adolescents. The absence of significant findings in the current study may be a function of low statistical power in light of the relatively small proportion of variance shared between psycho-social variables and biological markers such as HbA_{1c}.[40]

Limitations of the current study include an exploratory, cross-sectional design, a relatively small sample size, and specific sampling of low-income, urban-dwelling African Americans. Replication is needed to increase confidence in the generalizability of these findings, which is limited to low-income, urban-dwelling African Americans with type 2 diabetes. The SDSCA has not been validated previously for use with African-American samples; further work is needed to establish the SDSCA as a valid measure for this population. Limited variability was found in patient ratings of adherence to exercise, SMBG, and medication-taking behavior. The majority of patients endorsed high levels of adherence to perceived provider recommendations in these categories. Imperfect patient recall of provider recommendations, variable provider recommendations, social desirability, demand characteristics, and bias in patient perception of their adherence to perceived self-care recommendations may contribute to the limited variability. Inter-item reliability for various subscales of this measure might also contribute to the limited association between cultural orientation and adherence to self-care behaviors. An additional consideration in the use of this measure is the development of the measure over time. The inter-item reliability of the dietary adherence subscale found in this sample was comparable to that reported in previously published studies using the older version (1994) of the measure.[32] Toobert and colleagues[33] noted lower inter-item reliability for the dietary adherence subscale in revised versions of the measure. It is reasonable to expect that results from future studies may differ from the current study if different versions of this measure are used. Finally, we found modest rates of patient recruitment in the current study. Limited available study funding (affecting both duration of the study recruitment period and remuneration rate), patient availability (eg, work or childcare responsibilities), and potential mistrust of research in a medical setting may have been contributing factors. Despite these limitations, we feel that our sample was representative of the larger African-American communities from which the sample was drawn.

The current study found a statistically significant relationship between traditional African-American cultural orientation and self-reported decreased dietary adherence in a sample of low-income African Americans with type 2 diabetes. This study expands previous work in the field by examining the relationship of cultural variables to diabetes-specific self-care behaviors in a low-income African-American sample. Results from this study and others[27–28,30] speak to the variability of world views and cultural orientation for individuals within a demographic group such as African Americans. Understanding the relationship of culture to health behaviors represents an important challenge for healthcare providers who wish to bridge the gap between state-of-the-art medical recommendations and implementation of these recommendations by patients with differing world views or cultural practices. Recognition of potential differences between provider and patient in the understanding of dietary recommendations, for example, creates an opportunity for healthcare providers to tailor their recommendations to be culturally consistent and meaningful for their patients.

Although further research is needed to replicate these findings in larger and more diverse samples, these data suggest practical tips that may be helpful to diabetes educators. In particular, diabetes educators should be sensitive to the possibility of cultural/racial mistrust and its impact on interventions. In addition, educators should work to design culturally tailored interventions that incorporate healthy preparation of traditional ethno-cultural foods. As the proportion of African Americans and other individuals of color with diabetes continues to rise,[41] the need for cultural sensitivity and tailoring on the part of healthcare providers may be expected to increase over time.

ACKNOWLEDGMENTS

Supported in part by NIH RO1-DK48122, MO1-RR00533, and NHLBI 5 T32 HL07456-18 and the Boeringer Mannheim Corporation. The authors wish to gratefully acknowledge the contribution of the faculty and staff of Boston Medical Center (Primary Care, Diabetes, and General Clinical Research Center) and Baystate Medical Center (IMC Primary Care Clinic and Mason Square Neighborhood Health Center).

Author's Note: Portions of this article are based on data originally presented in abstract form to the 21st annual scientific sessions of the Society of Behavioral Medicine, Nashville, Tennessee, April 2000.

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Appendix: Diabetes Self-Care Activities Questionnaire[32]

The first few questions ask you about your eating habits over the past 7 days. If you have not been given a specific diet by your doctor or dietitian, answer Question 1 according to the general guidelines you have received.

1. How often did you follow your recommended diet over the last 7 days?

   _____ 1. Always _____ 2. Usually _____ 3. Sometimes _____ 4. Rarely
   _____ 5. Never

2. What percentage of time did you successfully limit your calories as recommended in healthy eating for diabetes control?

   _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

3. During the past week, what percentage of your meals included high fiber foods, such as fresh fruits, fresh vegetables, whole grain breads, dried beans and peas, bran?

   _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

4. During the past week, what percentage of your meals included high fat foods such as butter, ice cream, oil, nuts and seeds, mayonnaise, avocado, deep-fried foods, salad dressing, bacon, other meat with fat or skin?

   _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

5. During the past week, what percentage of your meals included sweets and desserts such as pie, cake, jelly, soft drinks (regular, not diet drinks), cookies?

   _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

Exercise

6. On how many of the last 7 days did you participate in at least 20 minutes of physical exercise?

   0 1 2 3 4 5 6 7

7. What percentage of the time did you exercise the amount suggested by your doctor? (For example, if your doctor recommended 30 minutes of activity.)

   _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

8. On how many of the last 7 days did you participate in a specific exercise session other than what you do around the house or as part of your work?

   0 1 2 3 4 5 6 7

Glucose Testing

9. On how many of the last 7 days (that you were not sick) did you test your glucose (blood sugar) level?

   _____ 1. Everyday _____ 2. Most days _____ 3. Some days _____ 4. None of the days.

10. Over the last 7 days (that you were not sick) what percentage of the glucose (blood sugar or urine) tests recommended by your doctor did you actually perform?

    _____ 0% None _____ 25% (¼) _____ 50% (½) _____ 75% (¾) _____ 100% (all)

Diabetes Medication

11. How many of your recommended insulin injections did you take in the last 7 days that you were supposed to?

    _____ 1. All of them _____ 2. Most of them _____ 3. Some of them
    _____ 4. None of them _____ 5. I do not take injections to control my diabetes.

12. How many of your recommended number of pills to control diabetes did you take that you were supposed to?

    _____ 1. All of them _____ 2. Most of them _____ 3. Some of them
    _____ 4. None of them _____ 5. I do not take pills to control my diabetes.