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Race/Ethnicity, Social Support, and Associations With Diabetes Self-Care and Clinical Outcomes in NHANES

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Abstract

Purpose—The purpose of this study was to evaluate how social support and race/ethnicity were associated with diabetes self-care behaviors and clinical outcomes.

Methods—Using the cross-sectional 2005-2006 National Health and Nutrition Examination Survey (NHANES), the authors examined white, black, and Latino respondents who self-reported a diabetes diagnosis (n = 450), estimating the associations of social support on diabetes outcomes. The primary exposure was a social support index (0-5), which assessed the number of sources of support in one's life. Outcomes were self-care behaviors (controlling weight, exercising, controlling fat/caloric intake, checking feet, and self-monitoring blood glucose) and intermediate clinical outcomes (hemoglobin A1C, diastolic blood pressure, and low-density lipoprotein [LDL]).

Results—There were no differences in social support by race/ethnicity. The authors observed several significant race/ethnicity by social support interactions in adjusted models, controlling for age, gender, education, self-reported health, depression, functional disability, insurance status, and insulin use. Among blacks, social support was associated with controlling weight (odds ratio [OR] = 1.55, P = .03), exercising (OR = 1.38, P = .03), controlling fat/calories (OR = 1.84, P = .03), and lower diastolic blood pressure (β = -3.07, P = .02). Among whites, social support was associated with lower LDL (β = -9.45, P = .01). No significant effects were noted for Latinos.

Conclusions—The relationship of social support with diabetes management differed by race/ethnicity, with the strongest findings among blacks. Social support may be influential for maintaining self-care behaviors among blacks and controlling lipid levels among whites.

Social support is an important issue for those with chronic illness. Fisher and colleagues highlight that although disease self-management is often perceived as an individual process, there are multiple spheres of influence, ranging from family and friends to worksites and neighborhoods.[1] In addition, Berkman and Glass[2] have theorized how the social environment influences health. They state that broad sociostructural conditions such as culture and socioeconomic status directly influence and shape social networks, which in turn operate through psychosocial mechanisms to influence individual health pathways such as health behaviors, psychology (including self-efficacy), and physiology. Although social networks and

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social support are conceptually distinct, the broader term "social support" will be used throughout this paper.

Furthermore, the impact of social support on diabetes has been studied extensively, largely because diabetes care relies heavily on self-management. Two recent reviews by Gallant[3] and van Dam and colleagues[4] found associations between social support—particularly diabetes-specific peer support and Internet and phone-based support—and several diabetes outcomes, such as self-care behaviors and hemoglobin A1C. Social support interventions tested in a single racial/ethnic minority group also reported modest improvements in some but not all outcomes, such as physical activity[5] and A1C,[6] but not weight gain. Several other studies report significant findings of social and family support on diabetes self-care among Mexican Americans,[7,8] African Americans,[9-12] and whites,[13] while others report no associations among a Latino population in the Northeast,[14] among whites or blacks in the Southeast,[15] or among blacks in Michigan.[13] However, research focusing on a single racial/ethnic group may not be applicable to all groups and makes between-group comparisons difficult. Because there is evidence that race/ethnicity is related to the nature and development of social networks and social support,[16-19] additional research into the interaction between race/ethnicity and social support, and their further impact on diabetes and other clinical outcomes, is warranted.

This study examined whether social support, race/ethnicity, and their interaction were associated with increased self-care behaviors and improved diabetes clinical outcomes within an ethnically diverse, nationally representative sample. In particular, we hypothesized that the associations of social support with diabetes outcomes would differ by race/ethnicity.

Design and Methods

Data Source

The dataset for these analyses was the 2005-2006 National Health and Nutrition Examination Survey (NHANES), about which the cross-sectional design and methods have been previously reported.[20] In brief, NHANES is a national survey of approximately 5000 individuals that combines interviews with detailed medical examinations and laboratory tests, conducted by the Centers for Disease Control and Prevention (CDC) since the 1960s to estimate the prevalence and risk factors for major diseases. NHANES uses a complex, multistage, probability sampling design to select individuals representative of the US population, with oversampling of areas with specific age groups (adolescents aged 12-19 and adults aged 60 or older), races/ethnicities (blacks and Hispanics/Latinos, primarily Mexican Americans), and/or lower-income groups (those with less than $20 000 annual income).

Study Population

The population of interest included those individuals self-reporting physician-diagnosed diabetes who also answered the social support questionnaire supplement (asked of all individuals aged 40 or older). About 5% of the total sample, or 521 respondents, reported being diagnosed with diabetes (either type 1 or type 2, but excluding gestational diabetes), and 450 of those individuals completed the social support questions. Race/ethnicity, a critical predictor in the analysis, was captured through self-report in the demographic section of the survey. Because of small sample sizes for certain racial/ethnic groups, the analyses focused only on whites, blacks, and Latinos. Therefore, 17 individuals with diabetes indicating another race were excluded. Finally, the response rates for covariates and outcomes of interest varied, with final analytic sample sizes ranging from 338 to 368.

Variables of Interest

To our knowledge, the social support questions in NHANES 2005-2006 have not yet been validated into a single index. Therefore, we developed an index with the available survey questions, similar to Ford and colleagues work using NHANES III questions.[21] Two binary variables explicitly assessed aspects of social support: having emotional support (someone to talk over problems or help make a difficult decision) and having financial support (anyone to help pay bills, housing costs, hospital visits, or provide food or clothes). If the respondent answered "yes" to these questions, they were assigned a "1." These 2 questions were based on fully validated scales from the MacArthur studies on successful aging.[22] The remaining 3 questions assessed social network ties: marital status, number of close friends, and number of times church was attended in the last year. Marital status was dichotomized according to whether someone was married or living as married, church attendance was dichotomized at 4 or more times per year, and the number of close friends was dichotomized at 4 or more—using the median values among individuals with diabetes in the sample. These 3 questions were based on the well-validated social network index.[23] Summing the 5 binary social support variables, the index ranged from 0 to 5. Finally, using a series of likelihood ratio tests, we determined that the social support index could be included as a linear term in the regression models.

The primary outcomes of interest were diabetes self-care behaviors that were assessed by self-report in the diabetes supplement of the survey, specifically, controlling weight (yes/no), controlling calories and/or fat intake (yes/no), exercising (yes/no), checking feet (number of times/week), and self-monitoring blood glucose (SMBG) (number of times/week). The diet and exercise behaviors were asked as dichotomous items on the survey and thus were analyzed as binary outcomes. In addition, the SMBG and feet behaviors were collapsed into binary outcomes of none (0) versus some (1+ time per week) because the initial analyses of the full distribution (ie, poisson and negative binomial regression for count outcomes) did not produce differing results. Secondary outcomes were related to blood sugar, blood pressure, and lipid control, specifically A1C, diastolic blood pressure (BP), and low-density lipoprotein (LDL) cholesterol. All 3 clinical outcomes were recorded in the examination/laboratory component of the survey and were analyzed as continuous variables.

The analysis also adjusted for potential confounders that were likely associated with both social support and our diabetes-related outcomes. These covariates included demographics of age (in years), gender, education (less than high school, high school graduate, or more than high school), and health insurance status (binary variable capturing any type of coverage). In addition, health status was controlled for by self-reported insulin use (as an indicator of severity of diabetes) and self-reported fair or poor health (fair/poor vs good/very good/excellent). In addition, functional disability was captured by a binary variable indicating limitation in work because of physical, mental, or emotional problems.[24] Finally, depression was controlled for in the analysis, since the prevalence of depression among individuals with diabetes is reportedly 3 times the rate of the general population and is strongly associated with social support[25] and self-care behaviors.[26] Ascertainment of depressive symptoms was based on the 9-item scale of the Patient Health Questionnaire (PHQ-9)[27] where the score was categorized into 3 levels: minimal (few to no symptoms with a score less than 5); mild (a score from 5-9); or moderate, moderately severe, or severe (collapsing the top 3 categories, a score from 10-27).

Statistical Analyses

To account for the complex survey design to generate accurate statistical estimates, all analyses specified the primary sampling units, strata, and observation weights that were used in the survey sampling process and provided by NHANES in the public use data files. Analyses were completed using the survey design commands in Intercooled Stata version 9.2 (College Station, Texas). Descriptive analyses first examined differences in social support by the covariates of interest. In addition, unadjusted bivariate associations between social support and the diabetes and clinical outcomes of interest were assessed, followed by unadjusted associations between race/ethnicity and the diabetes outcomes.

Next, adjusted regression models examined the influence of social support and race/ethnicity on the diabetes outcomes—first including social support and race/ethnicity as independent predictors, then including their interaction term (race/ethnicity × social support). In the models with interaction terms, linear combinations of the parameters produced estimates for the association of social support with the diabetes outcomes for each racial/ethnic subgroup. We also completed *F*-tests to determine the joint statistical significance of the interaction terms.

All 5 self-care behavior outcomes were analyzed using logistic regression. Odds ratios (OR) estimated the increase in odds of performing a self-care behavior for a 1-unit increase in the social support index. Since all 3 clinical outcomes of A1C, diastolic BP, and LDL cholesterol were measured continuously, they were analyzed with linear regression. The regression coefficients estimated the mean change in the clinical outcomes (ie, percent A1C, mmHg of BP, or mg/dL of cholesterol) for a 1-unit increase in the social support index. Although these outcomes did not have completely normal distributions, the relatively large sample size allowed for valid comparisons of mean group differences.[28]

Finally, because the odds of performing each self-care behavior were relatively high, we used the information from the logistic regression models with interaction terms to calculate predicted probabilities for each racial/ethnic group at selected social support scores. For example, we calculated the probability of controlling weight for whites, blacks, and Latinos with social support scores of 3 and then again with a score of 5—allowing evaluation of the change in probabilities of controlling weight when the social support score increased by 2 points, separately within each race/ethnic group. The remaining covariates were kept constant when calculating the predicted probabilities: using a mean age of 64 and the most prevalent categories of female, more than a high school education, no insulin use, insured, not in fair/poor health, not functionally disabled, and not depressed. The confidence intervals were calculated using endpoint transformations.[29]

Results

Descriptive and Unadjusted Analyses

Overall, 171 individuals in the sample were white (39.5%), 150 were black (34.6%), and 112 were Latino (25.9%). The social support score (mean = 3.45 out of 5 possible; SD = 1.12) did not differ significantly by race/ethnicity. While age, gender, and insulin use were not associated with social support in the descriptive analyses, lower education, depression, functional disability status, and poorer self-reported health status were significantly associated with lower social support scores (Table 1). When comparing respondents versus nonrespondents to variables of interest (results not shown), whites were more likely to be missing a social support score. Those with lower social support were also more likely to be missing a depression and self-reported health information, and Latinos were less likely to be missing depression or self-reported health data.

In unadjusted regression models with race/ethnicity and social support as separate predictors of the diabetes and clinical outcomes, there were no significant associations between social support and self-care behaviors. A 1-point increase in social support was significantly associated with a 5.65 mg/dL decrease in LDL cholesterol (P = .01), but not with A1C or diastolic BP. In addition, there were no significant differences in the 5 self-care behaviors by racial/ethnic group. However, blacks had 0.78% higher mean A1C compared with whites (P

< .001), and Latinos had higher diastolic BP (3.93 mmHg, *P* = .046) and LDL cholesterol (17.5 mg/dL, *P* = .03) compared with whites.

Adjusted Analyses: No Interaction

The first set of adjusted regression models did not include an interaction term between social support and race/ethnicity (Table 2), but controlled for age, gender, education, health insurance status, insulin use, self-reported health, functional disability, and depression. These models did not have significant associations of social support on diabetes self-management or health outcomes, with the exception of a 6.31 mm/Hg decrease in LDL cholesterol for a 1-point increase in social support (95% confidence interval [CI]: -11.2, -1.42).

Adjusted Analyses: Interaction Between Social Support and Race/Ethnicity

Next, we added interaction terms between social support and race/ethnicity to all of the models. Four of the 8 diabetes outcomes had joint *F*-tests for the interaction terms that were statistically significant or trended toward statistical significance (controlling weight [*P* = .13], A1C [*P* = .15], diastolic BP [*P* = .04], and LDL cholesterol [*P* = .02]), while the other 4 outcomes did not (controlling fat/calories [*P* = .66], exercising [*P* = .30], checking feet [*P* = .44], and SMBG [*P* = .48]). Because our a priori hypothesis of race/ethnic differences in the influence of social support on diabetes outcomes was frequently supported by this evidence, and for simplicity, we chose to uniformly report the racial/ethnic-specific results (Table 3).

Self-Care Behaviors

For self-care behavior outcomes, there were significant associations with social support, particularly for blacks. In adjusted logistic regression models, a 1-point increase in social support for blacks was associated with a 55% increase in the odds of controlling weight (95% CI: 1.07, 2.25), a 38% increase in the odds of exercising (95% CI: 1.03, 1.85), and an 84% increase in the odds of controlling calories/fat (95% CI: 1.05, 3.22). In the adjusted logistic regression models for SMBG and checking feet, there were no statistically significant associations.

When converting these findings to predicted probabilities (Table 4), blacks had 80% (CI: 67%, 88%) predicted probability of controlling weight at a social support score of 3, increasing to 90% (CI: 81%, 96%) with a social support score of 5. Similarly, blacks had 78% (CI: 66%, 87%) predicted probability of exercising with a score of 3, increasing to 87% (CI: 73%, 95%) with a score of 5. Finally, blacks had 73% (CI: 54%, 86%) predicted probability of controlling fat/calories with a score of 3, increasing to 90% (CI: 80%, 95%) with a score of 5. Social support did not have a significant increase for these 3 self-care behaviors among the other racial/ethnic groups.

Clinical Outcomes

For all 3 adjusted linear regression models, there were significant racial/ethnic differences for the associations of social support with the clinical outcomes of A1C, diastolic BP, and LDL cholesterol. For a 1-point increase in the social support score, blacks had an estimated 3.07 mmHg decrease in mean diastolic BP (95% CI: -5.48, -0.66), and whites had an estimated 9.21 mg/dL decrease in mean LDL cholesterol (95% CI: -15.5, -2.90). There was also significant interaction between social support and race/ethnicity in models predicting A1C. Yet whites had an estimated 0.20% increase in A1C for a 1-point increase in social support (95% CI: 0.06, 0.34)—the opposite of the hypothesized direction.

Discussion

Overall, in the unadjusted analyses, there was weak evidence of an association between social support and diabetes outcomes. In addition, there was no evidence of an association between race/ethnicity and diabetes self-care behaviors, although racial/ethnic minorities had poorer diabetes control compared with whites, similar to prior NHANES studies[30] and other meta-analytic studies.[31] This population-based study thus differed from previous studies reporting differences in diabetes self-management by race/ethnicity.[32-34] However, considering interactions of social support with each of the racial/ethnic groups suggested that future research evaluating these groups separately as well as contrasting groups may be warranted. The association of social support with the outcomes was most markedly different for blacks, with increased odds of performing 3 out of the 5 self-care behaviors (controlling weight, controlling fat/calories, and exercising) as well as decreased diastolic BP. This pattern of improving diabetes outcomes was not observed for the other 2 racial/ethnic groups, with the exception of whites having decreased LDL cholesterol with increased social support scores.

These results are consistent with previous research examining social support within the black community, such as a greater reliance on informal social networks[17] and the importance of familial support for those with diabetes.[10] In addition, previous research on social support within NHANES found that African Americans had higher scores on several social support measures compared with whites and Hispanics.[35] Thus, perhaps the development of social ties and/or utilization of social support within specific cultural communities are unique enough to impact health in different ways—a topic that deserves further exploration. While it remains unclear why the same patterns of social support did not emerge for Latinos or whites in this study, future research into how social support influences health behaviors and outcomes comparing various racial/ethnic groups is needed; for example, investigating whether the positive effects of peer, Internet, and phone-based social support interventions among individuals with diabetes[4] are applicable across races/ethnicities.

Furthermore, we found that social support was associated with A1C levels among whites, but in the opposite direction than anticipated (ie, increased social support was associated with higher A1C). Although social support is theorized to influence health behaviors as well as psychological and biological pathways,[2] the potential causal link between social support and improved self-care behaviors is likely tighter than the link between social support and improved diabetes clinical outcomes, and the biological pathways activated through social support are not well understood. Moreover, the clinical outcomes in this cross-sectional analysis were probably vulnerable to reverse causality—that is, individuals with worse A1C might be receiving or relying more on social support than those with better blood sugar control. Therefore, future longitudinal studies examining the influence of social support among several racial/ethnic groups may be able to take further steps toward establishing causality and better understanding how race/ethnicity and social support work together to influence clinical outcomes.

There are several study limitations to note. First, a fully validated measure, such as the social network index, might have captured more subtle differences in social integration or support across races/ethnicities. The index in this analysis captured a count of the types of support in one's life, which is more general than a scale.[36] The index created assumed that each type of support contributes equally and interchangeably to the index, an assumption that cannot be verified within this scope of this study. Furthermore, this index combined aspects of support and networks into a single measure, which is different from previous studies on this topic. Although both networks and support are theorized to similarly influence self-efficacy and, in turn, self-care behaviors and clinical outcomes, they may exert a different influence on the outcomes in this study.[2] Different aspects of social support not included in NHANES, such as tangible support for getting to doctor's appointments,[37] might also have an important influence on diabetes outcomes.

Furthermore, the findings are also based on a relatively small sample size. However, despite overall small numbers that may have limited statistical power, these comparisons were made within a nationally representative NHANES survey with oversampling of racial/ethnic minorities, which likely increases the generalizability of the results. In addition, the self-care behaviors were captured through self-report in the survey and could be over-reported because of social desirability, which has been suggested in other studies.[38] Differences in self-report by race/ethnicity would impact our group comparisons most significantly. Moreover, more detailed reporting of self-care outcomes in future studies (ie, beyond reducing the outcomes to binary assessments) might provide more information about the relationship between social support and health behaviors. Finally, although there are several outcomes of interest in this study, we knowingly did not adjust for multiple comparisons,[39] given that this was an initial analysis to examine differences in social support in diabetes care by race/ethnicity with an expectation that findings would be replicated in future confirmatory analyses.

Conclusions and Implications

In summary, our findings suggest the importance of social support for diabetes management, particularly in maintaining self-care behaviors for blacks. This significant finding for a specific racial/ethnic subgroup highlights how race/ethnicity may act as a social determinant of health, impacting several aspects of life simultaneously and ultimately influencing health outcomes through a variety of pathways. Because some of these pathways to health outcomes, such as social support, may differ among racial/ethnic groups, there are several implications for diabetes education. For example, educators and providers could engage patients in a discussion around not only the sources of social support in their lives but also about the subsequent impact of this support on their self-management behaviors. Emphasizing how to utilize existing family or friend support could be particularly beneficial for some patients. In addition, when developing interventions for diabetes control, it may be important to consider that different racial/ethnic groups may rely on social support in varying ways to manage their chronic illness. Building interventions that understand a broader social context for diabetes self-management and that can be appropriately tailored to different communities will be most useful. Overall, diabetes educators and providers should be aware of the influence of social support when advising patients on diabetes management—in particular, how race/ethnicity may interact with social support and by extension influence self-care activities.

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Table 1

Descriptive Statistics by Social Support Score

Variable of Interest	Social Support 0-2 (n = 184)	Social Support 3-5 (n = 249)	*P* Value	Total (n = 433)
% Race/ethnicity (n)				
White	37.5 (69)	41.0 (102)	.46	39.5 (171)
Black	34.8 (64)	34.5 (86)		34.6 (150)
Latino	27.7 (51)	24.5 (61)		25.9 (112)
Mean age (SD)	64.5 (12.1)	64.1 (11.5)	.27	64.3 (11.7)
% Education (n)				
Less than high school	48.1 (90)	34.5 (86)	<.01	40.7 (176)
High school graduate	26.6 (49)	24.9 (62)		25.6 (111)
More than high school	24.5 (45)	40.6 (101)		33.7 (146)
% Male (n)	47.8 (88)	51.4 (128)	.33	49.9 (216)
% Depression (n = 369)[a]				
Minimal	58.6 (89)	81.1 (176)	<.01	71.8 (265)
Mild	19.7 (30)	15.2 (33)		17.1 (63)
Moderate, moderately severe, or severe	21.7 (33)	3.69 (8)		11.1 (41)
% Fair/poor health (n = 381)[a]	58.0 (91)	43.3 (97)	<.01	49.3 (188)
% Insured (n)	85.3 (157)	91.6 (228)	.08	88.9 (385)
% Insulin (n)	27.2 (50)	28.5 (71)	.63	27.9 (121)
% Functional disability (n)	59.2 (109)	43.0 (107)	.03	49.9 (216)

Numbers and percentages reflect the sample, but the *P* values take the survey design into account.

[a]A total of 64 individuals were missing depression information (14.8% of sample), and 52 were missing self-reported health (12.0% of sample).

Table 2

Unadjusted Regression Models for Race/Ethnicity and Social Support

	Logistic Regression Models for Self-Care Behaviors					Linear Regression Models for Clinical Outcomes		
	Controlling Weight	Controlling Fat/Calories	Exercising	Checking Feet	SMBG	A1C	Diastolic BP	LDL Cholesterol
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	Δ % (95% CI)	Δ mmHg (95% CI)	Δ mg/dL (95% CI)
Black (referent white)	0.97 (0.46, 2.05)	0.93 (0.65, 1.32)	1.04 (0.71, 1.54)	1.10 (0.64, 1.90)	1.18 (0.45, 3.08)	0.78[a] (0.42, 1.13)	2.04 (−3.06, 7.13)	−4.91 (−17.4, 7.56)
Latino (referent white)	0.83 (0.36, 1.90)	0.91 (0.40, 2.03)	1.12 (0.64, 1.96)	0.48 (0.18, 1.30)	0.50 (0.19, 1.31)	0.88[b] (−0.07, 1.83)	3.93[a] (0.09, 7.77)	17.5[a] (2.28, 32.7)
Social support (per 1-unit increase)	1.07 (0.83, 1.38)	1.19 (0.90, 1.57)	1.09 (0.86, 1.36)	1.00 (0.72, 1.40)	1.47 (0.99, 2.18)[b]	0.10 (−0.07, 0.28)	-0.12 (−1.92, 2.16)	-5.65[a] (−9.57, -1.73)

Reports separate models for race/ethnicity and social support as exposure variables for each of the eight diabetes outcomes.

Abbreviations: SMBG, self-monitoring blood glucose; BP, blood pressure; LDL, low-density lipoprotein; OR, odds ratio; CI, confidence interval.

[a]Significance at $P \leq .05$.

[b]Significance at $P \leq .10$.

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Table 3

Results From Adjusted Regression Models

For 1-unit Increase in Social Support	Logistic Regression Models for Self-Care Behaviors					Linear Regression Models for Clinical Outcomes		
	Controlling Weight	Exercising	Controlling Calories/Fat	Checking Feet	SMBG	A1C	Diastolic BP	LDL Cholesterol
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	Δ % (95% CI)	Δ mmHg (95% CI)	Δ mg/dL (95% CI)
Models without interaction term	1.09 (0.81, 1.47)	1.09 (0.83, 1.43)	1.41[b] (0.99, 2.02)	0.99 (0.69, 1.44)	1.40 (0.88, 2.21)	0.12[b] (-0.01, 0.26)	-0.34 (-2.60, 1.92)	-6.31[a] (-11.2, -1.42)
Models with interaction term								
Whites	0.92 (0.61, 1.39)	0.96 (0.65, 1.42)	1.30 (0.77, 2.19)	0.88 (0.51, 1.51)	1.68 (0.86, 3.29)	0.20[a] (0.06, 0.34)	0.91 (-1.72, 3.54)	-9.21[a] (-15.5, -2.90)
Blacks	1.55[a] (1.07, 2.25)	1.38[a] (1.03, 1.85)	1.84[a] (1.05, 3.22)	1.03 (0.55, 1.94)	0.98 (0.53, 1.83)	-0.08 (-0.35, 0.18)	-3.07[a] (-5.48, -0.66)	2.00 (-4.36, 8.37)
Latinos	1.29 (0.91, 1.83)	1.27 (0.83, 1.93)	1.40 (0.89, 2.20)	1.40[b] (0.94, 2.10)	1.16 (0.58, 2.32)	0.08 (-0.27, 0.44)	-1.37 (-3.96, 1.21)	-5.52 (-20.4, 9.35)

Abbreviations: SMBG, self-monitoring blood glucose; BP, blood pressure; LDL, low-density lipoprotein; OR, odds ratio; CI, confidence interval.

[a] Significance at $P \leq .05$.

[b] Significant at $P \leq .10$.

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Table 4

Predicted Probabilities (%) from Adjusted Logistic Regression Models

	Controlling Weight	Exercising	Controlling Calories/Fat	Checking Feet	SMBG
	Predicted Probability (CI)	**Predicted Probability (CI)**	**Predicted Probability (CI)**	**Predicted Probability (CI)**	**Predicted Probability (CI)**
Social support = 3					
White	0.80 (0.67, 0.88)	0.74 (0.62, 0.84)	0.73 (0.62, 0.83)	0.88 (0.71, 0.96)	0.92 (0.80, 0.97)
Black	0.80 (0.64, 0.90)	0.78 (0.66, 0.87)	0.73 (0.54, 0.86)	0.90 (0.64, 0.98)	0.95 (0.73, 0.99)
Latino	0.75 (0.47, 0.91)	0.77 (0.56, 0.90)	0.69 (0.38, 0.89)	0.84 (0.61, 0.94)	0.95 (0.75, 0.99)
Social support = 5					
White	0.77 (0.62, 0.87)	0.73 (0.51, 0.88)	0.83 (0.63, 0.93)	0.85 (0.59, 0.96)	0.97 (0.87, 0.99)
Black	0.90 (0.81. 0.96)	0.87 (0.73, 0.95)	0.90 (0.80, 0.95)	0.90 (0.75, 0.97)	0.95 (0.69, 0.99)
Latino	0.84 (0.51, 0.96)	0.84 (0.54, 0.96)	0.82 (0.47, 0.96)	0.91 (0.75, 0.97)	0.96 (0.82, 0.99)

The predicted probabilities/values were computed for the adjusted regression models with an interaction term between race/ethnicity and social support. The covariates were set at age of 64, female, more than a high school education, no insulin use, insured, not in fair/poor health, no functional disability, and not depressed.

Abbreviation: CI, confidence interval.