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Effect of Perceived Racial Discrimination on Self-Care Behaviors, Glycemic Control, and Quality of Life in Adults with Type 2 Diabetes

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Abstract

Objective—This study used a large sample size of Black and White patients with type 2 diabetes to investigate the influence of perceived racial discrimination on biologic measures (glycemic control, blood pressure, and LDL-cholesterol), the mental component of quality of life (MCS), and health behaviors known to improve diabetes outcomes.

Methods—602 patients were recruited from two adult primary care clinics in the southeastern United States. Linear regression models were used to assess the associations between perceived racial discrimination, self-care, clinical outcomes, mental component of quality of life (MCS), adjusting for relevant covariates. Race stratified models were conducted to examine differential associations by race,

Results—The mean age was 61 years, with 64.9% non-Hispanic black, and 41.6% earning less than $20,000 annually. Perceived discrimination was significantly negatively associated with MCS (β= -0.56, 95% CI -0.90, 0.23), general diet (β= -0.37, CI -0.65, -0.08), and specific diet (β= -0.25, CI -0.47, -0.03). In African Americans, perceived discrimination was significantly associated with higher systolic blood pressure (β= 10.17, CI 1.13, -19.22). In Whites, perceived discrimination was significantly associated with lower mental component of quality of life (β= -0.51, CI -0.89, -0.14), general diet (β= -0.40, CI -0.69, -0.99), specific diet (β= -0.25, CI -0.47, -0.03), and blood glucose testing (β= -0.43, CI -0.80, -0.06).

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Conclusions—While no association was found with biologic measures, perceived discrimination was associated with health behaviors and the mental component of quality of life. In addition, results showed a difference in influence of perceived discrimination by race.

Keywords

Perceived racial discrimination; self-care; glycemic control; type 2 diabetes

Introduction

There are more than 29 million people in the US that have diabetes [1]. In addition to increased mortality, diabetes is associated with many health complications including blindness, kidney failure, and lower-limb amputation [1]. Non-Hispanic Blacks make up 13.2% of people over the age of 20 with diabetes, however, ethnic minorities show increased prevalence, risk of complications and mortality compared to their White counterparts [1,2]. Research has shown through effective self-care, glucose monitoring, medication adherence, diet, and exercise, that patients have effectively improved their diabetes outcomes [3]. However, evidence suggests that minorities engage in less self-management behaviors and have worse glycemic control than non-Hispanic Whites. [4-5] A number of studies have shown racial disparities exist in diabetes self-management and psychosocial factors are an important consideration in care. [4-8].

Increasing attention has been placed on perceived discrimination as a stressor with implications for health disparities, such as those seen in diabetes outcomes [9]. Reviews of research have found an inverse association between discrimination and morbidity, as well as associations between discrimination and physical, mental and emotional health outcomes [9-15]. Perceived discrimination can be defined as the belief that negative attitudes, judgment or unfair treatment occurs toward members of a group, and has been shown to cause stress due to its unpredictability [11,16]. Perceived discrimination may damage an individual's self-image, limit socioeconomic status and negatively affect health by lowering an individual's sense of self-control [11,17]. Studies have also found those who experience perceived discrimination also experience diminished well-being, more depressive symptoms, higher continuous blood glucose levels and higher blood pressure [11,12,17-20].

Evidence also indicates perceived discrimination may result in an increase in unhealthy behaviors and a decrease in quality of life [11,12,14,17,20]. African American men who experienced discrimination engaged in more sedentary behaviors [21], and in African Americans with hypertension perceived discrimination was associated with poor medication adherence [14]. Given the relationship between self-care and outcomes in type 2 diabetes, perceived discrimination may be a contributing factor to a decreased willingness to engage in positive behaviors and improve diabetes outcomes [17,20]. And while research conducted in patients with diabetes found that complications due to diabetes are associated with poor health-related quality of life,[21] the association between perceived discrimination and quality of life in patients with type 2 diabetes remains unclear.

While the literature suggests that perceived discrimination negatively influences mental and physical health, few studies have focused on the impact of racial discrimination on self-care,

health outcomes, and health related quality of life in patients with type 2 diabetes. This study used a large sample size of Black and White patients with type 2 diabetes and investigated physical health in the form of biologic measures, the mental component of quality of life (MCS), and health behaviors known to improve diabetes outcomes. We hypothesized that perceived discrimination would be inversely associated with glycemic control, MCS, and health behaviors.

Methods

Sample

602 patients were recruited from two adult primary care clinics in the southeastern United States after all procedures were approved by the Institutional Review Board. Sites included a local VA medical center and an academic medical center in the Southeast United States. Letters of invitation were sent to those meeting eligibility requirements, in addition to approaching patients in clinic waiting rooms. Eligibility criteria included ages 18 years or older, diagnosis of type 2 diabetes in their medical record, and ability to communicate in English. Patients were ineligible if research coordinators determined patients to be cognitively impaired as a result of significant dementia or active psychosis. Research coordinators provided an explanation of the study and consented patients prior to completion of validated questionnaires. Validated questionnaires capturing social determinants of health factors, demographic information and self-care information were included based on the conceptual framework by Brown et al.[22]. The framework described the relationship between social determinants (such as perceived discrimination) and diabetes outcomes including mediators such as self-care. HbA1c, blood pressure and LDL-cholesterol were abstracted from the electronic medical record.

Demographic Variables

Age, duration of diabetes, and number of comorbidities were self-reported and collected as continuous variables. Race was categorized as non-Hispanic Black or non-Hispanic White and Hispanic/other were coded as missing. Marital status was categorized as married, separated/divorced, widowed, or never married. Previously validated items from the 2002 National Health Interview Survey [23] were used to capture education, employment, and household income. Household income was categorized into 8 income units: <$10,000; $10,000-$14,999; $15,000-$19,999; $20,000-$24,999; $25,000-$34,999; $35,000-$49,999; $50,000-$74,999; and ≥ $75,000. Years of education and number of hours worked per week were both collected as continuous variables.

Measures

Perceived Discrimination—Previously validated items from the DISTANCE survey [24] were used to capture perceived discrimination. Patients self report on how often in the past 12 months they felt they were treated poorly or made to feel inferior because of race/ethnicity. Response options included never, sometimes, usually, and often. Additional questions measuring discrimination by education, sex/gender, and language were part of the DISTANCE survey but were not used in this analysis. [24]

Self-Reported Medication Adherence—Medication Adherence was assessed with the Morisky Medication Adherence Scale (MMAS); an 8-item scale with higher values indicating higher adherence [25].

Behavioral Skills—Diabetes behavior was assessed with the Summary of Diabetes Self-Care Activities (SDSCA) scale; an 11-item scale measuring frequency of self-care activity in the last 7 days for general diet (follow healthy diet), specific diet (ate fruits/two fat diet), exercise, blood glucose testing, and foot care [26].

Health Status—Health status was measured by the single general health item from the Medical Outcomes Survey, where response options included excellent, very good, good, fair, and poor [27]. It has been validated across different conditions and populations and found to be a reliable measure of perceived health [28].

Quality of Life—Quality of life was assessed using the SF-12; a 12-item scale yielding summary physical health (PCS-12) and mental health (MCS-12) outcome scores. The SF-12 is a valid and reliable instrument (alpha=0.89) [29].

Clinical Measures—Hemoglobin A1c and systolic blood pressure were abstracted from the electronic medical record using the most recent values within the previous 6 months. LDL-cholesterol was abstracted using the most recent values within the previous 1 year.

Statistical Analyses

Sample Size—The target sample size for the study was 602 adults to provide 80% power to detect an association of at least $\rho=0.3$, where ρ represents the population correlation between the dependent (i.e. diabetes self-care, clinical outcomes and quality of life) and perceived discrimination. In fully adjusted models, this sample size provides 80% power to detect between a small effect (primary independent variable accounts for 2% of the variance of the dependent variable) and a moderate effect (primary independent variable accounts for 13% of the variance).

Analysis—After ensuring that variables were normally distributed, we performed four sets of analyses. First, unadjusted linear regression models were used to assess the associations between self-care, clinical outcomes, mental component of quality of life (MCS) and perceived racial discrimination. Second, multiple linear regression models were used to assess the associations adjusting for relevant covariates, including race, site, gender, marital status, duration of diabetes, number of years in school, number of hours worked per week, income, health status, and charlson comorbidity score. Third, racially stratified multiple linear regression models were conducted to examine the associations by race, adjusting for relevant covariates. Relevant covariates were based on findings from the literature on perceived discrimination and other psychosocial factors. Finally, a multiple linear regression model assessed the association between perceived racial discrimination and all relevant covariates to evaluate which factors are associated with racial discrimination. All analyses were performed using Stata Version 13. Two-tailed alpha of 0.05 was used to assess statistical significance.

Results

Demographic characteristics for this sample of 602 adults with type 2 diabetes are shown in Table 1, stratified by race and overall. The mean age overall was 61 years, with the majority being men (61.6%), non-Hispanic Black (64.9%), and employed (65.3%). The mean age for Blacks was 60 and was 65 for Whites. Blacks worked 14 hours per week and Whites worked 10 hours per week. Blacks completed 13 years of school and Whites completed 14 years of school. Overall, 13% had less than a high school diploma, and 41.6% earned less than $20,000 annually. Mean systolic blood pressure was 129.7 mm/Hg, mean LDL was 96.9 mg/dL, and mean HbA1c was 7.9% (63 mmol/mol).

Table 2 shows the unadjusted models of the relationship between perceived discrimination, self-care, diabetes outcomes and quality of life. Perceived racial discrimination was significantly negatively associated with the mental component of quality of life (β= -0.83, 95% CI -1.16, -0.50), general diet (β= -0.41, 95% CI -0.67, -0.14), specific diet (β= -0.33, 95% CI -0.53, -0.13), and medication adherence (β= -0.53, 95% CI -0.78, -0.26).

Table 3 shows the adjusted models of the relationship between perceived discrimination, self-care, diabetes outcomes and quality of life. In the overall population, perceived discrimination was significantly negatively associated with the mental component of quality of life (β= -0.56, 95% CI -0.90, 0.23), general diet (β= -0.37, CI -0.65, -0.08), and specific diet (β= -0.25, CI -0.47, -0.03). In African Americans, perceived discrimination was significantly positively associated with systolic blood pressure (β= 10.17, CI 1.13, -19.22). In Whites, perceived discrimination was significantly negatively associated with the mental component of quality of life (β= -0.51, CI -0.89, -0.14), general diet (β= -0.40, CI -0.69, -0.99), specific diet (β= -0.25, CI -0.47, -0.03), and blood glucose testing (β= -0.43, CI -0.80, -0.06).

Table 4 shows the factors associated with perceived race discrimination on self-care, diabetes outcomes and quality of life. Being African American (β= 0.28, CI 0.16, 0.40) and having income between $10,000 and $14,999 (β= 0.21, CI 0.21, 0.41) were both significantly positively associated with reporting perceived discrimination.

Discussion

In this study of 602 patients with type 2 diabetes, we found that after adjusting for relevant covariates perceived discrimination had a significant negative association with the mental component of quality of life (MCS), general diet, and specific diet. In African Americans, perceived discrimination was significantly positively association with systolic blood pressure, while in Whites, it was significantly negatively associated with MCS, general diet, specific diet, and blood sugar testing. Factors associated with perceived discrimination on self-care, diabetes outcomes, and quality of life included being African American and having income between $10,000 and $14,999.

These findings provide a better understanding of the influence of perceived discrimination on health in individuals with type 2 diabetes. A conceptual model of the pathways by which perceived discrimination influence health outcomes suggests the importance of

understanding the impact on mental and physical health, as well as health behaviors [11]. This is the first study that provides information from the same population of patients with type 2 diabetes on physical health, mental health and self-care behaviors. Previous work in diabetes has focused on the relationship between psychological distress, mental health, and physical outcomes [15,18]; however, little research has investigated the impact of perceived discrimination on health behaviors. These results suggest that while a direct association to physical health outcomes may not exist, perceived discrimination has an influence on the mental component of quality of life and health behaviors, and thus should be addressed through educational programs focused on improving health in patients with type 2 diabetes. Longitudinal analyses should be conducted to inform the direction and mechanism of this association. In addition, this study provides a stratified analysis by race, suggesting perceived discrimination may influence different races in different ways. Previous research has found both whites and blacks experience discrimination from individuals in positions of power. [30] This study found that while both races may experience perceived discrimination the impact may differ. While perceived discrimination in whites showed a significant association with quality of life and self-care measures, in blacks there was a significant association with the clinical measure of systolic blood pressure. Efforts to ensure diabetes education program are culturally tailored should assist in addressing this difference as the way races experience and are influenced by perceived discrimination may differ. Additionally, more research is warranted to understand why the associations differ by race.

While little work has been done in populations with type 2 diabetes, these results are consistent with the current literature in other diseases, which suggests that perceived discrimination has an independent influence on health and adjustment for relevant covariates does not remove the association [11]. It is also consistent with the literature from other diseases, which suggests that perceived discrimination has a more negative influence on mental health than physical health [11]. In this study, while there was a significant association with MCS, perceived discrimination did not have an impact on biologic measures other than blood pressure in African Americans. Previous research found significant associations with mean continuous glucose, insulin resistance, and glycemic control [15,18], however, these studies were only conducted in women and sample sizes were much smaller. This study found that while a significant association with physical health outcomes was not present, health behaviors were associated with perceived discrimination and may be an appropriate way to mitigate the impact of perceived discrimination on health outcomes in patients with type 2 diabetes. In addition, this study found that race and income are associated with the report of perceived discrimination, and when stratified by race the influence of perceived discrimination on outcomes differs. As a result, while studies should appropriately control for these factors, they should not focus on a specific race, gender or socioeconomic level when collecting data because all groups show some significant associations.

The strengths of this study include the large sample size and the well-adjusted models for inclusion of variables, increasing the generalizability of these results. However, there are three limitations that should be noted. First, the study design was cross-sectional, limiting the ability to address causality or direction of the associations observed and the mechanism through which the association is focused. Previous work using longitudinal and

experimental designs suggest the direction of association [9,11], however, it cannot be confirmed with the data used in this analysis. Second, there may be additional confounding factors that could influence the results, such as disease severity, and health care access. Third, the study was conducted in the southeast United States and may not be representative of populations in other areas. While there is no indication results would differ by region, future research should be conducted in other regions of the United States and in other countries in order to fully understand the relationship among perceived discrimination, self-care, diabetes outcomes and quality of life.

Conclusions

In conclusion, this study found an association between perceived discrimination, health behaviors such as diet, and the mental component of quality of life. While no direct association was found with biologic measures when both races were included in the analysis, the influence on health behaviors suggests this may be an important factor when considering how to improve the health of patients with type 2 diabetes. In addition, this study found that race is a factor associated with perceived discrimination and the influence of perceived discrimination may differ by race. Perceived discrimination in blacks was associated with the clinical outcome of systolic blood pressure, while in whites it was associated with the mental component of quality of life and multiple self-care behaviors. This study highlights the importance of culturally tailoring diabetes education programs and taking into account psychosocial factors such as perceived discrimination when working with patients to improve self-care, clinical outcomes and quality of life.

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References

1. Center for Disease Control and Prevention. National Diabetes Statistics Report, 2014. US Department of Health and Human Services, Center for Disease Control and Prevention; Atlanta: 2014.
2. Egede LE, Dagogo-Jack S. Epidemiology of Type 2 diabetes: focus on ethnic minorities. Med Clin N Am. 2005; 89(5):949–975. [PubMed: 16129107]
3. American Diabetes Association. Standards of Medical Care in Diabetes – 2013. 2013; 36:S11–S66.
4. Nwasuruba C, Osuagwu C, Bae S, Singh KP, Egede LE. Racial differences in diabetes self-management and quality of care in Texas. J Diabet Complications. 2009; 23(2):112–118.
5. Campbell JA, Walker RJ, Smalls BL, Egede LE. Glucose control in diabetes: the impact of racial differences on monitoring and outcomes. Endocr J. 2012; 42(3):471–482.
6. Walker RJ, Smalls BL, Campbell JA, Williams JL, Egede LE. Impact of social determinants of health for type 2 diabetes: a systematic review. Endocrine. 2013; 47(1):29–48. [PubMed: 24532079]
7. Fiore V, Marci M, Poggi A, Giagullia VA, Licchelli B, Iacoviello M, Guastamacchia E, Pergola G, Triggiani V. 2014. The association between diabetes and depression: a very disabling condition. Endocrine. 2014 Epub ahead of print. 10.1007/s12020-014-0323-x
8. Daniele TM, Bruin VM, Forte AC, Oliveira DS, Pompeu CM, Bruin PF. 2012. The relationship between physical activity, restless legs syndrome, and health-related quality of life in type 2 diabetes. Endocrine. 2012; 44(1):125–131. [PubMed: 23203003]

9. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. J Behav Med. 2009; 32(1):20–47. [PubMed: 19030981]
10. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: Findings from community studies. Am J Public Health. 2003; 93(2):200–208. [PubMed: 12554570]
11. Pascoe EA, Richman LS. Perceived discrimination and health: a meta-analytic review. Psychol Bull. 2009; 135(4):531–554. [PubMed: 19586161]
12. Chen D, Yang T. The pathways from perceived discrimination to self-rated health: an investigation of the roles of distrust, social capital, and health behaviors. Soc Sci Med. 2014; 104:64–73. [PubMed: 24581063]
13. Perry BL, Harp KL, Oser CB. Racial and gender discrimination in the stress process: implications for African American women's health and well-being. Sociol Perspect. 2013; 56(1):25–48. [PubMed: 24077024]
14. Forsyth J, Schoenthaler A, Chaplin WF, Ogedegbe G, Ravenell J. Perceived discrimination and medication adherence in black hypertensive patients: the role of stress and depression. Psychosom med. 2014; 76(3):229–236. [PubMed: 24677163]
15. Wagner JA, Tennen H, Feinn R, Finan PH. Racial discrimination and metabolic control in women with type 2 diabetes. Ethnic Dis. 2013; 23(4):421–427.
16. Mays VM. Black women, work, stress, and perceived discrimination: the focused support group model as an intervention for stress reduction. Cult Divers ment Health. 1995; 1(1):53–65. [PubMed: 9225548]
17. Otiniano AD, Gee GC. Self-reported discrimination and health-related quality of life among Whites, Blacks, Mexicans and Central Americans. J Immigr Minor Health. 2012; 14(2):189–197. [PubMed: 21562787]
18. Wagner JA, Tennen H, Feinn R, Osborn CY. Self-reported discrimination, diabetes distress, and continuous blood glucose in women with type 2 diabetes. J Immigrant Minority Health. 2014 Epub ahead of print.
19. Dolezsar CM, McGrath JJ, Herzig AJM, Miller SB. Perceived racial discrimination and hypertension: a comprehensive systematic review. Health Psychol. 2014; 33(1):20–34. [PubMed: 24417692]
20. Womack VY, Ning H, Lewis CE, Loucks EB, Reis J, Siddique J, Sternfeld B, Van Horn L, Carnethon MR. Relationship between perceived discrimination and sedentary behavior in adults. Am J Health Behav. 2014; 38(5):641–649. [PubMed: 24933133]
21. Coffey JT, Brandle M, Zhou H, Marriott D, Burke R, Tabaei BP, Engelgau MM, Kaplan RM, Herman WH. Valuing health-related quality of life in diabetes. Diabetes Care. 2002; 25(12):2238–2243. [PubMed: 12453967]
22. Brown AF, Ettner SL, Piette J, Weinberger M, Gregg E, Shapiro MF, Karter AJ, Safford M, Waitzfelder B, Prata PA, Beckles GL. Socioeconomic position and health among persons with diabetes mellitus: a conceptual framework and review of the literature. Epidemiol Rev. 2004; 26(1):63–77. [PubMed: 15234948]
23. National Center for Health Statistics. Survey Questionnaire, National Health Interview Survey. National Center for Health Statistics; Hyattsville, Maryland: 2004. Available at: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2002/
24. Moffet HM, Adler N, Schillinger D, Ahmed AT, Laraia B, Selby JV, Neugebauer R, Liu JY, Parker MM, Warton M, Karter AJ. Cohort Profile: Diabetes Study of North California (DISTANCE) – objectives and design of a survey follow-up study of social health disparities in a managed care population. Int J Epidemiol. 2009; 38(1):38–47. DISTANCE survey available at: http://www.dor.kaiser.org/external/uploadedFiles/content/research/distance/DISTANCE_Survey_FINAL_2006.pdf. [PubMed: 18326513]
25. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self reported measure of medication adherence. Med Care. 1986; 24(1):67–74. [PubMed: 3945130]
26. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. Diabetes Care. 2000; 23(7):943–950. [PubMed: 10895844]

27. Ware J, Kosinski M, Keller S. 12-Item Short-Form Health Survey: Construction of Scales and Preliminary Tests of Reliability and Validity. Med Care. 1996; 34(3):220–233. [PubMed: 8628042]

28. Idler E, Benyamini Y. Self-rated health and mortality: A review of 28 studies. J Health Soc Behav. 1997; 38(1):21–37. [PubMed: 9097506]

29. Resnick B, Parker R. Simplified scoring and psychometrics of the revised 12-item short-form health survey. Outcomes Manag Nurs Pract. 2001; 5(4):161–166. [PubMed: 11898312]

30. Bower KM, Thorpe RJ, LaVeist TA. Perceived Racial Discrimination and Mental Health in Low-income Urban-dwelling Whites. Int J Health Serv. 2013; 43(2):267–280. [PubMed: 23821905]

Table 1
Sample demographic characteristics (n=602)

	% or Mean ± standard deviation			
	Overall	**African American**	**White**	**p-value**
Continuous Variables				
Age	61.5 ± 10.9	59.86 ± 11.14	64.67 ± 9.64	<0.001
Number of Years in School	13.4 ± 2.9	12.99 ± 2.57	14.26 ± 3.19	<0.001
Number of Hours Worked per	12.3 ± 18.9	13.57 ± 19.73	9.74 ± 17.04	0.019
Duration of Diabetes	12.3 ± 9.2	11.94 ± 9.11	12.93 ± 9.31	0.210
Charlson Comorbidity Score	25.7 ± 2.2	25.63 ± 2.28	25.87 ± 2.16	0.214
Race Discrimination	1.32 ± 0.63	1.44 ± 0.72	1.09 ± 0.30	<0.001
Categorical Variables				
Gender				
Female	38.7	46.9	22.7	<0.001
Race/Ethnicity				
African American/Black	66.3	--	--	
Annual Household Income				<0.001
<$10,000	20.1	26.4	7.7	
$10,000-$14,999	11.5	13.5	7.7	
$15,000-$19,999	10.3	10.6	9.7	
$20,000-$24,999	10.1	10.4	9.7	
$25,000-$34,999	14.8	16.8	10.7	
$35,000-$49,999	13.4	9.1	21.9	
$50,000-$74,999	10.3	9.3	12.2	
$75,000+	9.5	3.9	20.4	
Marital Status				<0.001
Never Married	11.3	13.5	6.9	
Married	49.3	42.5	62.6	
Separated/Divorce	28.3	31.7	21.6	
Widowed	11.1	12.3	8.9	
Site				
VA Medical Center	48.2	46.6	51.2	0.284
Health Status				0.171
Excellent	1.3	1.0	2.0	
Very Good	12.0	11.3	13.3	
Good	38.9	37.1	42.4	
Fair	38.2	41.6	31.5	
Poor	9.6	9.0	10.8	

* p-values are for African American vs. White comparisons

Table 2

Unadjusted Models for the Relationship between Perceived Discrimination, Self-Care, Diabetes Outcomes and Quality of Life

	β	*P*-value	CI
Hemoglobin A1c	0.13	0.284	-0.11,0.38
Systolic Blood Pressure	0.73	0.508	-1.44,2.91
LDL	7.53	0.113	-1.78,16.84
Mental Component of Quality of Life	-0.83***	<0.001	-1.17,-0.50
General Diet	-0.41**	0.003	-0.68,-0.15
Specific Diet	-0.33**	0.001	-0.54,-0.13
Exercise	0.02	0.885	-0.28,0.32
Blood Glucose Test	-0.31	0.068	-0.64,0.02
Foot Care	-0.09	0.573	-0.43,0.24
Medication Adherence	-0.53***	<0.001	-0.79,-0.27

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$

Table 3

Adjusted Models for the Relationship between Perceived Discrimination, Self- Care, Diabetes Outcomes and Quality of Life

	Overall			Black			White		
	β	*p*	CI	β	*p*	CI	β	*p*	CI
A1c	-0.03	0.840	-0.28, 0.23	-0.27	0.502	-1.07, 0.52	-0.003	0.984	-0.29, 0.29
Systolic Blood Pressure	1.86	0.159	-0.73, 4.45	10.17*	0.028	1.13, 19.22	0.70	0.606	-1.97, 3.37
LDL	3.18	0.545	-7.13, 13.50	-4.06	0.830	-41.38, 33.26	3.69	0.511	-7.34, 14.73
MCS	-0.56**	0.001	-0.90, -0.23	-0.68	0.204	-1.73, 0.37	-0.51**	0.008	-0.89, -0.14
General Diet	-0.37*	0.012	-0.65, -0.08	-0.21	0.692	-1.28, 0.85	-0.40**	0.009	-0.69, -0.99
Specific Diet	-0.25*	0.025	-0.47, -0.03	-0.17	0.702	-1.07, 0.72	-0.25*	0.024	-0.47, -0.03
Exercise	0.10	0.527	-0.21, 0.42	0.43	0.477	-0.77, 1.64	0.11	0.522	-0.22, 0.43
Blood Glucose Test	-0.29	0.108	-0.65, 0.06	0.69	0.316	-0.66, 2.03	-0.43*	0.023	-0.80, -0.06
Foot Care	-0.25	0.162	-0.60, 0.10	0.14	0.839	-1.22, 1.50	-0.22	0.218	-0.58, 0.13
Medication Adherence	-0.20	0.148	-0.47, 0.07	-0.02	0.963	-1.00, 0.96	-0.21	0.162	-0.51, 0.09

Models are adjusted for race, site, gender, marital status, duration of diabetes, number of years in school, number of hours worked per week, income, health status, charlson comorbidity score

MCS = Mental Component of Quality of Life

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$

Table 4
Factors Associated with Perceived Race Discrimination

	β	*P*-value	CI
Race			
Black	0.28***	<0.001	0.16, 0.40
Site			
VAMC	0.14	0.051	-0.0006, 0.28
Age	-0.005	0.084	-0.01, 0.0007
Gender			
Male	-0.06	0.451	-0.20, 0.09
Marital Status			
Married	-0.05	0.592	-0.22, 0.13
Separated/Divorce	0.09	0.349	-0.09, 0.27
Widowed	0.05	0.657	-0.18, 0.28
Duration of Diabetes	-0.004	0.197	-0.01, 0.002
Number of Years in School	0.0005	0.964	-0.02, 0.02
Number of Hours Worked per Week	0.002	0.120	-0.0006, 0.01
Income			
$10,000-$14,999	0.21*	0.030	0.21, 0.41
$15,000-$19,999	0.001	0.989	-0.21, 0.21
$20,000-$24,999	0.001	0.991	-0.21, 0.22
$25,000-$34,999	0.05	0.600	-0.14, 0.25
$35,000-$49,999	0.01	0.953	-0.20, 0.21
$50,000-$74,999	-0.01	0.929	-0.23, 0.21
$75,000+	0.06	0.656	-0.20, 0.32
Health Status			
Very Good	-0.07	0.764	-0.52, 0.38
Good	0.01	0.954	-0.42, 0.44
Fair	0.04	0.851	-0.39, 0.47
Poor	0.27	0.239	-0.18, 0.73

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$