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## Depression and Risk Perceptions in Older African Americans with Diabetes

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Running Head: Depression and Risk Perceptions in Diabetes

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Depression and Risk Perceptions in Diabetes

**Key Words:** Depression, Diabetes Mellitus, African Americans, Risk Perceptions

**Abstract**

**Introduction:** The purpose of this study is to describe the impact of depression on perceptions of risks to health, diabetes self-management practices, and glycemic control in older African Americans with type 2 diabetes.

**Methods:** The authors analyzed data on depression, risk perceptions, diabetes self-management, and hemoglobin A1C in African Americans with type 2 diabetes. T tests, chi square, and multivariate regression were used to analyze the data.

**Results:** The sample included 177 African Americans (68% women) whose average age was 72.8 years. Thirty four (19.2%) participants met criteria for depression. Compared to non-depressed participants, depressed participants scored significantly higher on Personal Disease

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Risk (the perception of being at increased risk for various medical problems), Environmental Risk (i.e., increased risk for environmental hazards), and Composite Risk Perception (i.e., overall perceptions of increased risk), adhered less to diabetes self-management practices, and had marginally worse glycemic control. Depression and fewer years of education were independent predictors of overall perception of increased health risks.

**Conclusion:** Almost 20% of older African Americans with type 2 diabetes in this study were depressed. Compared to non-depressed participants, they tended to have fewer years of education, perceived themselves at higher risk for multiple health problems, and adhered less to diabetes self-management practices. It is important for diabetes educators to recognize the impact of low education and the fatalistic perceptions that depression engenders in this population.

**Introduction**

The relationship between diabetes and depression is complex and bidirectional. (1, 2)

Depression reduces physical activity, fosters unhealthy diets, depletes motivation to manage one's health, and activates neuroendocrine and inflammatory pathways that increase insulin resistance.(3, 4) Diabetes requires major life-style changes, carries a high risk of medical complications, and is associated with structural brain changes, all of which may cause

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depression.(5-7) These considerations are important to older African Americans who, compared to whites, have almost twice the rate of type 2 diabetes (T2DM), worse glycemic control, and equivalent or higher rates of depression.(8-10) In fact, about 25% of African Americans with T2DM have clinically significant depression but they are less likely than whites to seek treatment due to misconceptions about depression, stigma, and limited access to culturally relevant care.(11-14) For these patients, untreated depression adds to disparities in education, health literacy, and socioeconomic resources and may explain why African Americans are more likely than whites to go blind, lose limbs, need dialysis, and die from diabetes.(15-17)

Perceptions of risk for developing these adverse outcomes influence diabetes self-management and the actual risk of developing diabetes complications. Drawing from health belief theories, risk perception invokes the concepts of perceived susceptibility (one's chances of experiencing a disease), perceived severity, perceived benefits (efficacy of the advised action to reduce risk), perceived barriers, cues to action (strategies to activate "readiness"), and self-efficacy.(18)

Perceptions of risk may be influenced by depression, which distorts one's sense of self-efficacy and view of the future and induces fatalistic perspectives on the preventability of diabetes complications and other health threats. In this study, we compared depressed and non-depressed older African Americans with T2DM to assess the impact of depression on risk perceptions, diabetes self-management practices, and glycemic control. Understanding these relationships may inform new interventions to improve glycemic control and prevent diabetes complications in this population.



**Methods:**

The participants (n = 177) are enrolled in an ongoing randomized controlled clinical trial that compares the efficacy of Behavior Activation (active treatment) to Supportive Therapy (control condition) to increase rates of dilated fundus examinations in older African American with T2DM.<sup>(19)</sup> The data we report here were obtained at the baseline assessment before randomization. Community health workers (CHWs) who were concordant in language, race, and ethnicity recruited participants from community sites and the primary care medical practices of Thomas Jefferson University and Temple University (both in Philadelphia, PA) to identify African Americans over age 65 with physician-diagnosed T2DM and no documented dilated fundus examination in the preceding year. Exclusion criteria included cognitive impairment on an abbreviated Mini-Mental Status Examination, psychiatric disorder other than depression or anxiety, need for dialysis, and sensory impairment that precluded research participation.

The 177 participants were drawn from among 197 potentially eligible patients. The 20 patients who did not enroll did not differ in age or sex from enrolled participants. One patient was excluded because of a diagnosis of schizophrenia. The CHWs made in-home visits to review the study, confirm eligibility, and conduct the baseline assessments. All participants signed an informed consent form approved by the institutional review boards of Jefferson and Temple. The CHWs also measured hemoglobin A1C levels using a portable measurement device and administered the following instruments:

1) Risk Perception Survey–Diabetes Mellitus (RPS-DM): The RPS-DM is a 26 item self-rated instrument that assesses perceived control over (i.e., Personal Control subscale), worry about, and likelihood of developing diabetes complications (e.g., vision loss, renal failure).(20) It also includes a Personal Disease Risk subscale, which assesses perceived risk of developing 9 medical conditions (e.g., myocardial infarction, stroke), and an Environmental Risk subscale, which assesses perceived risk of 9 potential environmental hazards (e.g., pollution, crime, riding in a car). A Composite Risk Perception score averages the scores of the 26 items. The RPS-DM also has a 5-item diabetes Risk Knowledge subscale that is not included in the composite score. Responses on the RPS-DM are rated on a 4-point Likert scale ranging from 1 = “strongly agree” to 4 = “strongly disagree”. Average item scores range from 1 to 4, with higher scores indicating more perceived risk. The RPS-DM subscales and composite score have demonstrated reliability and validity. (20)

2) Diabetes Self-Care Inventory-Revised (DSCI-R): The DSCI-R is a 14-item self-report measure of adherence to diabetes self-care practices that has established reliability and validity, correlates with hemoglobin A1C levels, and is responsive to treatment.(21) Items include blood glucose monitoring, medication use, exercise, diet, and attending clinic appointments. Responses are rated on a 5-point Likert scale ranging from 1 = “never do this” to 5 = “always do this as recommended”. Scores are averaged and converted to a 0 to 100 point scale, with higher scores indicating greater adherence during the preceding month.

3) Patient Health Questionnaire-9 (PHQ-9): The PHQ-9 is a structured instrument with known reliability and validity that includes the nine criteria that comprise DSM-IV diagnoses of depressive disorders.(22) The PHQ-9 yields both categorical diagnoses and a continuous measure of depressive symptoms, and has been validated in the African American population.(23) Each of the nine depressive symptoms is scored from 0 = “not at all” to 3 “nearly every day,” yielding a range from 0 to 27. Scores of 10 and above indicate clinically significant depressive symptoms with an 88% sensitivity and specificity for the diagnosis of a depressive disorder. (22) We used this cut-off score to designate participants with clinically significant depression.

Statistical Analyses: The demographic and clinical characteristics of depressed and non-depressed participants were compared using chi-square analyses for categorical data and one way analysis of variance for continuous data. Multiple regression analysis was used to determine if depression, defined as a PHQ-9 score of 10 or greater, was related to Composite Risk Perception, after controlling for age, education, sex, and hemoglobin A1C level.

**Results:**

The sample was comprised of 177 African Americans with T2DM of whom 68.0% were women; the average age (standard deviation) of participants was 72.8 (6.1) years. Thirty four (19.2%) participants met the criteria for clinically significant depression. Thirty three of them (97.1%) had moderate depression (i.e., PHQ-9 scores from 10 to 20); one participant had severe depression (i.e., PHQ-9 score over 20). Table 1 compares depressed and non-depressed participants and shows that a higher proportion of depressed participants were women and that depressed participants tended to have fewer years of education. Depressed participants also scored significantly higher on Personal Disease Risk (indicating their perception of being at increased risk for various medical problems), Environmental Risk (i.e., increased risk for various environmental hazards), and Composite Risk Perception (i.e., overall perceptions of increased risk). Depressed participants scored significantly lower on the Diabetes Self-Care Inventory (indicating lower levels of adherence to diabetes self-management practices) and tended to score lower on Personal Control (indicating their perception of limited control over whether or not they develop diabetes complications). There was a trend for depressed participants to have higher hemoglobin A1C levels, suggesting worse glycemic control.

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Table 2 shows the results of a multiple regression analysis examining the relationship of participants' demographic characteristics (i.e., age, sex, education), glycemic control (i.e., hemoglobin A1C level), and depression status to total risk perception (i.e., Composite Risk Perception score). Perceived risk was higher for depressed participants ( $t = 2.31$ ;  $p \leq .022$ ) and those with fewer years of education ( $t = -2.26$ ;  $p \leq .025$ ). The other demographic characteristics and hemoglobin A1C level were not independent predictors of perceptions of risk.

**Discussion:**

We found that almost 20% of older African Americans with T2DM in this study were depressed. Compared to their non-depressed peers, they perceived themselves at higher risk for multiple health problems and are, in fact, at higher risk for diabetes complications because they adhere less to diabetes self-management practices. Depressed participants also perceived themselves at higher risks for other medical problems and environmental hazards, suggesting a global negative outlook on multiple domains of their lives. Besides depression, fewer years of education were associated with greater perceptions of risk to one's health. Low education may reflect low health literacy (i.e., the capacity to obtain, process, and understand basic health information) and may prevent accurate health appraisals. This may lead to both over- and under-estimations of health risks although in this sample we found higher estimations of risk.

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These findings agree with other studies reporting high rates of depression and low health literacy in older African Americans with diabetes, as well as higher depression rates in women and worse diabetes self-management practices, glycemic control, and medical outcomes in persons with depression and fewer years of education .(8, 13, 24-28) There are two notable limitations of our study. First, the sample is not representative of older African Americans in general, given that participants were drawn primarily from primary care medical practices, had not had dilated fundus examinations in the preceding year, and met other eligibility criteria. Our results, therefore, require replication in more representative population-based samples. Second, we relied on participants' self-report of diabetes self-management practices, which has inherent bias and may be further impacted by depression. This bias would tend to reduce the strength of associations with glycemic control. These limitations notwithstanding, the study has a number of strengths, including the relatively large sample size, systematic assessments using standardized instruments, and the new associations we found between risk perceptions, diabetes self-management, and depression in older African Americans. These associations highlight the diversity within this population and the impact of depression on health perceptions and behaviors.

People with depression tend to hold pessimistic views of themselves and their circumstances.

These views coupled with loss of interest, low self-efficacy, and low motivation levels, compromise diabetes self-management and increase the risk for adverse health outcomes.(5, 6)

The Health Belief Model, which posits that health beliefs predict one's actions to maintain

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health, may not account for depression's impact on expected health attitudes and behaviors.(18) For this reason, other aspects of health behavior theories are needed to incorporate the influence of depression. Behavioral Psychology theory suggests that depression results from low rates of positive reinforcement for adaptive behaviors, wherein negative interactions with the environment degrade one's ability to adapt effectively to life circumstances.(29) We hypothesize that poor diabetes self-management in the context of depression reflects the absence of immediate reinforcement for desired behaviors (e.g., health benefits require years to accrue) and the immediate presence of aversive experiences (e.g., pain from finger sticks). This view suggests that linking diabetes self-management behaviors to positive reinforcers may achieve better glycemic control and treat depression.

The population is aging, the prevalence of T2DM is increasing rapidly, and our society is becoming more racially and ethnically diverse.(15) For older African Americans, who comprise one of the fastest growing minorities, depression and diabetes are diagnosed at more advanced stages compared to whites, when outcomes are less promising and care is costlier.(15, 30 , 31 ) These facts necessitate novel culturally appropriate interventions to treat depression and improve diabetes self-management in this population. Although community-based diabetes education programs are available to all older African Americans, those who are depressed and/or have fewer years of education may not seek them out, and physicians and nurse educators may fail to appreciate the fatalistic attitudes and altered risk perceptions that depression and low health literacy engender.(32 ) For medical providers and diabetes

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educators, greater awareness of the effects of depression will encourage them to screen for depression in all patients with diabetes, help patients attain more realistic appraisals of their health, and support efforts to improve glycemic control when depression is present.

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**Table 1. Demographic and Clinical Characteristics of Depressed and Non-depressed  
Participants (N = 177)**

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	<b>Not Depressed</b>  <b>(n = 143)</b>	<b>Depressed</b>  <b>(n = 34)</b>	<b>p</b>
Age <sup>†</sup>	72.9 (6.2)	72.7 (6.1)	.869
Female (n, %)	91 (63%)	31 (92%)	.001
Education, years <sup>†</sup>	12.2 (2.4)	11.3 (2.9)	.063
Risk Perception Survey–Diabetes Mellitus (RPS-DM):			
- Personal Disease Risk <sup>†, *</sup>	2.8 (.8)	3.1 (.7)	.030
- Environmental Risk <sup>†, *</sup>	2.2 (.7)	2.5 (.6)	.046
- Personal Control <sup>†, *</sup>	3.1 (.6)	2.9 (.6)	.088
- Composite Risk Perception <sup>†, *</sup>	2.5 (.4)	2.7 (.4)	.010
Diabetes Self Care Behaviors <sup>†, *</sup>	38.3 (6.8)	34.8 (6.8)	.008
Risk Knowledge <sup>†, *</sup>	3.9 (1.2)	3.8 (1.4)	.664
A1c <sup>†, #</sup>	7.4 (1.6)	7.9 (2.1)	.153

<sup>†</sup> mean, (standard deviation)

\* Higher score indicates greater standing on this variable.

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# Higher value indicates worse glycemic control.

**Table 2. Multiple Regression of Total Perceived Risk<sup>1,2</sup>**

<b>Variable</b>	<b>Beta</b>	<b>t</b>	<b>p</b>
Sex (1 = male; 2 = female)	.08	1.02	.311
Education (number of years)	-.18	-2.26	.025
Age	.01	.06	.953
HbA1c	.02	.31	.757
Depression Status (0 = not depressed; 1 = depressed)	.19	2.31	.022

1 A higher score indicates greater perceived risk.

2 Multiple  $r = .305$ ,  $p = .009$ .