Published in final edited form as:

Diabetes Educ. 2012 ; 38(3): 427–435. doi:10.1177/0145721712440335.

Association between Spirituality and Depression in Adults with Type 2 Diabetes

Cheryl P. Lynch, MD, MPH^{1,2}, Joni L. Strom, MPH¹, Melba A. Hernandez-Tejada, MS¹, and Leonard E. Egede, MD, MS^{1,2}

¹Center for Health Disparities Research, Department of Medicine, Medical University of South Carolina, Charleston, SC

²Center for Disease Prevention and Health Interventions for Diverse Populations, Charleston VA REAP, Medical University of South Carolina, Charleston, SC

Abstract

Purpose—The purpose of the study was to examine the association between spirituality and depression among patients with type 2 diabetes.

Methods—This study included 201 adult participants with diabetes from an indigent clinic of an academic medical center. Participants completed validated surveys on spirituality and depression. The Daily Spiritual Experience (DSE) Scale measured a person's perception of the transcendent (God, the divine) in daily life. The Center for Epidemiologic Studies-Depression scale assessed depression. Linear regression analyses examined the association of spirituality as the predictor with depression as the outcome, adjusted for confounding variables.

Results—Greater spirituality was reported among females, non-Hispanic blacks (NHB), those with lower educational levels, and those with lower income. The unadjusted regression model showed greater spirituality was associated with less depression. This association was mildly diminished but still significant in the final model. Depression scores also increased (greater depression risk) with females and those who were unemployed but decreased with older age and NHB race/ethnicity.

Conclusions—Treatment of depression symptoms may be facilitated by incorporating the spiritual values and beliefs of patients with diabetes. Therefore, faith-based diabetes education is likely to improve self-care behaviors and glycemic control.

Keywords

spirituality; depression; diabetes

Corresponding Author: Leonard E Egede, MD, MS, Center for Health Disparities Research, Center for Disease Prevention and Health Interventions for Diverse Populations, Medical University of South Carolina, 135 Rutledge Avenue, Room 280G, P.O. Box 250593, Charleston, SC 29425-0593, Phone: 843-876-1238, Fax: 843-876-1201, egedel@musc.edu.

Authors' Contributions:

Study concept and design: Egede

Acquisition of data: Egede

Analysis and interpretation of data: Egede, Lynch, Hernandez Tejada, Strom

Drafting of the manuscript: Lynch, Hernandez Tejada, Strom

Critical revision of the manuscript for important intellectual content: Egede, Lynch, Hernandez Tejada

Final approval of manuscript: Egede, Lynch, Hernandez Tejada, Strom

Conflict of Interest

None of the authors have any financial disclosure or conflict of interest to report.

Individuals with diabetes and comorbid depression have an accelerated course in the progression to disability through microvascular and macrovascular complications^{1,2} and to death³. The prevalence of depression among people with type 2 diabetes has been reported to be as high as 30%^{4,5}. The risk of depression is twice as high among people with diabetes as those without diabetes^{4,6}. Among people with diabetes, the adverse impact of comorbid depression is partly mediated through poor self-care and poor glycemic control⁷⁻⁹.

The performance of appropriate self-management behaviors is inadequate for achieving good glycemic control among a considerable number of depressed patients with diabetes⁹, the mechanisms of which have not been fully elucidated. More intrinsic characteristics such as personal and social motivation likely contribute to poor diabetes-related behaviors and self-management. This is partly attributed to patients' having a negative attitude toward their disease¹⁰ and a lack of motivation for tending to diabetes self-management¹¹. Social motivation, generally in the form of social support, has been shown to be a mediating factor through which depression influences diabetes outcomes like glycemic control and self-management behaviors^{9,12} and has also been shown to confer protection against poor self-care¹³. Alternatively, personal motivation such as one's faith and spiritual beliefs are often the basis upon which individuals deal with health-related stressors or perceived health problems¹⁴. However, evidence is very limited regarding faith-based personal motivation (fatalism, religiosity, spirituality) as a mechanism for thwarting depressive symptoms among patients with diabetes.

Religiousness and spirituality have been examined as factors related to improved glycemic control¹⁵ and lower disease morbidity and mortality^{9,14,16} as it likely facilitates greater self-efficacy, higher self-care, and better overall disease management⁹. Spirituality has significant therapeutic benefit among those with depression (providing a defense against depression among those with chronic disease)^{16,17}. Therefore, the primary aim of this study was to examine the association between spirituality and depression among low-income patients with diagnosed type 2 diabetes. The study hypothesis was that high levels of spirituality will be associated with a lower depression scores among low-income patients with type 2 diabetes.

RESEARCH DESIGN AND METHODS

Data Source

This study was conducted as part of a study funded by the Agency for Health Care Research and Quality (AHRQ). Billing records were used to identify all patients with type 2 diabetes in an indigent clinic of an academic medical center. Patients were contacted by telephone and invited to participate in the study. Over a 12-month period, consenting subjects completed validated surveys to assess depression, spirituality, diabetes knowledge, diabetes self-management, perceived control of diabetes, and health-related quality of life. Response rate was 60% and did not differ by race/ethnicity. Only data on race/ethnicity was available for responders and non-responders, and there was no significant difference. The university Institutional Review Board approved this study.

Sample Characteristics

Demographic variables based on self report included age, gender, race/ethnicity, marital status, educational level, employment status, annual income level, and health insurance. In addition, the presence or absence of comorbid conditions and the use of insulin were assessed. Age was grouped into three categories: <50 years, 50–64 years, and 65+ years. Gender was dichotomized into two groups: male and female. Race/ethnicity was defined as non-Hispanic Whites (NHW) and non-Hispanic Blacks (NHB). Marital status was dichotomized as married or not married. Educational level was categorized as less than high

(HS) graduate, HS graduate, or greater than HS graduate. Employment status was dichotomized as unemployed or employed. Four income categories were defined: <\$5,000, <\$10,000, <\$15,000, and \$15,000+. Health insurance was divided into three groups: private, government, or uninsured. Comorbidity was categorized into three groups: 0–1 condition, 2 conditions, and 3+ conditions. Current comorbid conditions were identified through chart audit and included: hypertension, heart disease, stroke, heart failure, chronic kidney disease, chronic obstructive pulmonary disease, peripheral vascular disease, chronic liver disease, and cancer. The use of insulin as a therapy in diabetes management was assessed by answering ‘yes’ or ‘no’. It was included as a measure of disease severity.

Variables and Instruments

Spiritual Experience—Six items from the Daily Spiritual Experience Subscale (DSES) were incorporated into the Brief Multidimensional Measure of Religiosity and Spirituality (BMMRS)¹⁸—a product of a national expert working group convened by the Fetzer Institute and the National Institute on Aging and designed for use in health care research. This 6-item self-report scale, used to assess spirituality, is intended to measure a person’s perception of the transcendent (God, the divine) in daily life and his or her perception of his or her interaction with or involvement of the transcendent in life¹⁸. The following six items were asked: (1) I feel God’s presence; (2) I find strength and comfort in my religion; (3) I feel deep inner peace or harmony; (4) I desire to be closer to or in union with God; (5) I feel God’s love for me, directly or through others; and (6) I am spiritually touched by the beauty of creation. The items were scored using a modified Likert scale, in which response categories were *many times a day, every day, most days, some days, once in a while, and never or almost never*. Once the instrument was completed, the score from each question was summed to represent a total score. For the DSES, lower scores reflected more frequent daily spiritual experiences (DSE) (e.g., *many times a day* = 1, *never or almost never* = 6)^{18,19}. The internal consistency reliability estimates with Cronbach’s alpha were very high at 0.91 for the 6-item scale used in the General Social Survey (GSS), which allows for normative population data for this subset of DSES questions. In the GSS, the mean score for the 6-item DSES was 18.7±7.9 with a range of 6–34¹⁸.

Depression—The Center for Epidemiologic Studies Depression Scale (CES-D) is a self-report scale designed to measure depression in the general population²⁰. The scale consists of 20 items rated on a 4-point scale with response categories indicating the frequency of occurrence of each item in the previous week. The 4-point scale ranges from 0 (rarely or none of the time) to 3 (most or all of the time). Scores for items 4, 8, 12, and 16 are reversed before scores for the 20 items are summed. Total scores range from 0 to 60, with higher scores indicating more depressive symptoms. A cutoff of 16 or higher has been used extensively for distinguishing depressed from non-depressed patients. The CES-D is a valid and reliable instrument for assessing depression in community samples with high internal consistency, good construct and concurrent validity, and modest test–retest reliability^{20–23}.

Statistical Analyses

All analyses were performed using STATA v10.0 software²⁴ (StataCorp LP, College Station, TX). Four main types of analyses were performed. First, the internal consistency of the 6-item DSES was examined in this sample. Second, the demographic characteristics of the sample were compared by depression status using *t* test for continuous variables and χ^2 statistics for categorical variables. Third, mean spirituality scores were computed by demographic characteristics and clinical factors (comorbidities and insulin therapy) using *t* tests and one-way *anova*. All variable distributions were examined for extreme values and skewness and found to be at least approximately normal, allowing the use of parametric statistical tests. Finally, three separate multiple linear regression models were constructed to

assess the independent association between spirituality and depression. Depression score, measured by the CES-D scale, was the outcome of interest. Although depression was a continuous variable with the score ranging from 0 to 60, a dichotomous variable was created such that individuals scoring at the cutoff of 16 or higher were considered as being depressed, while those with a score of less than 16 were not depressed. The dichotomous depression variable was entered into regression models as the primary dependent variable. Spirituality score, as a continuous variable, was the primary independent variable. Age, gender/sex, race/ethnicity, marital status, education, employment, income, insurance status, comorbidity burden, and use of insulin therapy were entered into the model as covariates. All variables were included in the models because each one was conceptually related to the outcome of interest.

RESULTS

The internal consistency of the 6-item DSES in this sample showed a Cronbach's alpha of 0.92, which is consistent with what was found in the national GSS study¹⁸. Of 201 participants, 20% reported being depressed or experiencing depressive symptoms. Demographic characteristics for this sample of adults with type 2 diabetes are shown in Table 1. Adults with diabetes who were depressed were significantly more likely to be 50–64 years of age ($p=0.017$), female ($p=0.018$), unemployed ($p=0.001$), and receiving governmental insurance ($p=0.002$). There was no significant difference in depression status among adults with diabetes based on race/ethnicity, marital status, education and income levels. There were also no statistical differences in depression status based on the number of comorbid conditions or use of insulin therapy.

Table 2 shows the results for mean spirituality scores for this sample. Based on score reporting for the DSES, lower scores represent more frequent DSE thus, greater spirituality. Females were significantly more likely than males to report DSE (11.4 in females vs. 14.1 in males, $p=0.002$). NHB reported lower spirituality scores, or more frequent DSE compared to NHW (10.6 vs. 14.6, $p<0.001$). Those adults with lower educational levels (HS graduate or less) were significantly more likely to report more frequent DSE (11.3–11.4, $p=0.001$) in comparison to those who studied beyond high school (13.7). The adults who reported an annual salary of \$10,000 - \$15,000 were also significantly more likely to score lower on the DSES (10.1 vs. 12.3, 12.2, and 14.3 in those with income levels of <\$5,000, <\$10,000, and \$15,000+, respectively, $p<0.001$); otherwise, there were no significant differences in the other sample characteristics including age, marital status, employment status, health insurance, comorbidities, and use of insulin therapy.

Results from the initial, unadjusted regression model, as shown in table 3, indicate spirituality and depression are positively correlated such that higher DSES scores (lower spirituality or less frequent DSE) relate to higher depression scores (beta 0.41, 95%CI 0.18–0.63). The overall variance in depression scores accounted for by spirituality scores was 5.6%. In the second model, considering mostly demographic factors (age, gender, race/ethnicity, marital status, educational level, employment status, annual income level, and health insurance), the following variables in the model were significant predictors of increased depression: higher DSES score (lower spirituality) (beta 0.25, 95%CI 0.08 to 0.49), younger age (50–64 years old [beta -5.74 , 95%CI -9.19 to -2.29] and 65+ years old groups [beta -10.02 , 95%CI -14.47 to -5.56] compared to <50 years old), NHB race/ethnicity (beta -5.05 , 95%CI -8.31 to -1.79) and unemployment (beta 4.84, 95%CI 1.20 to 8.49). The addition of these predictors increased the overall variance accounted for in depression scores to 22.6%. The third and final model, in which comorbidity and insulin therapy were adjusted for, the same predictor sets emerged as seen in the intermediate

model. The variance accounted for in depression scores by model 3 (23.2%), was only slightly improved relative to prior model.

CONCLUSIONS

The findings of this study demonstrate a significant inverse relationship between spirituality and depression such that a 1-point increase in DSES score (or lower spirituality) was associated with a 0.41-point increase in depression score (greater depression). After adjusting for sociodemographic and clinical variables in multivariate models, the magnitude of this difference was moderately diminished but remained significant. Several demographic factors had the strongest negative associations with depression score like older individuals (50+ years compared to <50 years) and NHB (compared to NHW) race/ethnicity. The strongest positive associations with depression were being female or unemployed. There were also demographic differences in mean spirituality scores such that individuals who were female, of lower education and of lower income had higher spirituality.

Multiple demographic, psychosocial, behavioral and clinical factors help provide an understanding of poor outcomes among patients with diabetes and comorbid depression; however, spirituality appears to confer protection against depression among patients with diabetes^{16,17}. Spirituality is a dynamic, personal and experiential process¹⁴ that is as important to overall health as the physical, emotional, and social dimensions. Spirituality contributes to an understanding of health and healing^{25,26}, but plays a greater role in fulfilling individual needs during times of illness¹⁴.

From this current study, the small to moderate correlation between spirituality and depression remained statistically significant even after adjusting for several sociodemographic and clinical variables. The relationship between spirituality and depression has also been examined among people with different chronic disease conditions like cancer, cardiovascular disease, hypertension, mood disorders and substance abuse^{14,27}, showing reductions in the incidence of depression among those with a strong sense of transcendence or spirituality. In these studies, spirituality has been assessed using a variety of instruments. The Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp) measured aspects of spirituality related to feelings of peace and coping, whereas the Ironson-Woods Spirituality/Religiousness Index (IW) measured beliefs, coping and relational aspects of spirituality. In that study, only spirituality instruments that measured meaning/peace significantly correlated with depression ($r=-0.50$, $p<0.001$) and quality of life ($r=0.41$, $p=0.001$)²⁷. Similarly, another study found a moderate correlation of $r=-0.36$ between spirituality (measured by Spiritual Involvement and Beliefs Scale) and depression (measured by Zung Depression Scale); also showing that high scores for items in the domain of intrinsic beliefs, such as belief in a higher power ($p<0.01$), the importance of prayer ($p<0.0001$) and finding meaning in times of hardship ($p<0.05$), were associated negatively with depression¹⁷. The DSES instrument used to measure spirituality in this study includes the components meaning/peace and belief in a higher power, which are consistently defined and assessed as spirituality in several studies^{14,17,27}. As demonstrated in this study and others, what remains consistent is the statistically significant and inverse relationship between spirituality and depression. Spirituality likely confers an inner sense of peace and intrinsic strength that guards against negative feelings and attitudes and probably allows one to maintain a higher performance of self-care behaviors and thus, greater glycemic control in those with diabetes.

Primary care physicians are the first line of defense for recognition and management of comorbid depression among patients with diabetes, with pharmacologic treatment as their primary weapon and referral for adjunctive behavioral therapy. However, psychosocial

factors and their impact on therapeutic management plans remain inadequately addressed in these clinical settings. The notion of spirituality being an empowering approach for patients to deal with symptoms of depression was even affirmed in a qualitative study that addressed how older African American women conceptualize the impact of spirituality on depression treatment²⁸.

Although a significant relationship was demonstrated between spirituality, sociodemographic variables and depression in patients with diabetes, significant amounts of variance are not accounted for by the models, and might be due to unmeasured factors. For example, psychosocial religious mediators such as congregational support, coping style and attendance at religious services (religiosity)²⁹ were not measured. According to some studies^{29,30}, interpersonal support in the form of a social network or an emotionally supportive individual or set of individuals has a particular impact on depression, and/or quickly recovering from depressive symptoms. A self-report scale of spirituality was used and measured only daily spiritual experiences. Social networks can be impacted by religious or spiritual practices, which were not fully captured in this study. Therefore, future studies should consider evaluating religiosity and/or spirituality and its effects on depression in the context of employment, marital status, education level, social activities, social support and religious participation. Other limitations include a relatively small sample size and limited generalizability to people without diabetes mellitus or people of other ethnicities, for example, Latino populations, who are known for having a strong social support inside their families and are at an increased risk of developing diabetes.

Implications

Several studies provide strong evidence that among adults with diabetes, depression impedes the adoption of effective self-management behaviors (including physical activity, appropriate dietary behavior, foot care, and adequate self-monitoring of blood glucose⁷ through a decrease in personal and social motivation⁹. The costs to society are compounded by the presence of depression in those with diabetes and few psychosocial factors are gaining ground as being protective against the adverse consequences of these comorbid conditions. Treatment of depression or depressive symptoms should incorporate the spiritual values and beliefs of patients with diabetes to improve self-care behaviors and glycemic control. Furthermore, clinical and research efforts should focus on training providers to perform routine assessment of spirituality in patients with diabetes and tailoring interventions to include a spirituality component as a means to increase and sustain self-care behaviors that improves diabetes outcomes and to positively impact multiple comorbid diseases.

Acknowledgments

Funding

This study was funded by grant 5K08HS11418 from the Agency for Health Care Research and Quality, Rockville, MD (PI: Leonard Egede, MD).

References

1. de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: a meta-analysis. *Psychosom Med*. Jul-Aug;2001 63(4):619–630. [PubMed: 11485116]
2. Lin EH, Heckbert SR, Rutter CM, et al. Depression and increased mortality in diabetes: unexpected causes of death. *Ann Fam Med*. Sep-Oct;2009 7(5):414–421. [PubMed: 19752469]
3. Lin EH, Rutter CM, Katon W, et al. Depression and advanced complications of diabetes: a prospective cohort study. *Diabetes Care*. Feb; 2010 33(2):264–269. [PubMed: 19933989]

4. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. *Diabetes Care*. Jun; 2001 24(6):1069–1078. [PubMed: 11375373]
5. Egede LE. Effect of comorbid chronic diseases on prevalence and odds of depression in adults with diabetes. *Psychosom Med*. Jan-Feb;2005 67(1):46–51. [PubMed: 15673623]
6. Egede LE, Zheng D. Independent factors associated with major depressive disorder in a national sample of individuals with diabetes. *Diabetes Care*. Jan; 2003 26(1):104–111. [PubMed: 12502665]
7. Gonzalez JS, Delahanty LM, Safren SA, Meigs JB, Grant RW. Differentiating symptoms of depression from diabetes-specific distress: relationships with self-care in type 2 diabetes. *Diabetologia*. Oct; 2008 51(10):1822–1825. [PubMed: 18690422]
8. Richardson LK, Egede LE, Mueller M, Echols CL, Gebregziabher M. Longitudinal effects of depression on glycemic control in veterans with Type 2 diabetes. *Gen Hosp Psychiatry*. Nov-Dec; 2008 30(6):509–514. [PubMed: 19061676]
9. Katon W, von Korff M, Ciechanowski P, et al. Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care*. Apr; 2004 27(4):914–920. [PubMed: 15047648]
10. Egede LE, Ellis C. The effects of depression on diabetes knowledge, diabetes self-management, and perceived control in indigent patients with type 2 diabetes. *Diabetes Technol Ther*. Jun; 2008 10(3):213–219. [PubMed: 18473696]
11. Egede LE, Ellis C. Development and psychometric properties of the 12-item diabetes fatalism scale. *J Gen Intern Med*. Jan; 2010 25(1):61–66. [PubMed: 19908102]
12. Rees CA, Karter AJ, Young BA. Race/ethnicity, social support, and associations with diabetes self-care and clinical outcomes in NHANES. *Diabetes Educ*. May-Jun;2010 36(3):435–445. [PubMed: 20332281]
13. Egede LE, Osborn CY. Role of motivation in the relationship between depression, self-care, and glycemic control in adults with type 2 diabetes. *Diabetes Educ*. Mar-Apr;2010 36(2):276–283. [PubMed: 20179250]
14. Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care*. 2000; 23:934–942. [PubMed: 10895843]
15. Gonzalez JS, Safren SA, Delahanty LM, et al. Symptoms of depression prospectively predict poorer self-care in patients with Type 2 diabetes. *Diabet Med*. Sep; 2008 25(9):1102–1107. [PubMed: 19183315]
16. Fisher L, Skaff MM, Mullan JT, et al. Clinical depression versus distress among patients with type 2 diabetes: not just a question of semantics. *Diabetes Care*. Mar; 2007 30(3):542–548. [PubMed: 17327318]
17. Kokoszka A, Pouwer F, Jodko A, et al. Serious diabetes-specific emotional problems in patients with type 2 diabetes who have different levels of comorbid depression: a Polish study from the European Depression in Diabetes (EDID) Research Consortium. *Eur Psychiatry*. Oct; 2009 24(7):425–430. [PubMed: 19541457]
18. Newlin K, Melkus GD, Tappen R, Chyun D, Koenig HG. Relationships of religion and spirituality to glycemic control in Black women with type 2 diabetes. *Nurs Res*. Sep-Oct;2008 57(5):331–339. [PubMed: 18794717]
19. Phillips LL, Paukert AL, Stanley MA, Kunik ME. Incorporating religion and spirituality to improve care for anxiety and depression in older adults. *Geriatrics*. Aug; 2009 64(8):15–18. [PubMed: 20722312]
20. Doolittle BR, Farrell M. The Association Between Spirituality and Depression in an Urban Clinic. *Prim Care Companion J Clin Psychiatry*. 2004; 6(3):114–118. [PubMed: 15361925]
21. Underwood LG, Teresi JA. The daily spiritual experience scale: development, theoretical description, reliability, exploratory factor analysis, and preliminary construct validity using health-related data. *Ann Behav Med*. 2002; 24(1):22–33. [PubMed: 12008791]
22. Loustalot FV, Wyatt SB, Boss B, et al. Psychometric examination of the Daily Spiritual Experiences Scale. *Journal of Cultural Diversity*. 2006; 13(3):162–167. [PubMed: 16989254]

23. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Measurement*. 1977; 1:385–401.
24. Roberts RE, Vernon SW. The Center for Epidemiologic Studies Depression Scale: its use in a community sample. *Am J Psychiatry*. 1983; 140:41–46. [PubMed: 6847983]
25. Knight RG, Williams S, McGee R, et al. Psychometric properties of the Centre for Epidemiologic Studies Depression Scale (CES-D) in a sample of women in middle life. *Behav Res Ther*. 1997; 35:373–380. [PubMed: 9134792]
26. Lyness JM, Noel TK, Cox C, King DA, Conwell Y, Caine E. Screening for depression in elderly primary care patients. A comparison of the Center for Epidemiologic Studies-Depression Scale and the Geriatric Depression Scale. *Arch Intern Med*. 1997; 157:449–454. [PubMed: 9046897]
27. Statacorp. Stata Version 10.0. College Station, TX: Stata Press; 2007.
28. Bekelman DB, Rumsfeld JS, Havranek EP, et al. Symptom burden, depression, and spiritual well-being: a comparison of heart failure and advanced cancer patients. *J Gen Intern Med*. May; 2009 24(5):592–598. [PubMed: 19288160]
29. Polzer RL, Miles MS. Spirituality in African Americans with diabetes: self-management through a relationship with God. *Qual Health Res*. Feb; 2007 17(2):176–188. [PubMed: 17220389]
30. Bosworth HB, Park KS, McQuoid DR, Hays JC, Steffens DC. The impact of religious practice and religious coping on geriatric depression. *Int J Geriatr Psychiatry*. Oct; 2003 18(10):905–914. [PubMed: 14533123]
31. Sternthal MJ, Williams DR, Musick MA, Buck AC. Depression, anxiety, and religious life: a search for mediators. *J Health Soc Behav*. Sep; 2010 51(3):343–359. [PubMed: 20943594]
32. Koenig H. Spirituality and Depression: A Look at the Evidence. *Southern Medical Journal*. 2007; 100(7):737–739. [PubMed: 17639763]

Table 1

Demographic Characteristics by Depression Status for Adults with Type 2 Diabetes

	All (n=201)	Depressed (n=40)	Non- depressed (n=161)	P-value
Age				0.017*
<50 years	21.9	35.0	18.6	
50–64 years	53.7	55.0	53.4	
65+ years	24.4	10.0	28.0	
Gender/Sex				0.018*
Female	72.6	87.5	68.9	
Male	27.4	12.5	31.1	
Race/Ethnicity				0.076
Non-Hispanic White	37.8	50.0	34.8	
Non-Hispanic Black	62.2	50.0	65.2	
Marital status				0.050
Married	38.5	25.0	41.9	
Not married	61.5	75.0	58.1	
Educational level				0.497
Less than HS graduate	40.4	48.7	38.4	
HS graduate	27.3	23.1	28.3	
Greater than HS graduate	32.3	28.2	33.3	
Employment status				0.001*
Unemployed	73.5	95.0	68.1	
Employed	26.5	5.0	31.9	
Annual income level				0.075
<\$5,000	26.6	34.2	24.7	
<\$10,000	25.0	18.4	26.7	
<\$15,000	23.4	34.2	20.7	
\$15,000+	25.0	13.2	28.0	
Health insurance				0.002*
Private	19.9	0.0	24.8	
Governmental	57.2	72.5	53.4	
Uninsured	22.9	27.5	21.7	
Comorbidities				0.179
0–1 condition	47.8	35.0	50.9	
2 conditions	29.9	35.0	28.6	
3+ conditions	22.4	30.0	20.5	
Insulin therapy				0.069
Yes	42.3	55.0	39.1	
No	57.7	45.0	60.9	
Spirituality Score	11.9 ± 6.1	13.6 ± 6.6	11.5 ± 5.9	0.057

All numbers represent percentages.

* Statistically significant, $P < .05$.

Table 2

Mean Spirituality Scores by Sample Characteristics

	Mean	Standard Deviation	P-value
Age			0.422
<50 years	13.8	6.6	
50–64 years	11.9	5.7	
65+ years	10.9	6.1	
Gender/Sex			0.002 *
Female	11.4	5.3	
Male	14.1	7.3	
Race/Ethnicity			<0.001 *
Non-Hispanic White	14.6	7.5	
Non-Hispanic Black	10.6	4.3	
Marital status			0.960
Married	11.3	6.0	
Not married	12.6	6.1	
Educational level			<0.001 *
Less than HS graduate	11.4	4.7	
HS graduate	11.3	5.1	
More than HS graduate	13.7	7.9	
Employment status			0.924
Unemployed	12.5	6.0	
Employed	12.0	6.1	
Annual income level			<0.001 *
<\$5,000	12.3	5.0	
<\$10,000	12.2	5.4	
<\$15,000	10.1	4.4	
\$15,000+	14.3	8.4	
Health insurance			0.834
Private	11.8	6.0	
Governmental	11.7	6.2	
Uninsured	13.3	5.7	
Comorbidities			0.614
0–1 condition	12.8	6.3	
2 conditions	11.3	5.6	
3+ conditions	11.7	5.9	
Insulin therapy			0.431
Yes	11.7	5.8	
No	12.4	6.2	

All numbers represent percentages.

* Statistically significant, $P < 0.05$.

Table 3

Regression Models for Effect of Spirituality on Depression

	Model 1	Model 2 [*]	Model 3 [†]
	Coefficient (95%CI)	Coefficient (95%CI)	Coefficient (95%CI)
Spirituality Scale	0.41 (0.18, 0.63) ***	0.25 (0.01, 0.49) ***	0.27 (0.03, 0.51) ***
Age [‡]			
50–64 years		–5.74 (–9.19, –2.29) ***	–5.92 (–9.38, –2.47) ***
65+ years		–10.02 (–14.47, –5.56) ***	–10.05 (–14.51, –5.60) ***
Gender/Sex [§]			
Female		3.48 (0.52, 6.43) ***	3.33 (0.38, 6.29) ***
Race/Ethnicity ^{//}			
Non-Hispanic Black		–5.05 (–8.31, –1.79) ***	–4.86 (–8.26, –1.46) ***
Marital status [¶]			
Not married		0.87 (–2.03, 3.77)	0.73 (–2.18, 3.63)
Educational level [#]			
HS graduate		–1.97 (–5.35, 1.41)	–1.77 (–5.16, 1.61)
More than HS graduate		–1.83 (–5.77, 2.11)	–1.39 (–5.41, 2.64)
Employment status ^{**}			
Unemployed		4.84 (1.20, 8.49) ***	4.20 (0.41, 7.98) ***
Annual income level ^{††}			
<\$10,000		–1.66 (–5.41, 2.09)	–1.66 (–5.40, 2.08)
<\$15,000		–0.90 (–4.70, 2.90)	–0.70 (–4.51, 3.12)
\$15,000+		–1.73 (–7.04, 3.59)	–1.94 (–7.24, 3.36)
Health insurance ^{‡‡}			
Governmental		1.98 (–2.55, 6.52)	1.78 (–2.74, 6.31)
Uninsured		1.60 (–3.36, 6.57)	1.81 (–3.14, 6.77)
Comorbidities ^{§§}			
2 conditions			–0.18 (–3.36, 3.01)
3+ conditions			2.34 (–1.40, 6.07)
Insulin therapy ^{//}			
Yes			1.66 (–1.06, 4.38)

* Adjusted for demographic characteristics.

† Adjusted for demographic characteristics and clinical factors.

Reference groups:

‡ age <50 years,

§ male gender,

// Non-Hispanic Whites,

$\%$ married,

$\#$ <high school graduate,

** employed,

$^{++}$ income <\$5,000,

$^{++}$ private health insurance,

ss 0–1 comorbid condition,

$///$ No insulin therapy used

*** Results statistically significant when range of the confidence interval (CI) excludes 0.