Spiritual and Religious Beliefs and Practices, and Social Support's Relationship to Diabetes Self-Care Activities in African Americans

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Abstract

Purpose—The purpose of this study is to investigate the relationship among spiritual and religious beliefs and practices, social support, and diabetes self-care activities in African Americans with type 2 diabetes, hypothesizing that there would be a positive association.

Method—This cohort study used a cross-sectional design that focused on baseline data from a larger randomized control trial. Diabetes self-care activities (Summary of Diabetes Self-Care Activities; SDSCA) and sociodemographic characteristics were assessed, in addition to spiritual and religious beliefs and practices and social support using the Systems of Belief Inventory (SBI) subscale I (beliefs and practices) and subscale II (social support).

Results—There were 132 participants: most were female, middle-aged, obese, single, high school-educated, and not employed. Using Pearson correlation matrices, there were significant relationships between spiritual and religious beliefs and practices and general diet. Additional significant relationships were found for social support with general diet, specific diet, and foot care. Using multiple linear regression, social support was a significant predictor for general diet, specific diet, and foot care. Gender was a significant predictor for specific diet, and income was a significant predictor for blood glucose testing.

Conclusions—The findings of this study highlight the importance of spiritual and religious beliefs and practices and social support in diabetes self-care activities. Future research should focus on determining how providers integrate patients' beliefs and practices and social support into clinical practice and include those in behavior change interventions.

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In the United States, an estimated 25.8 million people, or 8.3% of the population, have been diagnosed with type 2 diabetes.[1] Of these, 4.9 million (18.7%) are non-Hispanic Blacks aged 20 years or older.[1] For African Americans, the incidence of complications from type 2 diabetes, such as cerebrovascular disease, renal failure, and amputations, is much higher than in non-Hispanic Whites.[1]

These diabetes complications may be reduced or prevented with optimal diabetes self-care. Self-care knowledge, skills, and activities are considered cornerstones of diabetes treatment. Self-care of diabetes is burdensome, due to the complexity of maintaining and managing daily self-care activities, including exercise, diet modification, and medication adherence. According to the American Association of Diabetes Educators,[2] there are seven diabetes self-care behaviors: being active (physical activity and exercise); eating healthy (diet composition and caloric content); taking medications; monitoring (e.g., blood glucose, weight, blood pressure); problem solving, especially for blood glucose (high and low levels, sick days); reducing risks (to decrease diabetes complications; smoking cessation); and healthy coping (psychosocial adaptation). These behaviors have been identified as measurable outcomes of effective diabetes education and thus should be implemented at both individual and population levels to achieve the desired outcomes of prevention of diabetes complications and physical and psychological well-being.

Spiritual and religious beliefs and activities can aid in coping with a chronic illness by providing support, confidence, and hope, or they can interfere with successful coping, as people may neglect self-care activities by relying on prayer and/or meditation to manage their illness.[3] Empirical evidence demonstrates the relationship between spirituality and self-management of hypertension,[4] but few studies have examined the impact of spirituality on diabetes self-management.[5] Thus, little is known about how spiritual beliefs and practices and social support affect self-care of diabetes in African American adults.[6] Several significant themes have emerged from previous studies concerning spirituality, religion, and diabetes in African Americans: spirituality is an important source of emotional support; God is perceived as central in providing strength to deal with daily challenges; God is often called upon for help in controlling diabetes; and a strong belief in God, prayer, meditation, and support from church members were all sources of support.[3, 5–8] In one study in Black women with type 2 diabetes, religion and spirituality were related to glycemic control,[9] whereas in another study, religion and spirituality were related to less likelihood of lifetime smoking among African Americans.[10]

The aforementioned findings and gap in the literature led us to address the possibility of bridging spiritual and religious beliefs into diabetes self-management. Spiritual beliefs include the relationship to a superior being and are related to an existential perspective on life, death, and the nature of reality.[11] Religious beliefs include practices/rituals such as prayer or meditation and engagement with religious community members. While spiritual and religious beliefs have significant overlap, the authors chose to examine both of these concepts because they are frequently brought into the forefront when coping with illness. Additionally, it is important to examine both of these concepts because some people may consider themselves to be spiritual but may not necessarily endorse being religious. Whereas religious beliefs and practices are more easily measured, [12] the authors wanted to examine

the broad context of individuals' systems of belief, specifically their perceptions on the meaning of life, illness, and existential concerns.[13] Given the need to examine both spiritual and religious beliefs and practices in the process of coping with an illness, the Systems of Belief Inventory (SBI) was chosen to measure these constructs.

The specific aim for this study was to examine the relationship between (a) spiritual and religious beliefs and practices, and social support; and (b) diabetes self-care activities in African Americans with type 2 diabetes. This is an important topic because African Americans experience numerous diabetes disparities (i.e., highest rates of diabetes, diabetes complications, and diabetes-related mortality rates).[14]

Given that little is known about how spiritual and religious beliefs and practices affect self-care of diabetes in African American adults, this study examined the relationship between spirituality, religion, and diabetes self-care activities, including diet, physical activity, blood glucose self-testing, and foot care behaviors in this population. Because some research exists supporting the relationship between spirituality and religion and lifetime smoking in African Americans,[10] a negative association was hypothesized between spirituality and religion and smoking. In particular, it was hypothesized that those who score higher on measures of spiritual and religious beliefs and practices and social support will participate in more diabetes self-care activities and smoke less.

Research Design and Methods

Participants

This cross-sectional study involved the analysis of de-identified baseline data from a larger, randomized control trial. Participants were recruited at two Federally Qualified Health Center (FQHC) primary care clinics in a Midwestern city. Primary inclusion criteria included: a diagnosis of type 2 diabetes; African American; age 18 years or older; ability to provide informed consent; and enrollment as a patient at a FQHC primary care clinic. Exclusion criteria were pregnancy or planning a pregnancy during the study period; presence of advanced complications of diabetes, such as severe neuropathy, nephropathy, or end-stage renal disease; prior renal transplant, significant coronary heart disease, or stroke; currently enrolled in a diabetes-related research study or had a household member enrolled in the current study; not available by phone; and significant cognitive or emotional impairment.

Data Collection

Participants completed a computer-delivered baseline assessment, including the self-report measures used in this study, prior to randomization to intervention groups for the RCT. The Institutional Review Board at the University of Illinois at Chicago reviewed and approved this sub-study.

Measures

In addition to sociodemographic questions, the following standardized measures were used in the analysis: Systems of Belief Inventory (SBI) subscale I and subscale II and Summary of Diabetes Self-Care Activities (SDSCA).

Spirituality and Religion—Spirituality and religion were assessed by the Systems of Belief Inventory (SBI), which has two subscales: SBI I (beliefs and practices) and SBI II (social support).[11] The SBI is designed to measure religious and spiritual beliefs and practices, as well as the social support provided by a community sharing those beliefs.[11] Spiritual beliefs and practices are operationalized, according to the SBI instrument, as: (1) the degree to which persons felt that they derived meaning from an existential perspective (i.e., ethereal, of an immaterial nature, or a sense of meaning of life); (2) the use of religious practices and rituals, such as meditation and prayer; (3) the relationship to a superior being or a perceived higher power, such as God. Social support is operationalized, according to the SBI instrument, as the level of social support derived from a community of individuals sharing similar beliefs. The SBI instrument consists of 15 items rated on a 4-point Likert scale, ranging from 0 (*strongly disagree*) to 3 (*strongly agree*) and a 4-point frequency scale ranging from 0 (*none of the time*) to 3 (*all of the time*). Internal consistency was supported for the total instrument and the subscales, as was test-retest correlation, providing support for temporal reliability.[11]

Diabetes Self-Care Activities—Diabetes self-care activities were assessed by the Survey of Diabetes Self-Care Activities (SDSCA).[15] The SDSCA is a self-report questionnaire of diabetes self-management, measuring the frequency (i.e., number of days) with which one has performed aspects of six diabetes regimens over the past 7 days. This study measured performance of six activities: general diet (following a healthful eating plan), specific diet (eating a diet of fruits or vegetables, high-fat foods, or full-fat dairy products), exercise, blood-glucose testing, foot care, and smoking. General diet for this scale asks if a healthful eating plan has been followed, whereas specific diet asks if fruits or vegetables, high-fat foods, or full-fat dairy products have been eaten. Prior research shows the SDSCA to have adequate psychometric properties.[15]

Analysis

All analyses were performed using Statistical Package for the Social Sciences (SPSS) 16.0 and Statistical Analysis System (SAS) 9.2 statistical programming. A power analysis was performed, and it was determined that a sample size of 100 participants was adequate to provide 90% power with an effect size of 0.82. Descriptive statistics were calculated on the demographic characteristics, age, gender, BMI, marital status, income, education, employment, and smoking history, as well as spirituality and diabetes self-care activities. Next, the data were checked for multicollinearity, linearity, homoscedasticity, and normality.

To examine the relationship between SBI subscale scores and diabetes self-care activities, a Pearson correlation matrix was computed, and multiple linear regressions were performed. Before multiple linear regressions could be performed, model checking (multicollinearity

and regression residuals), model selection using forward selection stepwise regression, and checking for normality using Shapiro-Wilk's W test were initially carried out. Although no multicollinearity was present, the data were non-normally distributed. A Box-Cox transformation was performed that provided the best lambda to normalize the data. Five models were tested with SBI I and SBI II as independent variables and the diabetes self-care activities (general diet, specific diet, physical activity, blood glucose self-testing and foot care) as dependent variables.

Smoking, the sixth dependent variable, was not included in the multiple linear regression analysis of diabetes self-care activities because it was a binary variable. The logistic regression model was used to examine the relationship between smoking and the spirituality subscales SBI I and SBI II.

Results

Descriptives

Demographic Characteristics—The total sample included 132 African American adults; most were female ($n = 88$; 67%), middle-aged ($M = 52.2$, $SD = 12.8$), obese (BMI $M = 34.1$, $SD = 8.6$) and single (89%). Almost all (91%) had an annual income of less than $25,000; more than half were high school graduates (61%); and 88% were not employed and/or retired. Fully 39% of the participants were current smokers.

Diabetes Self-Care Activities—Participants were asked which diabetes self-care activities they had engaged in during the past 7 days; scores indicate the number of days respondents indicated they had engaged in each activity in the previous 7 days. Foot care ($M = 4.52$, $SD = 2.46$) and blood glucose testing ($M = 4.14$, $SD = 2.47$) were performed most often. On average, physical activity ($M = 2.67$, $SD = 1.93$) was performed least often.

Percentage by Systems of Belief Inventory Items—Participants reported being spiritual (e.g., 83% believed God does exist; 80.3% believed one's life and death followed a plan from God), engaging in religious practices (e.g., 69.7% believed prayer or meditation helped in coping), and relying on social support from their religious and spiritual communities when experiencing difficulties (e.g., 82.6% of those who needed help with problems turned to their religious/spiritual community).

SBI I, SBI II, and SDSCA by Gender, Income and Age—Using the Mann-Whitney U test, there were significant differences by gender (Females: $M = 3.89$, $SD = 1.31$; Males: $M = 3.30$, $SD = 1.43$) in the median scores on the SBI subscales (SBI I and SBI II) and the SDSCA activity of specific diet ($p = 0.02$). However, using the Kruskal-Wallis test, no significant difference was found in median frequency of blood glucose testing and mean income ($p = .05$). The authors further explored this trend between blood glucose testing frequency and other variables important to this diabetes self-care activity (i.e., age, baseline A1C, insurance status, SBI I, and type of medication [oral medications versus insulin injections]). There was only a difference between medians for blood glucose testing frequency and type of medication. Those who received insulin injections tested more frequently ($p < .044$).

We used simple linear regression analysis to test seven models to examine the relationship between age (independent variable) and the following seven variables as outcome variables: SBI I, SBI II, general diet, specific diet, blood glucose testing, physical activity, and foot care. Age was positively and significantly associated with SBI II (social support), $p < .0001$; general diet, $p < .0001$; and specific diet, $p = .01$. However, the R^2 values were low (less than 20%), which indicated that the predictor value (age) did not account for a significant reduction of the variance of the outcome variables (diabetes self-care activities, religion, and spirituality variables).

Spirituality, Religion, and Self-Care Activities

Table 1 shows the correlations between Systems of Belief Inventory subscales SBI I and SBI II and five continuous diabetes self-care activities (general diet, specific diet, physical activity, blood sugar testing, and foot care). A statistically significant, positive correlation was found between SBI subscale I (beliefs and practices) and general diet ($p = .002$). For SBI subscale II (social support), statistically significant, positive correlations were found for general diet ($p < .0001$), specific diet ($p = .006$), and foot care ($p = .008$).

Spirituality, Religion, Age, Gender, and Income as Predictors of Self-Care

Table 2 shows the results of the multiple linear regression analysis to model diabetes self-care activities (general diet, specific diet, physical activity, blood glucose testing, and foot care) as the estimate of outcome, given a set of predictors (SBI I, SBI II, age, gender, and income). The results indicated that SBI II, gender, and income were significant predictors for diabetes self-care activities. SBI II (indicating social support) was a significant predictor for general diet ($p = .02$), specific diet ($p = .02$), and foot care ($p = .02$). For every one-unit increase in SBI II, there was an increase of 0.29 days per week in general diet adherence, holding all the other independent variables constant. For every one-unit increase in SBI II, there was an increase of 0.30 days per week in specific diet and foot care, holding all the other independent variables constant. Gender was a significant predictor for specific diet ($p = .01$), and income was a significant predictor for blood glucose testing ($p = .01$).

Spirituality and Religion as Predictors of Smoking

Table 3 shows the results of using logistic regression to describe the relationship between a set of predictor variables (SBI I and SBI II) and one dichotomous diabetes self-care activity (smoking). As indicated in Table 3, there was no significant association for SBI I or SBI II with smoking.

Discussion

In general, participants reported being spiritual and engaging in religious practices, as evidenced by high scores on SBI subscale I (which measures beliefs and practices). Additionally, they reported that they relied on social support from their religious communities when experiencing difficulties, as evidenced by high scores on SBI subscale II (which measures social support). In terms of diabetes self-care activities, foot care and blood glucose testing were performed most often; physical activity was performed least often. Older age was significantly associated with higher scores on the SBI II, and with general

diet and specific diet as measured on the SDSCA. However, those associations had low R^2 values, which indicated that the predictor value (age) accounted for a modest reduction of the variance of the outcome variables (diabetes self-care activities and spirituality variables).

It is not surprising that this population did not exercise habitually; physical activity is the most neglected aspect of the type 2 diabetes regimen.[16] Misra and Lager found that, compared to other diabetes self-care behaviors, African Americans had the most difficulty with physical activity.[17] African Americans also reported more physical activity barriers than Caucasians,[18] including greater complications and comorbidities, lack of child care, transportation problems, and unsafe walking areas.[19]

Blood glucose testing was performed significantly more often in those reporting lower income. Upon further analysis, it was discovered that both income and type of medication (insulin injections vs. oral) were significant predictors of blood glucose testing frequency. This was not a surprising finding for insulin injections because patients may have tested their blood glucose more often due to being concerned about hypoglycemia and/or to adjust insulin injections. Another possible explanation for this finding is that patients in this study may have had more access to blood glucose testing resources and supplies because they had other chronic conditions and thus may see a health care provider more often, creating more opportunities to obtain support and resources for self-testing.

Using Pearson correlation matrices, the finding of a significant relationship between spirituality and beliefs and practices (SBI I) and general diet partially supports our hypothesis, which was that those who scored higher on the Beliefs and Practices subscale of the SBI (subscale I) would participate in more diabetes self-care activities. However, using multiple linear regression models to test spirituality, religion, age, gender, and income as predictors of self-care, SBI I (indicating beliefs and practices) was not a significant predictor of general diet. This multivariate association must be interpreted with caution, as other confounders that were not measured may have had an influence as well. Samuel-Hodge et al. found that, in a group of 70 African American women with diabetes, spirituality was an important factor for overall health, disease adjustment, and coping.[6] Additionally, these findings are consistent with other literature.[20] Polzer and Miles developed a theoretical model about how the spirituality of African Americans affects self-care of their diabetes.[5] Their findings suggested that spirituality was a key factor in providing support when managing illness; thus, including some components of spirituality and religion when educating patients about diabetes self-care may contribute to decreasing these diabetes disparities in this population.

The significant relationship of social support (SBI II) with general diet, specific diet, and foot care in this study is a new finding, and no literature to date has studied this in African Americans. However, diabetes-related social support has been examined in this population. Tang, Brown, Funnell, and Anderson in a study with 89 African American adults with diabetes found that positive support was a significant predictor of following a healthy eating plan and that social support was an important factor in diabetes self-care practices.[21] Similar findings were also found by Utz et al., who concluded that dietary habits and foot care in African Americans with diabetes were influenced significantly by social support from others

with diabetes.[22] Although the aforementioned studies from the literature did not examine social support from one's religious and spiritual community, social support influenced specific diabetes health-related outcomes and behaviors.

Limitations

One limitation of this study is the lack of generalizability of the findings because the inclusion criteria for the overall intervention trial focused on African American adults without serious diabetes complications who attended FQHC primary care clinics. The study used multiple testing methods, and it is important to note, because of this, that associations may have occurred by chance. Also, the study relied on self-reported data. Known limitations of self-reported data include participants' having trouble recalling distant past behaviors. Self-reported data may suffer from one's reporting what reflects positively on their own abilities, knowledge, beliefs, or opinions.[23] Another limitation is that this study did not consider religious affiliations and associations and the impact they have on health behaviors. It may have been helpful to consider this, as some conservative denominations do not engage in smoking.[24] Next, most participants in this study reported being spiritual. Perhaps in a larger study, their findings could be contrasted with those that are not spiritual. Lastly, future research should explore religion and spirituality as lending coping strength for dealing with the stress of struggling to self-manage a serious chronic illness like diabetes.

Conclusion

In summary, the results of this study suggest the need for future studies to examine the relationship among spirituality, religion, and health. Future research should consider using other ways to measure spirituality, such as a religious coping scale, a longitudinal study and individual interview methodology to further understand the role of spirituality in health care behaviors, the inclusion of other religious affiliations and racial/ethnic groups, and a diabetes intervention using a spirituality-based approach.

Implications for Diabetes Education Practice

The findings of this study suggest the importance of spirituality and religion as factors that can affect diabetes self-care. More generally, the findings suggest the importance of spirituality and religion for African Americans with diabetes. Diabetes educators may want to consider how they can integrate spirituality and religion into their practice. The Joint Commission on the Accreditation of Health Care Organizations states that a spiritual assessment should be performed on every patient, identifying the patient's denomination, spiritual beliefs, and practices.[25] One way diabetes educators can integrate spirituality into diabetes education practice is by the use of several spiritual history tools, such as the FAITH tool.[26] As mentioned earlier, one finding from this study is that social support influenced specific diabetes health-related behaviors, which in turn might affect outcomes (e.g., A1C). The proclivity towards using social support may suggest that diabetes self-care activities may be improved if spiritual support is included in a diabetes treatment plan.

Acknowledgments

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TABLE 1

Correlation for Diabetes Self-Care Activities and Systems of Belief Inventory Scales

Variable	Diabetes Self-Care Activities						
	General Diet	Specific Diet	Physical Activity	Blood Glucose Testing	Foot Care	SBI I[a]	SBI II[b]
General diet	1.000						
Specific diet	.362	1.000					
p	.000						
Physical activity	.332	.205	1.000				
p	.000	.019					
Blood glucose testing	.264	.267	.316	1.000			
p	.002	.002	.000				
Foot care	.168	.324	.202	.231	1.000		
p	.056	.000	.021	.008			
Systems of Belief Inventory: I	.274	.167	.111	.078	.135	1.000	
p	.002	.060	.216	.380	.129		
Systems of Belief Inventory: II	.354	.242	.151	.114	.235	.734	1.000
p	.000	.006	.090	.200	.008	.000	

SBI = Systems of Belief Inventory

[a] Systems of Belief Inventory: I = Beliefs and practices.

[b] Systems of Belief Inventory: II = Social support.

TABLE 2

Multiple Linear Regression Analysis for Summary of Diabetes Self-Care Activities Scale, Systems of Belief Inventory Scale, and Demographics

Model	Dependent Variable	Independent Variable	Coefficient Estimate(β)	SE	p	R²
1	General diet	SBI I[a]	.09	.02	.64	.15
		SBI II[b]	.29	.04	.02	
		Age	.11	.00	.18	
		Gender	.07	.21	.42	
		Income	−.09	.09	.29	
2	Specific diet	SBI I	−.10	.02	.45	.12
		SBI II	.30	.03	.02	
		Age	.11	.00	.21	
		Gender	−.23	.13	.01	
		Income	−.04	.06	.62	
3	Physical activity	SBI I	.02	.01	.99	.05
		SBI II	.13	.02	.36	
		Age	.08	.00	.37	
		Gender	−.03	.10	.77	
		Income	−.14	.04	.13	
4	Blood glucose testing	SBI I	−.04	.06	.78	.10
		SBI II	.10	.09	.44	
		Age	.09	.00	.32	
		Gender	−.13	.46	.13	
		Income	−.25	.20	.01	
5	Foot care	SBI I	−.10	.11	.44	.09
		SBI II	.30	.17	.02	
		Age	−.04	.01	.67	
		Gender	−.09	.85	.29	
		Income	−.12	.36	.18	

SBI = Systems of Belief Inventory

[a] SBI = Systems of Belief Inventory: I = Beliefs and practices.

[b]Systems of Belief Inventory: II = Social support.

TABLE 3

Logistic Regression Analysis for Current Smoking and Systems of Belief Inventory Scales

Variable	B	SE	Wald	df	p	Exp (B)
Systems of Belief Inventory: I[a]	0.05	.05	0.94	1	.33	1.05
Systems of Belief Inventory: II[b]	0.08	.08	0.22	1	.64	1.04

SBI = Systems of Belief Inventory

[a]Systems of Belief Inventory: I = Beliefs and practices.

[b]Systems of Belief Inventory: II = Social support.