The Relationship of Spirituality and Health Outcomes in Black Women with Type 2 Diabetes

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The purpose of this pilot study was to explore the relationships between spiritual well-being, emotional distress, HbA_{1c} values, and blood pressure levels in a convenience sample of 22 Black women with type 2 diabetes. Results revealed significant inverse correlations between diastolic blood pressure (BP) and both total spiritual well-being ($r=-.51$, $P=.02$) and religious well-being (RWB) ($r=-.55$, $P=.01$). Women with higher RWB scores tended to have lower diastolic BP, as compared to their counterparts with lower RWB scores ($z=2.78$, $P=.005$). Emotional distress was positively related to systolic BP ($r=.48$, $P=.03$). These findings suggest that holistic care, addressing the spiritual and emotional dimensions, may foster improved BP levels among Black women with type 2 diabetes, thereby potentially reducing their high risk for secondary complications. (*Ethn. Dis.* 2003;13:61–68)

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Introduction

The incidence and prevalence of diabetes mellitus continue to increase in the United States. According to the Centers for Disease Control and Prevention (CDC), approximately sixteen million Americans currently have diabetes, and an estimated 750,000 new cases are diagnosed each year. Over the past 2 decades, diabetes surveillance statistics from CDC reveal that the prevalence of diagnosed diabetes was higher among Blacks than Whites, and was highest among Black women.[1] In 1996, age-adjusted prevalence rates revealed that Black women (57.8/1000 persons) and Black men (54.6/1000 persons) were more than twice as likely to have diabetes, as compared to their White counterparts (26.6/1000, and 26.7/1000, respectively).[1]

The American Diabetes Association (ADA)[2] reports that Blacks, as compared to Whites, experience increased morbidity and mortality associated with diabetes. Blacks have a statistically higher risk for developing diabetes-related complications, including blindness, kidney failure, lower extremity amputations, and premature death. In fact, Blacks are twice as likely to suffer from diabetes-related blindness and lower extremity amputations, and may be up to 6 times more likely to develop kidney disease.[2] In addition, diabetes is the seventh leading cause of death in the United States, and the fourth leading cause of death among Black women.[1] The ADA and CDC underscore that improved glycemic and blood pressure (BP) control may critically reduce these unacceptable rates of diabetes-related complications and premature death.[3–4]

The CDC stresses the need to educate individuals with type 2 diabetes on self-care practices (diet, exercise, glucose monitoring, and/or medication administration), in order to promote successful management of blood glucose levels.[4] However, education alone is insufficient.[5–6] Traditional diabetes education often fails to address psychosocial factors—such as emotional well-being, health beliefs, and coping methods. These factors may profoundly influence the translation of diabetes knowledge into daily disease management.[7]

Sensitive to the limitations of diabetes education, researchers are increasingly investigating the numerous psychosocial factors influencing daily management of diabetes. A number of studies, for example, have examined the relationship between emotional well-being and daily diabetes management, as reflected by HbA_{1c} values. Overall, these studies have demonstrated that emotional distress is significantly associated with poor glycemic control, thereby suggesting the need to address emotional factors related to diabetes management.[8–9]

Additionally, several studies have demonstrated that effective coping methods may influence daily diabetes management, fostering improved glycemic control, as indicated by HbA_{1c} values.[10–14] Further, studies have indicated that problem-focused and/or emotion-focused coping methods may contribute significantly to emotional well-being among adults with diabetes.[12–14] The diabetes literature suggests that coping and emotional well-being, as related variables, may act as significant mediators in the translation of diabetes education into daily regimen adherence.[12–14]

The chronic illness literature further indicates that coping and emotional

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well-being may be influenced positively by spirituality. Several studies have demonstrated that spiritual or religious beliefs and practices serve as a salient source of emotion- and/or problem-focused coping among individuals challenged by cancer, HIV/AIDS, and renal failure.[15–18] Additional studies have demonstrated that components of spirituality are positively related to quality of life, hope, and other positive mood states, and negatively associated with anxiety, depression, and illness-related distress, particularly among adults coping with cancer and HIV/AIDS.[19–23] Spiritual well-being has been found to serve as a potential internal coping resource in adjusting psychologically to diabetes.[24] However, the relationships among spiritual well-being, daily diabetes management, glycemic control, and BP levels have not been well investigated.

Moreover, enhanced coping and emotional well-being also have been associated consistently with spiritual practices and activities among Black Americans, particularly Black women. Analysis of data from 4 national probability surveys of older adults indicated that Blacks display significantly higher levels of organizational, non-organizational, and subjective religiosity, as compared to Whites.[25] Analysis of data from the National Survey of Black Americans (NSBA) demonstrated that personal religiosity significantly influenced overall life satisfaction, self-esteem, and feelings of self-efficacy.[26–28] NSBA data further revealed that prayer is the most common coping response among Black women faced with illness,[29] and that private devotional activities, such as prayer, buffer the negative psychological impact of chronic illness among Black Americans.[26]

Despite the widespread spiritual/religious practices and traditions of the Black community, the relationship between spirituality and health outcomes in Black Americans has been markedly understudied. Further, there is a paucity of studies in the spirituality literature examining the role of spirituality as a viable resource for coping with diabetes, particularly in relationship to daily management.

In summary, the diabetes research literature suggests that emotional well-being, and both emotion- and problem-focused coping methods, are significantly related to self-management outcomes. Effective coping appears to ameliorate stress and anxiety associated with daily diabetes management, fostering improved glycemic control and emotional well-being. The literature also indicates that spiritually based coping methods may attenuate emotional distress associated with the demands of chronic illness, thereby promoting an enhanced sense of well-being. However, the role of spirituality as a resource to reduce emotional distress related to daily diabetes management has not been well investigated. Research addressing the potential relationships among spirituality, diabetes-related emotional distress, and health outcomes, particularly among Black Americans, has been extremely limited.

The purpose of this study was to explore the relationships between spiritual well-being, emotional distress, HbA_{1c} values, and BP levels in Black women with type 2 diabetes. The specific aim of this study was to evaluate the magnitude and direction of these potential relationships.

METHODS

This pilot study was cross-sectional in design, and comprised African-American and Afro-Caribbean women with type 2 diabetes. The women were drawn from 2 completed intervention studies that investigated the efficacy of culturally sensitive diabetes care and education for Black women with type 2 diabetes.[12,30] The participants were originally recruited from the general population of a mid-sized city in a small New England state, through press releases and community health fairs. All subjects met inclusion criteria, requiring that they have a diagnosis of type 2 diabetes (confirmed by C-peptide levels); be between the ages of 21 and 64; not be pregnant or lactating; and be free of serious complications (such as blindness, renal failure, lower extremity amputation) or illness. All participants signed informed consent forms.

Instruments/Measures

In this pilot study, the independent variables were spiritual well-being and emotional distress, and the dependent variables were glycemic control and blood pressure (BP). Spiritual well-being was assessed by using the Spiritual Well-Being Scale (SWBS), in which spirituality is divided into both a religious and an existential component.[31] The existential component refers to the perception of life purpose and life satisfaction, without specific religious reference. The religious component refers to a direct, personal relationship with God. The SWBS is largely based on the definition that "spiritual well-being is the affirmation of life in a relationship with God, self, community and environment that nurtures and celebrates wholeness."[32(p1)]

The SWBS consists of 2 subscales, existential well-being (EWB) and religious well-being (RWB), which collectively reflect total spiritual well-being (SWB). The scale has 20 questions, 10 existentially oriented, and 10 religiously oriented. The questions are presented in a Likert-type format with 6 response options, ranging from strongly agree to strongly disagree. The maximum possible subscale score is 60, and the maximum overall scale is 120.

The SWBS has demonstrated sufficient reliability and validity.[31] In a previous study, among a student sample, test-retest reliability coefficients were 0.93 (SWB), 0.96 (RWB), and 0.86 (EWB).[31] Coefficient alphas were 0.89 (SWB), 0.87 (RWB), and 0.78 (EWB). In the present study, coefficient alphas were 0.89 (SWB), 0.86 (RWB), and 0.79 (EWB). Further, the SWBS has been correlated with intrinsic religious orientation (r=.67, P<.001), extrinsic religious orientation (r=.26, P=.001), and other theoretically related scales.[31]

Diabetes-related emotional distress was measured by the Problem Areas in Diabetes Survey (PAID).[8] The PAID is a 20-item questionnaire, in which each item addresses a unique aspect of diabetes-related emotional distress. Each item is rated on a 6-point Likert scale, reflecting the extent to which aspects of distress are perceived to be problematic. The maximum score is 120, with higher scores indicative of higher levels of emotional distress.

The PAID has demonstrated adequate reliability and validity.[8] In the present study, the PAID was found to have a high level of internal consistency (Cronbach alpha=0.93). In a large 1995 study,[8] the coefficient alpha was reported as 0.95. Item-to-total correlations ranged from 0.32 to 0.84. Concurrent validity has been established between the PAID and generalized distress, fear of hypoglycemia, disordered eating, and adherence to self-care behaviors, with significant correlations (P<.0005). Further, predictive validity has been established, demonstrating the PAID to be predictive of glycemic control at >1 year after its administration.[8]

Glycemic control was assessed by HbA_{1c} levels. Optimal glycemic control is reflected by glycosylated hemoglobin values, specifically HbA_{1c}. HbA_{1c} values indicate the percentage of glucose saturation to a HbA_{1c} molecule, thereby evaluating glucose control over a previous 12 week period. The American Diabetes Association[3] has established a HbA_{1c} value of <7.0% as a goal for individuals with diabetes. The present study used the DCA 2000 Analyzer for HbA_{1c} determinations. Using al-uL/40-uL random capillary blood sample, the DCA 2000 performs a monoclonal antibody assay to determine HbA_{1c} values.[33]

Resting BP levels, both systolic and diastolic, were measured manually, using instruments complying with established standards. Blood pressure measurements were performed by both a registered nurse and a student nurse. Instruments included an aneroid sphygmomanometer with an appropriately sized cuff, and a Littman cardiology stethoscope.

Data Analysis

Each subject's data were entered into an Access database. Statistical analyses were conducted using Version 8 of the Statistical Analysis System (SAS) and Software Program for Social Sciences (SPSS). Descriptive statistics were used to characterize the study sample in terms of demographics and study measures. Additionally, non-parametric analyses were performed, as the data were not normally distributed. Spearman rank correlation coefficients were computed to determine the relationships between spiritual well-being, emotional distress, HbA_{1c} values, and BP levels. The sample was then dichotomized into those with higher vs lower total SWB, RWB, and EWB scores. The Wilcoxon signed rank test was used to examine differences in BP levels between the 2 groups for each score.

RESULTS

The pilot study sample consisted of 22 Black women, ranging in age from 32 to 64 years (M=51.1, SD=2.0), with a slight majority of women aged 52 through 64 years (64.5%). Age at onset of type 2 diabetes ranged from 22 to 62 years (M=43.9, SD=3.5), with the majority of participants experiencing onset at younger than 50 years (57.1%). Most of the women had completed high school (95.5%), and more than one third had attended college (40%). A majority of women (54.5%) reported an income greater than $25,000 a year. A religious or church affiliation was reported by 85% of the women. No significant relationships were found among the demographic variables.

Descriptive analyses of the Spiritual Well-Being Scale (SWBS) responses for the sample revealed means for total spiritual well-being (SWB) (M=99.0, SD=3.1), religious well-being (RWB) (M=51.9, SD=1.9), and existential well-being (EWB) (M=47.1, SD=1.0). These mean scores demonstrate high overall levels of spirituality for the sample (see Table 1). Scores on the Problem Areas in Diabetes Survey (PAID) were generally lower than the scale's midpoint (60), ranging from 2 to 67 (M=33.4, SD=4.3), suggesting relatively low levels of emotional distress for the sample (see Table 1). HbA_{1c} values ranged from 5.6% to 13.4% (M=8.8, SD=0.5), indicating poor average glycemic control for the sample (see Table 1). Systolic blood pressure levels ranged from 100 to 200 mm Hg (M=139.7, SD=22.6), and diastolic BP levels ranged from 62 to 120 mm Hg (M=83.0, SD=2.6), revealing mild hypertension for the sample as a whole (see Table 1).

Relationships Between Variables

Correlational analyses did not demonstrate significant relationships between SWB, RWB, EWB, or PAID scores, and HbA_{1c} values (see Table 2). Significant correlations were noted,

Table 1. Sample means, standard deviations, and ranges for spiritual well-being, problem areas in diabetes, hemoglobin A_{1c}, and blood pressure

Measures	Mean	Standard Deviation	Range
Total spiritual well-being (SWB)	99.0	3.1	67–120
Religious well-being (RWB)	51.9	1.9	30–60
Existential well-being (EWB)	47.1	1.0	31–60
Problem areas in diabetes (PAID)	33.4	4.3	2–67
Hemoglobin A_{1c} (HbA_{1c})	8.8	0.5	5.6–13.4
Systolic blood pressure	139.7	22.6	100–200
Diastolic blood pressure	83.0	2.6	62–120

however, between BP levels and both SWBS and PAID scores. A moderate negative association was found between SWB and diastolic BP levels ($r=-.51$, $P=.02$). Further, RWB was significantly inversely related to diastolic BP levels ($r=-.55$, $P=.01$). PAID scores were positively correlated with systolic BP levels ($r=.48$, $P=.03$) (see Table 2).

In order to clarify the relationship between SWBS scores and BP levels, the sample was dichotomized according to above and below mean values, according to their SWB, RWB, and EWB scores. Findings revealed that the higher-scoring RWB group ($N=11$) tended to have significantly lower diastolic BP levels; whereas, the lower-scoring RWB group ($N=10$) tended to have significantly higher diastolic BP levels ($z=2.8$, $P=.005$) (see Table 3). The higher-scoring RWB group's median diastolic BP level (Mdn=80, IQR=.00) was more than 10% lower, as compared to that of the lower-scoring RWB group (Mdn=90, IQR=12.0) (see Table 4). No significant differences in diastolic BP levels for either the higher or lower-scoring SWB or EWB groups were observed (see Table 3).

Summary

Overall, the study data revealed a number of significant relationships between BP levels and total SWB, RWB, and emotional distress. Among the total sample, strongly moderate inverse correlations were demonstrated between diastolic BP levels and both total SWB and RWB. Further, the higher-scoring RWB group tended to demonstrate significantly lower diastolic BP levels, as compared to the lower-scoring RWB group. Emotional distress was positively related to systolic BP levels.

DISCUSSION

This pilot study specifically examined the relationship among spiritual well-being, diabetes-related emotional distress, HbA_{1c} values, and blood pressure (BP) levels in a group of middle aged Black women with type 2 diabetes, the majority of whom reported a religious or church affiliation, and had graduated from high school. A significant positive relationship was revealed between emotional distress and systolic BP levels. Significant inverse relationships were found between diastolic BP levels and both total SWB and RWB. The higher-scoring RWB group tended to have lower diastolic BP levels, while the lower-scoring RWB group tended to have higher levels.

These findings are supported by the research literature. Hixson, Gruchow, and Morgan,[34] using a female adult sample ($N=112$), found that religiosity may be directly related to lower levels of BP. This 1998 study further demonstrated that religiosity tended to exert a greater influence on diastolic BP, as compared to systolic BP. Koenig et al[35] similarly revealed that religiously active older adults ($N=3,963$) tended to have lower BP levels, particularly diastolic, compared to those who were less religiously active. Further, Steffen, Hinderliter, Blumenthal, and Sherwood[36] found that, among African-American adults ($N=78$), high levels of religious coping were significantly related with lower BP levels, both while sleeping and awake.

Although significant relationships between spiritual well-being and BP levels were observed, no significant relationship between spiritual well-being and glycemic control based on HbA_{1c} values was observed, nor was spiritual well-being found to be significantly related to emotional distress. This latter finding is contrary to other larger studies that examined illness-related distress and spiritual well-being. For example, Landis,[24] in a sample of adults with diabetes, found that spiritual well-being had an inverse relationship with emotional distress, and that spiritual well-being had a significant mediating effect on the emotional distress dimension of psychological adjustment to diabetes. Additional chronic illness studies have demonstrated that spir-

Table 2. Intercorrelations among the study variables

Variable	TSWB	RWB	EWB	PAID	HbA_{1C}	SBP	DBP
Total spiritual well-being (SWB)	—	.92†	.90†	−.33	.07	−.25	−.51*
Religious well-being (RWB)	—	—	.64†	−.22	.22	−.32	−.55†
Existential well-being (EWB)	—	—	—	−.35	.05	−.12	−.30
Problem areas in diabetes (PAID)	—	—	—	—	.21	.48*	.10
Hemoglobin (Hb) A_{1C}	—	—	—	—	—	.16	.17
Systolic blood pressure (SBP)	—	—	—	—	—	—	.31†
Diastolic blood pressure (DBP)	—	—	—	—	—	—	—

* $P<.05$.
† $P<.01$.

Table 3. Wilcoxon signed ranks test analyses: differences in higher vs lower-scoring RWB, SWB, and EWB groups' diastolic blood pressure levels

	Group Differences in Diastolic Blood Pressure Levels		
	N	Z	*P*
Religious well-being (RWB)			
1. Lower-scoring group	10	2.8	.005
2. Higher-scoring group	11		
Total spiritual well-being (SWB)			
1. Lower-scoring group	11	−1.9	.06
2. Higher-scoring group	10		
Existential well-being (EWB)			
1. Lower-scoring group	9	1.3	.18
2. Higher-scoring group	12		

The higher-scoring religious well-being group tended to have lower diastolic BP levels, while the lower-scoring RWB group tended to have higher levels.

itual well-being is inversely associated with anxiety, depression, and negative mood states.[19,20,23]

Two principal factors may have obscured an underlying relationship between spiritual well-being and emotional distress in the present study. The sample used in this pilot study consisted of 22 women. Further, the sample had recently undergone treatment conditions in previous randomized studies investigating culturally sensitive diabetes care and education for Black women with type 2 diabetes. The treatments may have attenuated the participants' diabetes-related emotional distress. This appears plausible, as the mean PAID score in the present study was remarkably low at 33.4. The maximum score for this diabetes-related distress tool is 120. The present study's mean PAID score is considerably lower than that found in the largest published descriptive study (*N*=451) employing the instrument.[8] Based on a sample comprising adolescents and adults, this 1995 study reported a mean PAID score of 54.5.[8]

This pilot study contributes to our knowledge in the understudied area of spirituality in Black Americans with type 2 diabetes, demonstrating that spirituality is a prominent contextual variable. The Spiritual Well-Being Scale (SWBS) responses and scores are remarkable. Responses to the religious well-being (RWB) dimension of the SWBS indicated that a large majority of the sample believe God loves and cares for them, has a personal relationship with them, is interested in their daily situations, and serves as a source of support in their lives. Responses to the existential well-being (EWB) component of the SWBS similarly revealed that a majority of the sample found great meaning in life, were hopeful about the future, and experienced life as a positive experience.

The RWB and EWB responses suggest, though indirectly, that religious and existential spirituality may serve as a coping resource, facilitating adjustment to, or management of, illness demands. Several previous studies support this inference. A recent, large qualitative study indicated that spiritually based coping is an integral daily aspect of type 2 diabetes management for Black women.[37] Additional studies involving individuals with diabetes, cancer, renal failure, and other chronic illnesses, have similarly demonstrated that aspects of spirituality play a vital role in coping with illness-related distress.[15,16,18,24,38]

In this study, the mean total spiritual well-being (SWB) score (99.0) was notably high, as compared to other mean SWB scores in the chronic illness literature. Among predominantly female samples with cancer, mean SWB scores have generally been lower, ranging from 87.5–99.8.[20,23,39] Studies involving largely male populations with HIV/AIDS have documented mean scores ranging from 88.23–88.5.[19,40] The present study's comparatively high SWB score indicates high levels of spiritual well-being for the sample as a whole. This finding is consistent with data from several

Table 4. Higher vs lower-scoring RWB, SWB, and EWB groups' diastolic blood pressure levels: medians and interquartile ranges

	Diastolic Blood Pressure Levels		
	N	Median	Interquartile Range
Religious well-being (RWB)			
1. Lower-scoring group	10	90.0	12.0
2. Higher-scoring group	11	80.0	0.0
Total spiritual well-being (SWB)			
1. Lower-scoring group	11	82.0	10.0
2. Higher-scoring group	10	80.0	0.0
Existential well-being (EWB)			
1. Lower-scoring group	9	82.0	10.0
2. Higher-scoring group	12	80.0	0.0

national surveys indicating that Black Americans, particularly Black women, demonstrate relatively high levels of religiosity, as compared to both their male and White counterparts.[25,41]

Limitations

As a pilot study, the present investigation had a number of limitations. The sample consisted of 22 Black women. As a result, underlying relationships between study variables, eg, spiritual well-being and diabetes-related distress, may have been obscured. However, notwithstanding the sample size, strongly moderate relationships between BP levels and both diabetes-related distress, and components of spiritual well-being, were still observed.

Drawn from 2 randomized studies, the participants in the present study were sampled by convenience vs random sampling procedures. Self-selected, the sample may reflect a proactive segment of the female Black American population with type 2 diabetes. Further, drawing participants from the completed intervention studies may have confounded findings in the present study, particularly in relation to the low levels of diabetes-related distress found for the sample as a whole.

As a quantitative study, the selected instruments offered only fixed responses. The use of instruments providing open-ended questions may have enriched the data and its interpretation. Further, the instruments, though appropriate, only assessed dimensions of spirituality and diabetes-related distress. Additional instruments measuring self-care, coping methods, and global emotional well-being, may have contributed to a greater understanding of the relationships between spiritual well-being and both glycemic and BP control. Cross-sectional in design, the data was collected at only one point in time. Longitudinal evaluation of the relationships among the study variables might have provided a fuller appreciation of the complex interplay of factors influencing daily management of type 2 diabetes, over time. Overall, despite the study's limitations, the findings are thought provoking, demonstrating strongly moderate relationships between BP levels and spiritual well-being and emotional distress.

Implications for Practice and Research

The current study, exploring spirituality as a component of health among Black American women with type 2 diabetes, has implications for clinical practice and research. The findings indicate that aspects of spirituality are negatively related to diastolic BP levels, whereas emotional distress is positively associated with systolic BP levels. These findings are supported by the research literature.[34–36,42–44] The Centers for Disease Control and Prevention[4] estimates that up to 65% of adults diagnosed with diabetes have high BP. Research strongly indicates that tight BP control may drastically reduce the risk of diabetes-related death and secondary organ failure. The United Kingdom Prospective Diabetes Study (UKPDS) demonstrated that reducing hypertension had an even greater effect on reducing the risk of diabetes-related death and macrovascular complications than did blood sugar reduction.[45] The UKPDS findings, coupled with results from the present study, suggest, though modestly, that holistic clinical interventions, fostering diabetes patients' spiritual and emotional dimensions, may potentially reduce diabetes-related complications and premature death among Black women with type 2 diabetes.

The present study has implications for future research. Previous qualitative research has indicated that spirituality and emotional distress influence daily diabetes management among Black women.[37,46] Descriptive data from earlier work revealed that the population under study reported predominately a religious affiliation.[12,30] Sociological data has revealed further that Black women demonstrate a strong reliance on religiosity when coping with a chronic illness, and that their religious practices exercise a statistically positive influence on their health.[29,47]

Informed by these studies, this pilot project sought to explore quantitatively the relationships between spirituality, emotional distress, and physiological outcomes, in a group of Black American women with type 2 diabetes. The study revealed that religious and existential spirituality are contextually prominent variables, potentially serving as a coping resource in daily management of, or adjustment to, the demands of a chronic illness. The study also demonstrated significant relationships between BP levels and both emotional distress, and aspects of spiritual well-being.

These findings are promising, and demonstrate the need for further work with a larger sample. The findings indicate that the contribution of spirituality to the coping abilities of diabetes patients requires further examination. It is necessary to investigate whether spirituality influences patients' ability to cope with the daily management of diabetes, thereby affecting physiological outcomes, such as HbA_{1c} values. Future research should also consider whether other potential variables, eg, self-care, mediate the relationship between emotional distress and BP, among others. In short, it is necessary to examine more fully the complex interplay of factors influencing daily diabetes management, and the associated physiological outcomes in this understudied population. Specifically, both cross-sectional and longitudinal investigations of a larger sample appear warranted, in order to ascertain the respective contributions of spiritual well-being, emotional distress, and coping methods, to daily self-care and, in turn, to physiological outcomes. Ideally, a more comprehensive understanding of the interrelationships among

prominent variables influencing Black American women's daily management of type 2 diabetes will facilitate the development of care specifically designed for this population.

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REFERENCES

1. Centers for Disease Control. The public health of diabetes mellitus in the United States. Surveillance Report. 2000. Available at: www.cdc.gov/diabetes/survl/surveill.htm.
2. American Diabetes Association. Diabetes Facts and Figures. 2000. Available at: www.diabetes.org/ada/facts.asp.
3. American Diabetes Association. Standards of medical care for patients with diabetes mellitus. *Diabetes Care.* 2002;25:S33–S49.
4. Centers for Disease Control. National Diabetes Fact Sheet. 1998. Available at: www.cdc.gov/diabetes/pubs/facts98.htm.
5. Bloomgarten ZT, Karmally W, Metger MJ, et al. Randomized, controlled trial of diabetic patient education: improved knowledge without improved metabolic status. *Diabetes Care.* 1987;10(3):263–272.
6. Brown SA. Meta-analysis of diabetes patient education research: variations in intervention effects across studies. *Res Nurs Health.* 1992; 15(6):409–419.
7. Centers for Disease Control. The Prevention and Treatment of Complications of Diabetes Mellitus: A Guide for Primary Care Practitioners. 2000. Available at: www.cdc.gov/diabtes/pubs/complications/psyc.htm.
8. Polonsky WH, Anderson BJ, Lohrer PA, et al. Assessment of diabetes-related distress. *Diabetes Care.* 1995;18(6):754–760.
9. Van der Does FE, De Neeling JN, Snoek FJ, Grootenhuis PA, Bouter LM, Heine RJ. Symptoms and well-being in relation to glycemic control in type II diabetes. *Diabetes Care.* 1996;19(3):204–210.
10. Edwards DL. *Psychological Factors Affecting Adherence and Metabolic Control in Diabetes Mellitus* [dissertation]. Iowa City: University of Iowa; 1989.
11. Peyrot M, McMurray D, Kruger D. A biopsychosocial model of glycemic control in diabetes: stress, coping, and regimen adherence. *J Health Soc Behav.* 1999;40(2):141–158.
12. Melkus G, Jefferson V, Spollett G, et al. Culturally sensitive intervention of education and care improves glycemic control for Black women with type 2 DM. *Diabetes.* 2001; 50(suppl 1):811.
13. Rubin R, Peyrot M, Saudek C. Effect of diabetes education on self-care, metabolic control, and emotional well-being. *Diabetes Care.* 1989;12(10):673–679.
14. Rubin R, Peyrot M, Saudek C. The effect of a diabetes education program incorporating coping skills training on emotional well-being and diabetes self-efficacy. *Diabetes Educ.* 1993;3(19):210–214.
15. Do Rozario L. Spirituality in the lives of people with disability and chronic illness. *Disabil Rehabil.* 1997;19(10):427–434.
16. Gurklis JA, Menke EM. Identification of stressors and use of coping methods in chronic hemodialysis patients. *Nurs Res.* 1988; 37(4):236–239.
17. Holland JC, Passik S, Kash KM, et al. The role of religious and spiritual beliefs in coping with malignant melanoma. *Psychol Oncol.* 1999;8:14–26.
18. Rees-McGee SA. *Religiosity, Control Beliefs, Coping Strategies, and Psychological Adjustment to Cancer* [dissertation]. Tempe: Arizona State University; 1991.
19. Coleman CL. *The Effects of Religious Attributes on Psychological Well-Being and Health Status in African Americans Living with HIV Infection* [dissertation]. San Francisco: University of California, San Francisco; 1996.
20. Fehring RJ, Miller JF, Shaw C. Spiritual well-being, religiosity, hope, depression, and other mood states in elderly people coping with cancer. *Oncol Nurs Forum.* 1997;24(4):663–670.
21. Riley BB, Perna R, Tate DG, Forchheimer M, Anderson C, Luara G. Types of spiritual well-being among persons with chronic illness: their relation to various forms of quality of life. *Arch Phys Med Rehabil.* 1998;79(3):258–264.
22. Sowell R, Moneyham L, Guillory J, Seals B, Cohen L, Demi A. Self-care activities of women infected with Human Immunodeficiency Virus. *Holistic Nurs Prac.* 1997;11(2): 18–26.
23. Kaczorowski JM. Spiritual well-being and adults diagnosed with cancer. *Hospital J Phys Psychosoc Pastoral Care Dying.* 1989;5(3/4): 105–116.
24. Landis BJ. Uncertainty, spiritual well-being, and psychosocial adjustment to chronic illness. *Issues Mental Health Nurs.* 1996;17:217–231.
25. Levin JS, Taylor RJ, Chatters LM. Race and gender differences in religiosity among older adults: findings from four national surveys. *J Gerontol.* 1994;49(3):137–145.
26. Ellison CG. Religious involvement and self-perception among Black Americans. *Soc Forces.* 1993;71(4):1027–1055.
27. Krause N, Van Tran T. Stress and religious involvement among older Blacks. *J Gerontol.* 1989;44(1):4–13.
28. Levin JS, Chatters LM, Taylor RJ. Religious effects on health status and life satisfaction among Black Americans. *J Gerontol.* 1995; 50(3):154–163.
29. Ellison CG, Taylor JR. Turning to prayer: social and situational antecedents of religious coping among African Americans. *Rev Religious Res.* 1996;38(2):111–131.
30. Melkus GD, Spollett G, Tuohy B, et al. Nursing intervention of care and education for Black women with type 2 DM. *Diabetes.* 1999;48(suppl 1):158A.
31. Ellison CW. Spiritual well-being: conceptualization and measurement. *J Psychol Theol.* 1983;11:330–339.
32. National Interfaith Coalition on Aging. *Spiritual Well-Being: A Definition.* Athens, Ga: NICA; 1975.
33. Bayer Diagnostics. Bayer Diagnostics: DCA 2000. 2001. Available at: www.bayerus.com/diagnostics/index.html.
34. Hixson KA, Gruchow HW, Morgan DW. The relation between religiosity, selected health behaviors, and blood pressure among female adults. *Prev Med.* 1998;27(4):545–552.
35. Koenig HG, George LK, Hays JC, Larson DB, Cohen HJ, Blazer DG. The relationship between religious activities and blood pressure in older adults. *Int J Psychiatry Med.* 1998; 28(2):189–213.
36. Steffen PR, Hinderliter AL, Blumenthal JA, Sherwood A. Religious coping, ethnicity, and ambulatory blood pressure. *Psychosom Med.* 2001;63(4):523–530.
37. Samuel-Hodge C, Headen S, Skelly A, et al. Influences on day-to-day self-management of type 2 diabetes among African-American women: spirituality, the multi-caregiver role, and other social context factors. *Diabetes Care.* 2000;23(7):928–933.
38. Potts RG. Spirituality and the experience of cancer in an African-American community: implications for psychosocial oncology. *J Psychosoc Oncol.* 1996;14(1):1–19.
39. Mickley JR, Soeken K, Belcher A. Spiritual well-being, religiousness, and hope among women with breast cancer. *Image.* 1992; 24(4):267–272.
40. Carson VB, Green H. Spiritual well-being: a predictor of hardiness in patients with acquired immunodeficiency syndrome. *J Prof Nurs.* 1992;8(4):209–220.
41. Chatters LM, Levin JS, Taylor RJ. Antecedents and dimensions of religious involvement among older Black adults. *J Gerontol.* 1992; 47:S269–S278.
42. Carels RA, Blumenthal JA, Sherwood A. Emotional responsivity during daily life: re-

lationship to psychosocial functioning and ambulatory blood pressure. *Int J Psychophysiol.* 2000;36(1):25–33.
43. Gendolla GH, Krusken J. Mood state and cardiovascular response in active coping with an affect-regulative challenge. *Int J Psychophysiol.* 2001;41(2):169–180.
44. Shapiro D, Jamner LD, Goldstein IB, Delfino RJ. Striking a chord: moods, blood pressure, and heart rate in everyday life. *Psychophysiology.* 2001;38(2):197–204.
45. UK Prospective Diabetes Study (UKPDS) Group. Tight blood pressure control and risk of macrovascular and microvascular complication in type 2 diabetes. *BMJ.* 1988;317: 703–723.
46. Maillet NA, D'Eramo-Melkus G, Spollett G. Using focus groups to characterize beliefs and practices of African-American women with NIDDM. *Diabetes Educ.* 1996;22(1):39–45.
47. Ferraro K, Koch J. Religion and health among Black and White adults: examining social support and consolation. *J Sci Study Rel.* 1994;4:362–375.

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