



Published in final edited form as:

Gen Hosp Psychiatry. 2012 November ; 34(6): 598–603. doi:10.1016/j.genhosppsy.2012.07.005.

Effect of Diabetes Fatalism on Medication Adherence and Self-Care Behaviors in Adults with Diabetes

Rebekah J. Walker, MS¹, Brittany L. Smalls, MHSA¹, Melba A. Hernandez-Tejada, MS¹, Jennifer A. Campbell, AA¹, Kimberly S. Davis, MD², and Leonard E. Egede, MD, MS^{1,2,3}

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

²Division of General Internal Medicine and Geriatrics, Department of Medicine, Medical University of South Carolina, Charleston, SC

³Center for Disease Prevention and Health Interventions for Diverse Populations, Charleston VA REAP, Ralph H. Johnson VA Medical Center, Charleston, SC

Abstract

Objective—Diabetes fatalism is defined as “a complex psychological cycle characterized by perceptions of despair, hopelessness, and powerlessness” and associated with poor glycemic control. This study examined the association between diabetes fatalism and medication adherence and self-care behaviors in adults with diabetes.

Methods—Data on 378 subjects with type 2 diabetes recruited from two primary care clinics in the Southeastern United States were examined. Previously validated scales were used to measure diabetes fatalism, medication adherence, diabetes knowledge, and diabetes self-care behaviors (diet, physical activity, blood sugar testing and foot care). Multiple linear regression was used to assess the independent effect of diabetes fatalism on medication adherence and self-care behaviors controlling for relevant covariates.

Results—Fatalism correlated significantly with medication adherence ($r = 0.24$, $p < 0.001$), diet ($r = -0.26$, $p < 0.001$), exercise ($r = -0.20$, $p < 0.001$) and blood sugar testing ($r = -0.19$, $p < 0.001$). In the linear regression model, diabetes fatalism was significantly associated with medication adherence ($\beta = 0.029$, 95% CI 0.016, 0.043); diabetes knowledge ($\beta = -0.042$, 95% CI -0.001 , -0.084); diet ($\beta = -0.063$, 95% CI -0.039 , -0.087), exercise ($\beta = -0.055$, 95% CI -0.028 , -0.083), and blood sugar testing ($\beta = -0.055$, 95% CI -0.023 , -0.087). There was no significant association between diabetes fatalism and foot care ($\beta = -0.018$, 95% CI -0.047 , 0.011). The association between diabetes fatalism and medication adherence, diabetes knowledge and diabetes self-care behaviors did not change significantly when depression was added to the models, suggesting that the associations are independent of depression.

Conclusion—Diabetes fatalism is associated with poor medication adherence and self-care and may be an important target for education and skills interventions in diabetes care. In addition, the effect of diabetes fatalism is independent of depression, suggesting that interventions that target depression may not be sufficient to deal with diabetes fatalism.

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Corresponding Author: Leonard E Egede, MD, MS, Center for Health Disparities Research, 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.

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Keywords

fatalism; medication adherence; self-care; diabetes

1. Introduction

Self-care behaviors are a significant component of glycemic control in adults with Type 2 diabetes (T2DM). Poor adherence to self-care guidelines and medication adherence leads to increased complications and mortality [1]. While diabetes knowledge has been associated with glycemic control in some studies [2], knowledge alone has been an insufficient predictor of self-care behaviors, suggesting other factors are influencing the decision to follow self-care regimen [3]. Recently, psychosocial variables have been recognized as a strong predictor of diabetes management, including diabetes fatalism, depression, social support, coping, and self-efficacy [3,4,5,6,7]. Gonzalez and colleagues conducted a meta-analysis that evaluated the association between depression and diabetes self-care (i.e., including missed appointments, blood glucose self-monitoring, diet, and medication adherence) and found depression had a medium effect size. [8] Like depression, fatalistic attitudes have been found to influence interaction with others, the meanings attached to those interactions, and the decision to adopt effective self care behaviors [7]. While diabetes fatalism is related to constructs such as depression and locus of control, it differs conceptually.

In an effort to better address diabetes fatalism, a scale to measure diabetes fatalism has been developed and validated in adults with type 2 diabetes [9]. Diabetes fatalism is defined as “a complex psychological cycle characterized by perceptions of despair, hopelessness, and powerlessness” [9,10,11]. The perspective of fatalism may be more applicable to African Americans than the locus of control construct due to its conceptualization in the context of the African American experience in the United States. [7] Development of the scale found three dimensions of diabetes fatalism including emotional distress (despair), religious and spiritual coping (hopelessness) and perceived self-efficacy (powerlessness). Emotional distress represents frustration with the disruption in lifestyle caused by diabetes, religious and spiritual coping represents acceptance and coping through attributing the outcome of diabetes to a higher power, and perceived self efficacy represents self confidence in one’s ability to control diabetes and prevent complications [9]. While diabetes specific distress is an important construct in itself, it is one aspect of the fatalism scale as a whole. The 12-item Diabetes Fatalism Scale can be investigated as an overall score rather than the individual constructs as they were found to be internally consistent (Cronbach’s alpha of 0.804), and independently associated with increased HbA1c (standardized beta= 0.21, p=0.005) after adjusting for demographics, comorbidity, and insulin use [9].

Research has shown fatalistic beliefs to be a barrier to effective diabetes self management, glycemic control and health outcomes, [7, 9] but the association between these measures has not been conclusive. Lange and Piette did not find fatalism to be associated with HbA1c, but did find higher fatalism to be associated with patients with lower education levels, lower income, more recent symptoms and higher number of comorbidities [12]. Egede and Ellis found fatalism to be associated with self-care problems, poor glycemic control and decreased quality of life [9]. Rather than being directly associated with health outcomes, Osborne and Egede found an indirect association of diabetes fatalism with glycemic control through four diabetes self-care measures: general diet, specific diet, foot care and blood sugar testing [13]. Other self-care measures, such as exercise, did not show a significant association [13] and no studies have investigated the relationship between fatalism and medication adherence.

The purpose of this study was to examine the association between diabetes fatalism and medication adherence and self-care behaviors in adults with Type 2 diabetes. However, because depression is strongly associated with poor diabetes outcomes and self-care behaviors [8,14–16], we wanted to determine if the association between diabetes fatalism and self-care behaviors was independent of depression. We hypothesized that individuals with more diabetes fatalism would have poorer self-care behaviors and lower medication adherence in a primary care sample with type 2 diabetes and that these effects would be independent of depression.

2. Methods

2.1 Sample

We recruited patients with consecutively scheduled appointments with a diagnosis of T2DM at two different adult primary care clinics in the Southeastern United States. The institutional review board at our institution approved all procedures prior to study enrollment. Eligible patients were clinic patients, age 18 years or older with a diagnosis of T2DM in the medical record, and a clinic appointment between June 2010 and August 2010. Patients were ineligible if they did not speak English, or if the research assistants determined (by interaction or chart documentation) they were cognitively impaired or too ill to participate.

2.2 Data and Procedure

Research assistants reviewed the electronic clinic roster to identify eligible patients. Eligible patients were approached in the clinic waiting room, and provided a description of the study. Those interested and eligible were consented and taken to a private area in the clinic to complete the study instruments. Participants completed the assessment before or after their scheduled clinic appointments, depending on clinic flow. Three hundred and seventy-eight subjects were consented and completed the study.

We collected data on self-reported age, sex, race/ethnicity, education, household income, employment status, insurance status, marital status and perceived health status. Additional measures included validated surveys of diabetes fatalism, diabetes knowledge, medication adherence, and diabetes self-care behavior.

2.3 Demographic variables

Age was categorized as 18–49 years, 50–64 years and 65 years and older. Race/ethnicity was categorized as non-Hispanic white and non-Hispanic black since none of the participants were of Hispanic or other racial origin. Marital status was categorized as married or not married. Education was categorized as less than high school graduate, high school graduate, or greater than high school graduate. Employment was categorized as employed or unemployed. Annual personal income was categorized as <\$10,000, <\$25,000, or \$25,000 or greater. Health insurance was categorized as insured or uninsured.

2.4 Diabetes fatalism

Diabetes fatalism was assessed with the 12-item Diabetes Fatalism Scale (DFS-12) [8]. Items are scored on a 6-point Likert scale with scores ranging from 1 = strongly disagree to 6 = strongly agree. Higher scores represent more fatalistic attitudes [9]. A summary score consisting of the sum of individual items is created, such that higher summary scores represent greater diabetes fatalism. The DFS-12 has good internal consistency with a Cronbach's alpha of 0.804 and has been shown to be an independent correlate of poor glycemic control [9].

2.5 Diabetes knowledge

Diabetes knowledge was assessed with the Diabetes Knowledge Questionnaire (DKQ) [17]. The DKQ elicits information about the respondent's understanding of the cause of diabetes, types of diabetes, self-management skills, and complications of diabetes. Response options are "yes", "no", or "don't know". The final score was based on the percentage of correct scores, with a maximal possible score of 100 [17].

2.6 Medication adherence

The Morisky adherence score [18], a commonly used self-report tool, was used to assess medication adherence. It has good reliability and validity [18, 19]. This scale asks patients to respond to "yes" or "no" to a set of 4 questions. A positive response to any question indicates a problem with adherence with a total possible score of 4; higher values indicate poorer adherence.

2.7 Diabetes self-care behavior

Self-care behavior was assessed with the 11-item Summary of Diabetes Self-Care Activities (SDSCA) scale [20]. The SDSCA scale measures frequency of self-care activity in the last 7 days for five aspects of the diabetes regimen: general diet (follow healthy diet), specific diet (ate fruits/low fat diet), foot care, blood-glucose testing, exercise, and cigarette smoking. For this analysis, general diet, foot care, blood-glucose testing and exercise were used.

2.8 Depressive symptoms

Depressive symptoms were assessed with the Patient Health Questionnaire (PHQ-9). The PHQ-9 has demonstrated usefulness as a screening tool for depression with acceptable reliability, validity, sensitivity, and specificity. The PHQ-9 is a 9-item self-report questionnaire corresponding to the nine DSM-IV signs and symptoms of major depression. Participants are asked to rate how they felt in the previous 2 weeks. Each question is scored 0 to 3 (0 = not at all, 1 = several days, 2 = more than half the days and 3 = nearly every day) and summed to produce a composite score ranging from 0–27, with higher scores representing more depressive symptomology. Depressive symptoms was treated as a continuous variable, but was also categorized according to established guidelines as no depressive symptoms (PHQ-9 score <5), mild depressive symptoms (PHQ-9 score 5–9) and major depressive symptoms (PHQ-9 score ≥ 10).

2.9 Statistical Analyses

We performed four sets of analyses. First, we ran a confirmatory factor analysis to determine the factor structure of the 12-item diabetes fatalism scale and calculated Cronbach's alpha to establish its internal consistency in our study population. Second, we calculated sample percentages for each demographic variable. Third, we used Spearman's correlation to test the association among diabetes fatalism, medication adherence, diabetes knowledge, and self-care behaviors (diet, physical activity, blood sugar testing and foot care). Fourth, we ran multiple linear regression models to assess the independent associations between diabetes fatalism and medication adherence, diabetes knowledge and diabetes self-care behaviors (diet, physical activity, blood sugar testing and foot care) controlling for covariates. For each regression model, medication adherence, diabetes knowledge and self-care behaviors (diet, physical activity, blood sugar testing and foot care) were the dependent variables, diabetes fatalism was the primary independent variable and age, sex, race/ethnicity, education, income, and employment were included in the model as covariates. To test whether the association between diabetes fatalism and medication adherence, diabetes knowledge and diabetes self-care behaviors was independent of the effect of depression, we included depression as a covariate in a final set of models. All

analyses were performed with STATA V10 and a two tailed alpha of 0.05 was used to assess for significance. Variables were selected for inclusion in the models based on clinical relevance.

3. Results

We assessed the psychometric properties of the diabetes fatalism scale in our study population. The principal component analysis yielded a 12-item scale with three factors having eigenvalues of 4.09, 3.15, and 1.30 that accounted for 71% of the variance. The eigenvalues provide the variance explained by each factor. Factor loadings ranged from 0.57 to 0.77. An item analysis for the 12-item scale revealed a Cronbach's α of 0.82. The item-test correlation of the 12-item scale ranged from 0.81 to 0.82 and the item analysis showed that alpha would not be meaningfully improved by dropping any one item from the scale. The psychometric properties were consistent with those found with the original scale [9].

Demographic characteristics for this sample of 378 adults with type 2 diabetes are shown in Table 1. The majority of participants were female (69%), Non-Hispanic Blacks (83%), between the ages of 50–64 (54%), unemployed (60%), insured (61%), and had an income of <\$10,000 (47%).

Table 2 shows the results for correlations among diabetes fatalism, medication adherence and diabetes self-care. Diabetes fatalism was significantly correlated with medication adherence ($r=0.239$, $p<0.0001$), diet ($r=-0.263$, $p<0.0001$), exercise ($r=-0.202$, $p<0.0003$), and blood sugar testing ($r=-0.189$, $p<0.001$). Diabetes fatalism was marginally correlated with foot care ($r=-0.107$, $p=0.057$), but not significantly correlated with diabetes knowledge ($r=-0.054$, $p=0.349$).

Results from the linear regression model, as shown in Table 3, indicate that diabetes fatalism was significantly associated with medication adherence ($\beta=0.029$, 95% CI 0.016, 0.043); diabetes knowledge ($\beta=-0.042$, 95% CI -0.001 , -0.084); diet ($\beta=-0.063$, 95% CI -0.039 , -0.087), exercise ($\beta=-0.055$, 95% CI -0.028 , -0.083), and blood sugar testing ($\beta=-0.055$, 95% CI -0.023 , -0.087). There was no significant association between diabetes fatalism and foot care ($\beta=-0.018$, 95% CI -0.047 , 0.011). The association between diabetes fatalism and medication adherence, diabetes knowledge and diabetes self-care behaviors did not change significantly when depression was added to the models, suggesting that the associations are independent of depression.

4. Discussion and Conclusion

4.1 Discussion

Consistent with our hypothesis, diabetes fatalism was significantly associated with poor medication adherence and self-care behaviors. After adjustment for pertinent covariates, the relationship remained statistically significant for the association between increased diabetes fatalism, decreased medication adherence, and decreased levels of three self-care behaviors (diet, exercise, and blood sugar testing). In addition, the effects of diabetes fatalism on medication adherence, diabetes knowledge and diabetes self-care behaviors were independent of depression, suggesting that diabetes fatalism is a separate construct from depression. These findings suggest that patients exhibiting higher levels of fatalistic attitudes may exhibit lower levels of self-care behaviors. Diabetes knowledge is an important factor associated with glycemic control [2], and we found it to be significantly associated with diabetes fatalism. This suggests that increased knowledge about diabetes may be an important strategy to change fatalistic attitudes among adults with type 2 diabetes.

Although a few studies have found similar associations between diabetes fatalism and self-care behavior [7,9,12,13], this is the first study to show a deleterious effect of diabetes fatalism on medication adherence. In addition, this is one of the first studies to examine the effect of diabetes fatalism on multiple distinct diabetes self-care behaviors controlling for the effect of depression. The mechanisms for these associations are unclear and will need to be elucidated in future studies. Nevertheless, this study highlights the importance of fatalism as an important psychosocial construct in diabetes.

The major contribution of this study is that diabetes fatalism may be an important area to consider when designing lifestyle change interventions. The effects of diabetes fatalism appear to be independent of those of depression, suggesting that interventions that target depression may not sufficiently address this characteristic insofar as its effect on diabetes care is concerned. Gonzalez and colleagues [23] raised a similar point in their discussion of the need to distinguish symptoms of distress from those of depression. However, both distress and depression are constellations of psychological symptoms, for which treatments exist; whereas diabetes fatalism is more akin to a personality trait. As such, and as our findings illustrate, even if correlated with depression, fatalism appears to exert its negative effects in a manner different than, and in excess of those explained by depression alone. Therefore, the concept of diabetes fatalism offers an additional perspective by which to inform treatment, one not simply tied to a psychological disorder. Consideration of diabetes fatalism, therefore, may be very relevant to diabetes treatment design.

Research has shown the success of psychosocial interventions on improving diabetes self care adherence, blood glucose levels and reducing diabetes-related hospitalizations [4]. Other studies have also found that combining psychosocial support with aggressive medical care could improve diabetes outcomes [5]. These findings suggest that the role of diabetes fatalism should be considered when addressing psychosocial factors. Fatalism has been incorporated into interventions to address cancer screening with positive results [11,24,25]. An intervention developed for colorectal cancer using the Powe Fatalism Model found increased cancer screening and decreased fatalism in the treatment group [24].

This study needs to be replicated in other populations to assess consistency of the findings and identify potential explanatory factors. Research is also needed to determine the role of diabetes fatalism on other diabetes outcome measures such as blood pressure control and lipid management. Finally it is important to note that although emotional distress is established as being a component within the construct of fatalism, emotional distress may have independent influence on diabetes management beyond that of the construct of fatalism. Additional research is needed to determine the level of this influence on diabetes management and medication adherence. It will also be important to understand how general distress (i.e. serious psychological distress) differs from diabetes specific distress (diabetes distress, emotional distress due to diabetes) and how they impact outcomes independent of depression. Future studies are needed to elucidate these processes in order to improve our understanding of the role of psychological factors on diabetes outcomes.

This study has some limitations that are worth mentioning. First, this was a cross-sectional study, so we are not able to speak to causality or direction of the associations. Second, this study was conducted at two locations both in the southeastern United States and it is possible that our findings may not be representative of other populations across the nation. Third, there are additional confounding factors that could influence the relationship between diabetes fatalism and self care behaviors, such as health literacy and multiple comorbidities which will need to be assessed in future studies.

4.2 Conclusion

In conclusion, this study found that after adjustment for pertinent covariates, the relationship remained statistically significant for the association between increased diabetes fatalism, decreased medication adherence, and decreased levels of three self-care behaviors (diet, exercise, and blood sugar testing).

4.4 Practice Implications

The study findings indicate that diabetes fatalism may be an important psychosocial construct to consider when designing interventions, and patients with this personality trait or life outlook may benefit from targeted interventions. Research has shown the success of psychosocial interventions on improving diabetes self care adherence, blood glucose levels and reducing diabetes-related hospitalizations [4]. Other studies have also found that combining psychosocial support with aggressive medical care could improve diabetes outcomes [5]. These findings suggest that patients exhibiting higher levels of fatalistic attitudes may exhibit lower levels of self-care behaviors and that diabetes fatalism may be an important target for education and skills interventions in routine clinical care for diabetes. In addition, the effect of diabetes fatalism is independent of depression, suggesting that interventions that target depression alone may not be sufficient to deal with diabetes fatalism.

Acknowledgments

Supported by Grant #T35DK007431 from the National Institute for Diabetes, Digestive and Kidney Disease

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Table 1

Sample Demographic Characteristics (n=378)

	%
Age	
18–49 years	24.0
50–64 years	53.6
65+ years	22.4
Gender	
Women	69.1
Race/Ethnicity	
Non-Hispanic Black	83.2
Marital Status	
Married	31.6
Educational level	
Less than HS graduate	25.8
HS graduate	43.8
Greater than HS graduate	30.3
Employment status	
Employed	39.5
Annual income level	
<\$10,000	46.5
<\$25,000	33.8
\$25,000+	19.6
Health insurance	60.9

HS = High School

Table 2

Correlations among Diabetes Fatalism, Medication Adherence, and Diabetes Self-Care Behaviors

Diabetes Fatalism	r	P-value
Medication Adherence	0.239	<0.0001
Diabetes Knowledge Test	-0.054	0.349
General Diet	-0.263	<0.0001
Exercise	-0.202	<0.0003
Blood Sugar Testing	-0.189	<0.001
Foot Care	-0.107	0.057

Table 3

Adjusted Models for the Relationship among Diabetes Fatalism, Medication Adherence and Diabetes Self-Care Behaviors

	β^* (95% CI)	<i>P</i> -value	β^*_1 (95% CI)	<i>P</i> -value
Medication Adherence	0.029 (0.016; 0.043)	<0.001	0.027 (0.013; 0.039)	<0.001
Diabetes Knowledge Test	-0.042 (-0.001; -0.084)	0.048	-0.040 (-0.083; 0.002)	0.061
General Diet	-0.063 (-0.039; -0.087)	<0.001	-0.060 (-0.036; -0.085)	<0.001
Exercise	-0.055 (-0.028; -0.083)	<0.001	-0.049 (-0.022; -0.077)	<0.001
Blood Sugar Testing	-0.055 (-0.023; -0.087)	0.001	-0.056 (-0.023; -0.088)	0.001
Foot Care	-0.018 (-0.047; 0.011)	0.227	-0.014 (-0.044; 0.015)	0.343

β^* =Linear regression model adjusted for age, race/ethnicity, gender, education, income and employment.

β^*_1 =Linear regression model adjusted for age, race/ethnicity, gender, education, income, employment and depression.