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Associations between Coping, Diabetes Knowledge, Medication Adherence, and Self-Care Behaviors in Adults with Type 2 Diabetes

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Abstract

Background—Few studies have examined the emotional approach to coping on diabetes outcomes. This study examined the relationship between emotional coping and diabetes knowledge, medication adherence, and self-care behaviors in adults with type 2 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 coping, medication adherence, diabetes knowledge, and diabetes self-care behaviors (including diet, physical activity, blood sugar testing and foot care). Multiple linear regression was used to assess the independent effect of coping through emotional approach on medication adherence and self-care behaviors while controlling for relevant covariates.

Results—Significant correlations were observed between emotional coping (as measured by emotional expression (EE) and emotional processing (EP)) and self-care behaviors. In the linear regression model, EP was significantly associated with medication adherence (β -0.17 , 95% CI -0.32 to -0.015), diabetes knowledge (β 0.76 , 95% CI 0.29 to 1.24), diet (β 0.52 , 95% CI 0.24 to 0.81), exercise (β 0.51 , 95% CI 0.19 to 0.82), blood sugar testing (β 0.54 , 95% CI 0.16 to 0.91), and foot care (β 0.32 , 95% CI -0.02 to 0.67). On the other hand, EE was associated with diet (β 0.38 , 95% CI 0.13 to 0.64), exercise (β 0.54 , 95% CI 0.27 to 0.82), blood sugar testing (β 0.42 , 95% CI 0.09 to 0.76) and foot care (β 0.36 , 95% CI 0.06 to 0.66), but it was not associated with diabetes knowledge.

Conclusion—These findings indicate that coping through an emotional approach is significantly associated with behaviors that lead to positive diabetes outcomes.

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Keywords

Coping; medication adherence; self-care; diabetes

INTRODUCTION

Diabetes affects more than 25.3 million people in the United States or 8.3 percent of the population [1]. It is the seventh leading cause of death according to United States death certificates in 2007, and the overall estimated national direct and indirect medical costs for people with diabetes in 2007 was \$ 174 billion, which is twice the medical cost for non-diabetics [1]. Many comorbid conditions and complications are associated with diabetes. These may include but are not limited to: blindness and other eye problems, nervous system disorders, kidney disease, lower-extremity amputations, periodontal disease, heart disease, and stroke [1].

Diabetes requires lifelong behavioral modifications for effective treatment, such as regular exercise, dietary changes, frequent blood sugar testing and medication adherence. Unfortunately, treatment compliance is often poor [2,3]. Coping is an area of study that seems to account for some of the variance in treatment compliance and subsequent diabetes-related health outcomes. Coping, as defined by Lazarus and Folkman (1984) within the context of Cognitive Theory of Stress and Coping “is a process involving cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding one's resources” (p. 141) [3]. Lazarus and Folkman (1984) also demarcate two ways of coping: problem-focused and emotion-focused [3]. The first has been considered as active coping, directed to resolve the problem in order to control situational demands. The latter, emotional approach to coping, has been given a passive connotation, in which a person, rather than solving the stressor related problem, instead tries to regulate emotions derived from the contact with the stressor [4–6].

Early research implied that an active, problem-focused approach was preferable to an emotional approach to coping [4]. More recent research echoes this sentiment, indicating that individuals with problem-focused coping tend to be more assertive in their decisions, display more adaptive behaviors and, in the specific case of dealing with a chronic disease, are more willing to follow directions about treatment and sustain adherence over a longer time, compared to people who tend to use an emotional approach to coping [4,7–8]. Thus, emotional approach to coping has been seen as negative, and most coping interventions are directed toward increasing problem-focused coping. However, this may be problematic in that the study of emotional approach to coping has been largely and artificially reduced to study of negative emotions, with little attention to positive emotions and their role in coping [5]. Similarly, the assumption that a person using problem-focused coping is in complete control of emotions and, thus, experiences positive emotions or a lack of emotions as a result of their problem-focused coping may be inaccurate.

Folkman and Moskowitz (2003), summarizing the evolution of the concept through years of research, indicated that emotions are integral to the coping process and that historical consideration of emotional approach to coping as negative or predictive of negative outcome is in part due to the manner in which these constructs are presented in coping scales. In other words, these scales considered negative emotions related to distress, not emotions in general, with positive emotions largely excluded [9]. Some authors, such as Austenfeld and Stanton noted this issue [10] and challenge the universal negative perception of the emotional approach to coping. These authors also argued that the items attempting to measure emotion in questionnaires about coping have been skewed and are mostly associated with distress

and negative outcomes, and offered a conceptualization of coping through an emotional approach in which two components are assessed: emotional processing (EP) and emotional expression (EE). EP is consistent with active attempts to address emotions without assuming distress, while EE reflects active verbal or non-verbal efforts to communicate emotions [10].

Therefore, the present study evaluated emotional approach to coping and its association with diabetes self-care behaviors, diabetes knowledge and medication adherence. We hypothesized that an emotional approach to coping would be associated with improved medication adherence and self-care behaviors in adults with type 2 diabetes mellitus (T2DM).

RESEARCH DESIGN AND METHODS

Sample

We recruited patients diagnosed with T2DM and scheduled appointments at two adult primary care clinics in the southeastern United States. The institutional review board at our institution approved all procedures prior to study enrollment. Eligible individuals were clinic patients, age 18 years of age or older with a diagnosis of T2DM in their medical record, and a clinic appointment between June 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 too ill or cognitively impaired to participate.

Data and Procedure

Research assistants reviewed the electronic clinic roster to identify eligible patients, who were then 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, and marital status. All of these data were self-reported. Additional measures included validated surveys of coping, diabetes knowledge, medication adherence, and diabetes self-care behavior.

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 as none of the study participants were Hispanic or of any 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 and greater. Health insurance was categorized as insured or uninsured.

Coping Measure

Coping was evaluated by using the 8-item emotional approach coping scale allowing evaluation of emotional processing (EP) and emotional expression (EE). The EP items measure active attempts to acknowledge, explore, and come to understand one's stressor-related emotions, while EE items represent active verbal and/or nonverbal efforts to communicate or symbolize emotional experience [12]. This measure has been shown to be valid and reliable (Cronbach's α : EP=0.91, EE=0.91) [10,11].

Diabetes knowledge

Diabetes knowledge was assessed with the Diabetes Knowledge Questionnaire (DKQ; Cronbach's $\alpha=0.78$) [13]. 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 [13].

Medication adherence

The Morisky adherence score [14], a commonly used self-report tool, was used to assess medication adherence. It is reliable and valid (Cronbach's $\alpha=0.61$) [14, 15]. 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, where higher values indicate poorer adherence.

Diabetes self-care behavior

Self-care behavior was assessed with the 11-item Summary of Diabetes Self-Care Activities (SDSCA) scale [16]. The SDSCA scale measures frequency of self-care activity in the last 7 days for five aspects of the diabetes regimen: general diet (followed 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.

Statistical Analyses

We performed three sets of analyses. First, we calculated sample percentages for each demographic variable. Second, we used Spearman's correlation to test the association among emotional approach to coping (EE and EP), medication adherence, diabetes knowledge, and self-care behaviors (diet, physical activity, blood sugar testing and foot care). Third, we conducted multiple linear regression to assess the independent associations between emotional approach to coping and medication adherence, diabetes knowledge and diabetes self-care behaviors (diet, physical activity, blood sugar testing and foot care) controlling for covariates. EE and EP were analyzed separately to test the individual contributions of each. 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. EE and EP were the primary independent variables and age, sex, race/ethnicity, education, income, and employment were included in the model as covariates. We also reran each of these models and computed standardized betas to determine the contribution of EE and EP to the variance of the respective measures of diabetes self-care behaviors. 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.

RESULTS

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 correlations between emotional approach to coping and medication adherence, diabetes knowledge and self-care behaviors. Significant correlations were found between EE and general diet ($p=0.005$), exercise ($p<0.001$), blood sugar testing ($p=0.008$), and foot care ($p=0.014$). No significant associations were found with medication adherence and diabetes knowledge test. With regards to EP, there were significant

correlations with diabetes knowledge test ($p=0.001$), general diet ($p=0.002$), exercise ($p<0.001$), and blood sugar testing ($p=0.023$). There was no significant correlation between EP and medication adherence or foot care.

The adjusted multiple regression model, shown in Table 3, indicated that there were significant associations between, both, EE and EP and diabetes health outcomes. The adjusted model indicated a significant independent associations between EP and medication adherence ($\beta -0.17$, 95% CI -0.32 to -0.15), diabetes knowledge test ($\beta 0.77$, 95% CI 0.29 to 1.24), general diet ($\beta 0.53$, 95% CI 0.23 to 0.81), exercise ($\beta 0.5$, 95% CI 0.19 to 0.82), and blood sugar testing ($\beta 0.54$, 95% CI 0.16 to 0.91). There were also significant independent associations between EE and general diet ($\beta 0.38$, 95% CI 0.13 to 0.64), exercise ($\beta 0.54$, 95% CI 0.27 to 0.82), blood sugar testing ($\beta 0.42$, 95% CI 0.09 to 0.76), and foot care ($\beta 0.36$, 95% CI 0.06 to 0.66).

The standardized betas shown in Table 4 indicate that EE accounted for 13–22% of the variance in the different diabetes self-care behaviors evaluated: general diet ($B= 0.17$, $p=0.003$) exercise ($B= 0.22$, $p<0.001$), blood sugar testing ($B= 0.14$, $p=0.013$) and foot care ($B= 0.13$, $p=0.019$). Similarly, EP accounted for 12–20% of the variance in the different diabetes self-care behaviors evaluated: medication adherence ($B= -0.12$, $p=0.32$), diabetes knowledge ($B= 0.17$, $p=0.002$), general diet ($B= 0.20$, $p<0.001$), exercise ($B= 0.18$, $p=0.002$) and blood sugar testing ($B= 0.16$, $p=0.005$).

DISCUSSION

Our study indicates that there is a significant association between emotional approach to coping and medication adherence, diabetes knowledge, and self-care behavior in adults with type 2 diabetes. Both EP and EE demonstrated significant associations, and it is important to recall the differences between the two. EP items measure active attempts to acknowledge, explore, and come to understand one's stressor-related emotions; whereas, EE items represent active verbal and/or nonverbal efforts to communicate or symbolize emotional experience. In the case of the present study, the ability to acknowledge, explore and come to an understanding of stressors was related to medication adherence, diabetes knowledge and self-care behaviors (except foot care); while being active in communicating the emotional experience was positively related to self-care behaviors but not diabetes knowledge and medication adherence. Yet, the Morisky medication adherence scale has an inverse association, higher scores indicate poorer medication adherence; therefore, the findings indicate an improvement in medication adherence. Viewed as general findings, this is consistent with the results of Austendfeld and Stanton (2004, 2011) who found that coping through emotional approach has beneficial effects when dealing with chronic illness and other life circumstances [10,12].

These findings imply that emotional coping may be useful in assisting those diagnosed with T2DM to better adjust to living with a chronic illness. Of course, this study should be replicated in other T2DM populations to assess reliability of findings in this population. Also, this study contributes to the growing literature noting the potential positive impact of emotion-focused coping on outcomes in chronically ill patients. More importantly, the study suggests that interventions that enhance emotional coping may lead to better health outcomes, resulting from more frequent blood sugar testing, better diet, and more exercise in adults with diabetes and thus need to be explored.

This study has some limitations: first, this was a small sample, so we are not able to make a generalization to patients with T2DM. Second, no statements of causality can be made as all analyses were correlational in nature. Third, study participants were recruited from two

health care organizations in southeastern United States and our findings may only be representative of the diabetic population within this area. Fourth, our study sample consisted mostly of African Americans who tend to be more spiritual than their majority counterparts and could skew the results based on their emotionally charged faith-based beliefs [16–19]. A more diverse study population would give a better indication of whether emotional approach to coping is beneficial for patients with T2DM. Finally, the measures used to determine the association between emotional coping, medication adherence, self-care behaviors, and diabetes knowledge did not address depression and diabetes-specific resources available to the study participants, which have been shown in other studies to impact self-care behaviors in patients with chronic illnesses [16–19].

In conclusion, this study found that an emotional approach to coping has a significant association with diabetes self-care and diabetes knowledge, and suggests that interventions that enhance emotional approach to coping may lead to better self-care behaviors in adults with diabetes.

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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
Men	30.9
Race/Ethnicity	
Non-Hispanic Black	83.2
Non-Hispanic White	16.8
Marital Status	
Married	31.6
Not Married	68.4
Educational level	
Less than HS * graduate	25.8
HS graduate	43.8
Greater than HS graduate	30.3
Employment status	
Employed	39.5
Unemployed	60.5
Annual income level	
<\$10,000	46.5
<\$25,000	33.8
\$25,000+	19.6
Health insurance	
Yes	60.9
No	39.1

* HS = High School

Table 2

Correlations among Emotional Expression, Emotional Processing, Medication Adherence and Diabetes Self-Care

	r	P-value*
Medication Adherence		
Emotional Expression	−0.080	0.155
Emotional Processing	−0.073	0.198
Diabetes Knowledge Test		
Emotional Expression	0.059	0.298
Emotional Processing	0.186	0.001
General Diet		
Emotional Expression	0.158	0.005
Emotional Processing	0.179	0.002
Exercise		
Emotional Expression	0.234	<0.001
Emotional Processing	0.199	<0.001
Blood Sugar Testing		
Emotional Expression	0.148	0.008
Emotional Processing	0.128	0.023
Foot Care		
Emotional Expression	0.138	0.015
Emotional Processing	0.104	0.066

*
P<0.05

Table 3

Adjusted Model[†] for the Relationship among Emotional Expression, Emotional Processing, Medication Adherence and Diabetes Self-Care

	β	CI	P-value *
Medication Adherence			
Emotional Expression	-0.131	-0.267; 0.005	0.059
Emotional Processing	-0.169	-0.324; -0.015	0.032
Diabetes Knowledge Test			
Emotional Expression	0.363	-0.061; 0.788	0.093
Emotional Processing	0.767	0.291; 1.245	0.002
General Diet			
Emotional Expression	0.381	0.127; 0.636	0.003
Emotional Processing	0.526	0.238; 0.813	<0.001
Exercise			
Emotional Expression	0.545	0.269; 0.821	<0.001
Emotional Processing	0.507	0.190; 0.823	0.002
Blood Sugar Testing			
Emotional Expression	0.423	0.090; 0.755	0.013
Emotional Processing	0.537	0.161; 0.914	0.005
Foot Care			
Emotional Expression	0.360	0.059; 0.661	0.019
Emotional Processing	0.321	-0.023; 0.665	0.067

[†]Model adjusted for age, sex, race/ethnicity, education, income, and employment.

* P<0.05

Table 4

Standardized Betas for Adjusted Model[†] for the Relationship among Emotional Expression, Emotional Processing, Medication Adherence and Diabetes Self-Care

	Standardized Betas [*]
Medication Adherence	
Emotional Expression	−0.108
Emotional Processing	−0.125 [*]
Diabetes Knowledge Test	
Emotional Expression	0.091
Emotional Processing	0.172 [*]
General Diet	
Emotional Expression	0.168 [*]
Emotional Processing	0.207 [*]
Exercise	
Emotional Expression	0.223 [*]
Emotional Processing	0.178 [*]
Blood Sugar Testing	
Emotional Expression	0.145 [*]
Emotional Processing	0.165 [*]
Foot Care	
Emotional Expression	0.136 [*]
Emotional Processing	0.109

[†] Models adjusted for age, sex, race/ethnicity, education, income, and employment.

^{*} P<0.05