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Factors Associated with Diabetes-related Distress: Implications for Diabetes Self-Management

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Abstract

Background—As 7.8% of the U.S. population is affected by diabetes, health care providers are tasked with providing resources to assist patients toward self-management. Psychosocial issues have an effect on diabetes self-care. Diabetes-related distress is associated with self-management and lower A1C. This cross-sectional study seeks to understand how demographic factors, psychological orientations, support, and diabetes management behaviors predict diabetes-related distress.

Methods—This study uses data from 267 adults with Type 2 diabetes. The Diabetes Distress Scale (DDS) is a 17-item scale measuring diabetes-related distress including emotional distress, physician related distress, regimen distress, and interpersonal distress.

Results—Hierarchical regression was conducted in four stages. The final model explains 48% of the variance in DDS. Significant factors related to lower DDS were older age, lower BMI, higher self-efficacy, higher levels of health care provider support, and a healthy diet.

Discussion—Findings of this study help health care providers know where to focus to reduce diabetes-related distress. Health care provider support is significant in reducing DDS. Diabetes education may want to include strategies that increase self-efficacy and assist people with diabetes to obtain a healthy weight through a more healthful diet.

Keywords

chronic illness; older adult; psychosocial intervention

Type 2 diabetes affects approximately 23.6 million people (7.8% of the general population) including 17.9 million who have been diagnosed and another estimated 5.7 million people who are undiagnosed (Centers for Disease Control and Prevention, 2011). As more people are diagnosed with diabetes, health care professionals are tasked with providing diabetes management education and other resources necessary to move patients toward a healthy orientation of self-management that will result in improved health outcomes.

Rubin and Peyrot (2001) assert that psychosocial issues have an effect on diabetes self-management that is not fully understood or adequately addressed by health care professionals. Furthermore, Snoek et al. (2011) found that nearly one-quarter of people with diabetes suffer from either depressive symptoms or diabetes-related distress and most people with diabetes acknowledged a need for psychological care. This cross-sectional study will investigate psychosocial and behavioral factors that are associated with distress in patients

with diabetes. The central focus in interventions for people with diabetes has been on increasing knowledge as a means of improving self-management. After systematically reviewing 72 studies that included an intervention to improve diabetes self-management, Norris and associates (2001) concluded there are factors other than knowledge contributory to achieving sustained behavioral change and posit that psychosocial factors may account for the absence of a consistently positive relationship between diabetes knowledge and glycemic control.

Peyrot et al. (2005) suggest issues that are particularly stressful in self-management of diabetes include daily management of diabetes tasks (e.g., diet, adequate activity, adherence to medication), the interaction of acute and chronic emotional distress with glucose control, and coping with social situations (Peyrot et al., 2005). Separating interventions for physical and mental health problems ignores their interaction and may be insufficient. Harkness et al. (2010) reviewed psychosocial interventions designed to improve mental and physical health in people with diabetes. While no specific interventions were identified that achieve integrative biopsychosocial care, the focus on mental health was effective in the treatment of psychological distress and depressive symptoms in people with diabetes (Harkness et al., 2010).

Rubin and Peyrot (2001) suggest a bidirectional relationship for depressed mood and diabetes in which poor diabetes management and poor glucose control exacerbate depressive symptoms, which contribute to even poorer diabetes self-management. However, depression and poor self-management are not necessarily synonymous; relieving depression alone may not be the best way to improve glycemic control (Rubin, 2001). This suggests a more complex relationship between depressive symptomology and diabetes self-management.

Fisher et al. (2010) assessed 506 people with Type 2 diabetes for major depressive disorder (MDD) as measured by the Composite International Diagnostic Interview (CIDI; Wittchen, 1994), depressive symptoms as assessed by the Center for Epidemiological Studies-Depression (CES-D; Radloff, 1997), and diabetes-related distress as measured by the Diabetes Distress Scale (DDS; Polonsky et al., 2005). Diabetes-related distress is defined as the patient's concerns about self-management of diabetes, perception of support, emotional burden, and access to quality health care (Fisher et al., 2008). Fisher et al. (2010) found that only diabetes-related distress not MDD or CES-D was significantly associated with self-management and A1C, the biological measure of glucose control, over the previous three months. Furthermore, Fisher et al. (2007) suggest most people with diabetes are not clinically depressed; therefore, reducing diabetes-related distress may be more important than treating depression in assisting people with diabetes to engage in self-care and reduce A1C. Moreover, Zagarins, Allen, Garb, and Welch (2012) found that improved glycemic control after diabetes education was associated with reduction in diabetes-related distress, but not changes in depressive symptoms. Glasgow, Toobert, and Gillette (2002) concur that assessing diabetes-related distress might be useful in identifying and overcoming barriers to diabetes self-management.

Psychosocial barriers consistently related to diabetes-related distress and poor diabetes self-management are low self-efficacy (King et al., 2010), external locus of control, and low

social support (Sarkar, Fisher, & Schillinger, 2006). Azjen (2002) asserts that self-efficacy deals primarily with the ease or difficulty of performing a given behavior, whereas locus of control measures the extent to which a behavior is under the control of the individual versus external agency.

Self-efficacy posits that the confidence patients have in their ability to competently perform health behaviors will determine which behaviors they will implement (Bandura, 1977). High self-efficacy is positively associated with diabetes self-management (Krichbaum, Aarestad, & Buethe, 2003; Sarkar et al., 2006). Thus, patients with higher self-efficacy along with an optimistic orientation to self-care are more likely to engage in diabetes self-management behaviors (Rose, Fliege, Hildebrandt, Schirop, & Klapp, 2002). Therefore, high self-efficacy may be associated with reduction in diabetes-related distress and increased confidence in performing self-management tasks necessary to improve health outcomes.

A related, but different measure of control over behavior is the notion of locus of control. Locus of control is the individual's perception about the extent to which performing certain behaviors are within his or her control (internal) as opposed to other people's control (external) (Azjen, 2002). Locus of control can be perceived on a continuum from totally internal (no dependence on others for help) at one extreme to totally external (total reliance on others) at the other extreme. Greater distress has been observed in people who feel that control for their diabetes management lies primarily on others rather than within themselves (Hernandez-Tejada, Lynch, Strom, & Egede, 2012).

In addition to personal factors such as self-efficacy and internal locus of control, social support from others may have a powerful influence for people with diabetes. The type and degree of support needs to be welcomed by the person with diabetes and be seen as truly supportive, not controlling or nagging. Research suggests that social support can be instrumental in the process of caring for diabetes (Rosland, Heisler, & Piette, 2012; Tol, Baghbanian, Rahimi, Shojaeizadeh, Mohebbi, & Majlessi, 2011). People with diabetes can learn strategies that enable them to cope with negative social responses, avoid and resolve conflicts, and reduce stress and isolation from loved ones (Rosland et al., 2012; Tol et al., 2011).

Moreover, Schoenthaler, Schwartz, Wood, and Stewart (2012) suggest in addition to social support, the quality of the patient-physician relationship has a strong influence on adherence to medication. The quality of this clinical relationship has an additive effect as a better relationship contributes to the patients' engagement in their care, which further influences outcomes related to self-care (Golin, DiMatteo, Leaks, Duan, & Gelberg, 2001). Conversely, when patients do not have confidence in their health care provider, they are less likely to implement care recommendations (Rodriguez, 2013).

Polonsky et al. (2005) suggest that living with diabetes can be characterized by a "complex, demanding, and often confusing set of self-care directives, patients may become frustrated, angry, overwhelmed, and/or discouraged" (p. 626). Furthermore, relationships with loved ones can become strained and interactions with health care providers may be challenging, which contributes to diabetes-related distress (Polonsky et al., 2005). When the challenges

of caring for diabetes affect the patient on an emotional level, it may result in diabetes-related distress.

Previous literature has suggested a relationship between distress and diabetes self-management; the purpose of this study is to further knowledge by identifying psychological factors, social support, and behavioral factors associated with diabetes-related distress in a diverse sample of people with Type 2 diabetes.

Methods

Participant Recruitment

IRB approval was obtained for this research study. The cross-sectional data were collected from three different sites: Scripps health care system, a private non-profit integrated health care organization providing health care and educational services to the San Diego community, the University of California San Diego (UCSD) health care system, and Taking Control of Your Diabetes (TCOYD), an independent, non-profit patient education and motivation center. Survey participants were community-dwelling adults who were at least 21 years old, had a diagnosis of Type 2 diabetes, and spoke and read either English or Spanish. Those eligible for inclusion at UCSD and Scripps were sent letters that explained the Behavior, Emotions, and Attitudes in Diabetes (BEAD) Project.

Scripps patients were informed that a representative would call to enquire about interest and willingness to participate unless they called a toll-free number or returned a postcard to opt out. Those who did not opt out were contacted by telephone and screened for inclusion. Conversely, UCSD chose to have patients call a phone number if they were interested in participating. Patients who met inclusion criteria and agreed to participate were sent the questionnaire, which included informed consent. They were asked to complete and return the survey and informed consent within two weeks. TCOYD chose to recruit participants during multiple one-day diabetes education seminars throughout the United States. Those who met inclusion criteria received the questionnaire and informed consent from a booth. They had the option to mail the survey to the project office or to complete it during the program and returned it to the same booth. All participants received a \$15 gift certificate after the completed survey was returned. Sample characteristics by sites are shown in Table 1.

Measures

Self-report data are often the most pragmatic way to collect data from the participants' perspective (Gonyea, 2005). Thus, the survey respondents were asked to complete a survey that asked for subjective information about their perceptions and behaviors. The researchers were interested in how their subjective perception affects diabetes-related distress; therefore precise, clinical definitions were not provided to participants. For example, their personal interpretation of "good" and "healthy" were left up their subjective interpretation of those terms. Tourangeau, Rips, and Rasinski (2000) suggest a four-step process is involved in responding to questions, which includes comprehension, retrieval, judgment, and response.

To protect against recall bias (Gonyea, 2005), when appropriate, participants were asked to report their behavior over the previous week.

Dependent Variable—The Diabetes Distress Scale (DDS) is a 17-item scale that measures diabetes-related distress in four domains including emotional burden, physician-related distress, regimen-related distress, and interpersonal distress (Table 2; Polonsky et al., 2005). All statements were measured on a 6-point Likert scale ranging from 1 = *not a problem* to 6 = *serious problem*. The mean score of the 17 items was used, with higher scores indicating greater distress. Cronbach's alpha for this sample was .92.

Psychological factors include locus of control and self-efficacy—Locus of control was measured by one statement. Respondents were asked to choose the degree to which they agreed or disagreed with the statement, There is nothing I can do now to slow or prevent long-term complications. Responses were recorded on a 5-point Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicate less of a sense of personal control over diabetes and outcomes.

Self-efficacy was measured by one question, At this time, how confident are you that YOU can take good care of your diabetes? Responses were recorded on a 5-point Likert scale from *not confident at all* = 1 to *very confident* = 5. The responses of *confident* or *very confident* were given by about half (51%) of those surveyed. Higher scores indicated more self-efficacy.

Social support was comprised of formal support from health care providers (HCP), which includes any healthcare professional providing diabetes care to the patient (i.e. nurse practitioners, physician assistants, physicians) and informal support from a significant person, which could be a spouse or another who is close with the respondent. Support from HCP was measured by three questions concerning (1) the perceived support of the HCP; (2) confidence the HCP knows what to do; and (3) whether the patient believes the HCP is telling them everything they need to know about diabetes. Responses were measured on a 5-point Likert scale. Higher scores indicate more HCP support. Cronbach's alpha for this sample was .78.

Informal support was measured by two questions related to social support at the present time. Respondents were asked to choose the degree to which they agree or disagree with statements concerning their spouse (or a person who is closest to them) with 1 = *strongly disagree* and 5 = *strongly agree*. For example, (1) *was he/she understanding and supportive* and (2) *said he/she would be willing to make lifestyle changes with me*. Higher scores indicated more informal support.

Behavioral factors—Respondents were asked about their current diabetes management behaviors. Responses were from 0 to 7 days per week. Diet was measured by asking, On how many of the last 7 days have you followed a healthful eating plan? Exercise was measured by asking, On how many of the last 7 days did you participate in at least 30 minutes of physical activity? (total minutes of continuous activity, including walking).

In addition, demographic variables included gender [1=male (44%), 2=female (56%)] and age ($M = 57.98$, $SD=13.64$). Body mass index (BMI) was calculated from self-reported height and weight as $BMI = (\text{Weight in Pounds} / (\text{Height in inches})^2) \times 703$. BMI can be expressed in categorical terms such as <18.5 = underweight; $18.5-24.9$ = normal; $25-29.9$ = overweight; and ≥ 30 = obese (CDC, Division of Nutrition, Physical Activity, and Obesity, 2011). For the purposes of this analysis, categorization was not used and BMI was a continuous variable. Self-reported ethnicity of the sample was white (56%), Hispanic (14%), Asian/Pacific Islander (15%), African American (9%), Native American (2%), and other (5%).

Data Analysis

Bivariate correlations were performed on all variables used in the linear regression models (Table 3). All independent variables included in the regression were significantly related to the DDS at the bivariate level. Those associated with higher DDS included being female, younger age, and higher BMI. Those associated with lower DDS included personal locus of control, higher self-efficacy, more HCP support, more support from loved ones, more days on a healthy diet, and more days of exercise. Time since diagnosis and sites were included as control variables; neither variable had a significant correlation with DDS. Education was not significantly related to DDS; this may be due to the lack of variation in education level in this sample; 76% had at least some college education. Moreover, self-efficacy was significantly related to all other variables, with the exception of site variables. ANOVA showed no significant differences between the three sites on DDS $F(2, 253) = .474$, $p = .49$; however, sites were included in the analysis as control variables.

Hierarchical regression was conducted through stepwise entry to investigate which demographic, psychological, support, and behavioral factors are associated with DDS (Field, 2009). Individual characteristics and control variables were entered in the first block. The remaining blocks were hypothesized to be related to DDS. The assumption of normality was tested via examination of the standard residuals. The P-P plot suggested a relatively normal distributional shape (with no outliers) of the residuals. In addition, skewness (.577) and kurtosis (-.408) statistics suggested that normality was a reasonable assumption.

In Model 1, a higher BMI was significantly related to DDS ($p < .01$). Demographics explained 11% of DDS, $F(6, 203) = 3.96$, $p < .01$ (Table 4).

In Model 2, younger age and higher BMI were significantly related to higher DDS ($p < .05$), when controlling for other variables. In addition, the TCOYD site was significantly related to higher DDS ($p < .01$) and lower self-efficacy was significantly related to higher DDS ($p < .01$). This model explained 42% of DDS, significantly more than demographic factors alone, $F(8, 201) = 18.04$, $p < .001$.

Model 3 examined the contribution of support from HCP and a significant other when controlling for demographics and psychological factors. Younger age and higher BMI ($p < .05$) were significantly related to higher DDS. The TCOYD site was significantly related to higher DDS ($p < .01$). Lower self-efficacy was significantly related to higher DDS ($p < .01$). More support from HCP was significantly related to lower DDS ($p < .05$); however, support

from loved ones was not significantly related to DDS. This model explained 46% of the variance, $F(10, 199) = 16.95, p < .001$.

In Model 4, there were five independent variables that were significantly related to DDS and this final model explained 48% of the variance in DDS. Younger age was significantly related to higher DDS when controlling for all other variables ($p < .05$). BMI was significantly related to higher DDS when controlling for all other variables ($p < .05$). Higher self-efficacy was related to lower DDS ($p < .01$). Higher HCP support was significantly related to lower DDS ($p < .01$) when controlling for other factors. Finally, healthful eating was related to lower DDS ($p < .05$) when controlling for all other variables. The addition of diabetes management behaviors did not significantly change the variance explained, $F(12, 197) = 15.04, p < .001$.

Limitations

This secondary analysis used self-reported cross-sectional data. This sample represented a relatively healthy group of people with Type 2 diabetes as evidenced by more than 70% self-reporting an A1C of $< 7\%$ and an average BMI of 30.94 ($SD = 7.57$). Additionally, functional ability was not assessed in this survey, but all participants were community-dwelling adults.

While a measurement of education was included in the survey, it was not significantly related to DDS. This may be due to the high education level in this sample; the mean education level was 5.44 ± 1.60 and 76% had at least some college education. Level of income was not included in the survey. This does not mean that socioeconomic status (SES) is not related to diabetes-related distress. In fact, future studies should include an examination of the relationship between SES factors and diabetes-related distress in a more diverse sample.

Locus of control and self-efficacy were measured by one question and significant other support was measured by two questions. We recommend future surveys include valid multi-item scales to measure these constructs. Social support has emerged as an important factor when examining health and future studies may want to examine what specific domains related to social support may be significant in reducing diabetes-related distress (e.g., number of social relationships, satisfaction with those relationships, and instrumental support).

Collecting survey data from a variety of sites was an attempt to broaden the sample. One survey collection site, TCOYD, was significantly higher in DDS when controlling for all other variables. While we cannot be certain why, this site represented a national sample and the survey participants were attending a series of workshops to provide information and support for people with diabetes. It may be that these participants were more distressed about their diabetes and, therefore, were seeking information to help alleviate their distress or their distress may have been increased by the information provided at the workshops.

Discussion

Symptoms of depression may include depressed mood, fatigue or loss of energy, feelings of hopelessness, difficulty concentrating and making decisions, and sleep disturbance (National Institute of Mental Health, 2011). These symptoms could just as well be signs of diabetes-related distress. Findings from this study may help health care providers identify those most at risk for diabetes-related distress (Fisher et al., 2010) and work toward relieving the distress.

Younger age was related to higher DDS (Fisher et al., 2010). This was true even after controlling for time since diagnosis. Younger people with diabetes may have additional stressors of family responsibilities, work, and financial challenges; therefore, managing diabetes may be contributing to their already high stress level and burden. In addition, older adults on Medicare may be less concerned about the cost of diabetes management than younger adults without insurance. To reduce diabetes-related distress, it would be important to assess the particular diabetes-related stressors (e.g. interpersonal distress, emotional burden, physician-related distress, or regimen-related distress) for younger patients and to determine confidence in performing self-management activities and to assess the social support available to them.

BMI was significantly related to diabetes-related distress after controlling for all other variables. In addition, BMI was significantly correlated at the bivariate level with being female, older age, lower self-efficacy, less support from a loved one, fewer days per week of healthy eating, and fewer days per week of exercise. Overweight stigma is related to psychological distress (Wott & Carels, 2010); therefore, helping patients to successfully reduce weight may improve DDS and have an effect on healthful eating and exercise, and improve self-efficacy.

Health care professionals involved in supporting people with diabetes may want to target increasing self-efficacy, which remained significant in all models after controlling for other factors. Confidence in their ability to manage diabetes is pivotal for patient engagement in self-care (Cherrington et al., 2010; Sarkar et al., 2006). People with diabetes need to learn skills and strategies necessary for self-management (e.g., making dietary changes, exercising regularly, blood sugar testing, and medication dosing) until they have been mastered. As patients believe they can make meaningful adjustments in lifestyle, they will be more likely to engage in changing dissonant behaviors such as poor dietary habits that are not conducive to health.

Consistent with findings by Polonsky et al. (2005), the more days people with diabetes reported following a healthful eating plan, the lower their distress. On average, this sample reported a healthy diet more than four out of seven days ($M = 4.35$, $SD = 1.84$). It is not clear whether this relationship is physiological or psychological. In other words, does the quality of diet improve the perception of distress or is it the confidence and sense of control that comes with having followed a healthy diet plan? In addition, HCPs should discuss individual goals related to modification of the patients' diet to meet goals. These dietary goals may include those outlined by the American Diabetes Association position statement,

which provides guidelines for managing diabetes with medical nutrition therapy (Bantle et al., 2008).

All people experience stress in everyday life. Those people with diabetes have additional stressors that need to be effectively identified and addressed in order to maintain health and quality of life. Fisher et al. (2010) found females were more likely to experience DDS; however, gender was not significant in our study, which is consistent with findings by Polonsky et al. (2005). We would suggest that as all people with diabetes have a stronger perception of personal control, acquire adequate social support, and engage in healthier eating, which results in substantially reduced diabetes-related distress. Building a comfortable relationship with a diabetes educator, dietician, social worker, and other members of a healthcare management team may allow patients to discuss their stressors, master practical skills, improve coping, and become more engaged in self-management.

Peyrot and Rubin (2007) suggest research often focuses exclusively on self-management strategies or addressing depression/distress, but not both. The person-in-environment approach is a valuable tool for assessing what the patient needs in context: healthy behavioral change and decreased distress. While the DDS can assess overall diabetes-related distress, it can also pinpoint the specific nature of the distress. For example, a patient with diabetes may experience particular difficulty with aspects of the self-care regimen and this would be helpful in identifying how to intervene. Diabetes educators may be able to assist in increasing self-efficacy and promoting strategies that increase support and reduce distress. People with diabetes may experience diminished diabetes-related distress and they might be more likely to achieve diabetes management goals.

In a systematic review of psychosocial outcomes after self-management, education, and psychological interventions in diabetes, Steed, Cooke, and Newman (2003) reported treatment of depressive symptoms was improved following psychological interventions and quality of life was improved following interventions targeting improvement of self-management. However, there were no interventions that attempted to effectively address both issues simultaneously. In addition, while some evidence suggests psychological interventions are effective in decreasing depression for those experiencing elevated depression, it is not certain whether interventions with a focus on improving self-management are beneficial for those with high levels of distress. There was a relationship between self-management behaviors and psychosocial well-being, which may be bidirectional (Steed et al., 2003). Therefore, it may be even more important to create an intervention that improves both self-management skills and psychosocial functioning. The overall benefit to the patient may be two-fold, improvement of self-management behaviors and reduction of distress.

Conclusions: Social Work Implications

This study identifies five elements that are associated with increased diabetes-related distress. They include younger age, higher BMI, lower self-efficacy, less support from their health care provider, and less days per week following a healthful eating plan. The inclusion of psychosocial supports to assist people with diabetes with self-management through the

reduction of diabetes-related distress is the concern; people with diabetes must believe they can do the things that lead to better outcomes and experience the results of their efforts.

Segal, Leach, May, and Turnbull (2013) suggest that in addition to medical management, access to psychosocial care is required if clinical targets are to be met; this is especially true for underserved populations. Social workers must be a part of healthcare teams, as they possess distinctive training in psychosocial care, relationship skills useful in improving communication with other healthcare professionals and significant others, effective behavioral change and coping skills, and understanding about ecological systems influence on people with diabetes (De Coster, 2001; Karls & O'Keefe, 2008; Segal et al., 2013; Snoek et al., 2011). For example, motivational interviewing has been shown to increase weight loss and improve self-management adherence (West, DiLillo, Bursac, Gore, & Greene, 2007).

Social workers can make substantial contributions to the creation and teaching of diabetes self-management (DSME) classes; they can communicate the need for psychosocial components of care in addition to basic knowledge (De Coster, 2001). In fact, social workers' behavioral science background that includes training in behavior modification, coping skills, and stress and time management is a perfect companion to the traditional biological and self-management skills training in many diabetes management programs (De Coster, 2001).

This study identifies the importance of the health care provider-patient relationship in reducing distress for people with diabetes. The more patients perceive they have the support of their HCP, the less distressed they are about their diabetes. In addition, HCPs must recognize that younger patients may be more prone to distress, regardless of time since diagnosis, than older patients and provide adequate interventions to moderate the distress. Social workers have the potential to bridge the gap and provide referrals and resources that may not be known to other HCPs. By intervening to suggest community supports, the social worker may be able to broaden available resources and reduce diabetes-related distress for people with diabetes.

For example, following a healthful eating plan is associated with lower diabetes-related distress. Thus, providing resources that enable patients to be successful in eating a healthful diet may be worth the investment. Helping people with diabetes obtain reliable information about diet and portion control and identify where they can obtain healthy food without breaking their budget can be invaluable. Moreover, referrals to dieticians or programs designed to support people in making dietary changes may not just reduce their waistlines, but may have the added benefit of reducing distress.

De Coster (2001) suggests social workers are uniquely trained to assist people with diabetes to navigate the various influences within their environment (i.e. social, familial, spiritual, and physical). The DDS provides an opportunity to assess the personal and environmental influences using an ecological systems approach; it measures emotional distress, interpersonal distress, regimen distress, and physician-related distress. When the barriers to care are identified, social workers can suggest coping strategies that may improve outcomes. In fact, DeCoster (2001) posits that social workers can "bring the clinics to the clients" by

organizing community events in settings that have the potential for outreach (p. 29). These opportunities to have interactions with people who are in need of support, but may not be able to go to the clinics, have potential to reach underserved populations.

Considering the ecological factors related to diabetes-related distress is paramount to considering the effectiveness of interventions (Karls & O'Keefe, 2008). Intervention strategies suggested by the social worker can target individual, familial, or broader aspects of the environment.

Social workers trained in health education have the opportunity to address diabetes self-management from a fresh perspective. Social workers should assist patients in creating a self-management plan that increases self-efficacy. In addition, it is imperative to incorporate interventions that target the patients' specific needs that can be readily implemented to reduce diabetes-related distress.

Managing diabetes is complex, requiring a variety of emotional and behavioral changes in order to adequately control blood glucose and improve outcomes. Addressing diabetes-related distress as a part of routine diabetes care may help to uncover unmet psychosocial needs and allow for reduction of diabetes-related distress (Snoek et al., 2011). This study helps to target the areas most likely to reduce diabetes-related distress, which may enable people with diabetes to improve self-management.

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References

- Azjen I. Perceived behavioral control, self-efficacy, locus of control and the theory of planned behavior. *Journal of Applied Social Psychology*. 2002; 32(4):665–683.
- Anderson D, Horton C, O'Toole ML, Brownson CA, Fazzino P, Fisher EB. Integrating depression care with diabetes care in real-world settings: Lessons from the Robert Wood Johnson Foundation Diabetes Initiative. *Diabetes Spectrum*. 2007; 20(1):10–16.
- Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*. 1977; 84(2):191–215. [PubMed: 847061]
- Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, Franz MJ, Wheeler ML. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care*. 2008; 31:S61–S78. [PubMed: 18165339]
- Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity. About BMI for adults. 2011. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
- Centers for Disease Control and Prevention. National diabetes fact sheet: National estimates and general information on diabetes and pre-diabetes in the United States. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; Atlanta, GA: 2011.
- DeCoster VA. Challenges of type 2 diabetes and role of health care social work: A neglected area of practice. *Health & Social Work*. 2001; 26(1):26–37. [PubMed: 11338276]
- Field, A. *Discovering statistics using SPSS*. Sage publications; 2009.
- Fisher L, Glasgow RE, Mullan JT, Skaff MM, Polonsky WH. Development of a brief diabetes distress screening instrument. *The Annals of Family Medicine*. 2008; 6(3):246–252.

- Fisher L, Mullan JT, Arean P, Glasgow RE, Hessler D, Masharani U. Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. *Diabetes Care*. 2010; 33(1):22–28.
- Fisher L, Skaff MM, Mullan JT, Arean P, Mohr D, Masharani U, Laurencin G. Clinical depression versus distress among patients with type 2 diabetes not just a question of semantics. *Diabetes Care*. 2007; 30(3):542–548. [PubMed: 17327318]
- Glasgow RE, Toobert DJ, Gillette CD. Psychosocial barriers to diabetes self-care and quality of life. *Diabetes Spectrum*. 2002; 14(1):33–41.
- Golin CE, DiMatteo MR, Leaks B, Duan N, Gelberg L. A diabetes-specific measure of patient desire to participate in medical decision making. *The Diabetes Educator*. 2001; 27(6):875–886. [PubMed: 12211927]
- Gonyea RM. Self-reported data in institutional research: Review and recommendations. *New Directions for Institutional Research*. 2005; 2005; (127):73–89.
- Harkness E, MacDonald W, Valderas J, Coventry P, Gask L, Bower P. Identifying psychosocial interventions that improve both physical and mental health in patients with diabetes: A systematic review and meta-analysis. *Diabetes Care*. 2010; 33(4):926–930. [PubMed: 20351228]
- Hernandez-Tejada MA, Lynch CP, Strom JL, Egede LE. Effect of perceived control on quality of life in indigent adults with type 2 diabetes. *The Diabetes Educator*. 2012; 38(2):256–262. [PubMed: 22316644]
- Karls JM, O'Keefe ME. Person-in-environment. *Social workers' desk reference*. 2008:371.
- King DK, Glasgow RE, Toobert DJ, Strycker LA, Estabrooks PA, Osuna D, Faber AJ. Self-efficacy, problem solving, and social-environmental support are associated with diabetes self-management behaviors. *Diabetes Care*. 2010; 33(4):751–753. [PubMed: 20150299]
- Krichbaum K, Aarestad V, Bueth M. Exploring the connection between self-efficacy and effective diabetes self-management. *The Diabetes Educator*. 2003; 29(4):653–662. [PubMed: 13677176]
- National Institute of Mental Health (NIMH). Depression. 2011. <http://www.nimh.nih.gov/health/publications/depression/depression-booklet.pdf>
- Norris SL, Engelgau MM, Venkat Narayan KM. Effectiveness of self-management training in type 2 diabetes: A systematic review of randomized controlled trials. *Diabetes Care*. 2001; 24(3):561–587. [PubMed: 11289485]
- Peyrot M, Rubin RR. Behavioral and psychosocial interventions in diabetes: A conceptual review. *Diabetes Care*. 2007; 30(10):2433–2440. [PubMed: 17666457]
- Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the Cross National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabetic Medicine*. 2005; 22(10):1379–1385. [PubMed: 16176200]
- Polonsky WH, Fisher L, Earles J, Dudl RJ, Lees J, Mullan J, Jackson RA. Assessing psychosocial stress in diabetes: Development of the Diabetes Distress Scale. *Diabetes Care*. 2005; 28:626–631. [PubMed: 15735199]
- Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1997; 3:385–401.
- Robinson N, Fuller JH, Edmeades SP. Depression and diabetes. *Diabetic Medicine*. 2009; 5(3):268–274. [PubMed: 2967150]
- Rodriguez KM. Intrinsic and extrinsic factors affecting patient engagement in diabetes self-management: Perspectives of a certified diabetes educator. *Clinical Therapeutics*. 2013; 35(2): 170–178. [PubMed: 23411000]
- Rose M, Fliege H, Hildebrandt M, Schirop T, Klapp BF. The network of psychological variables in patients with diabetes and their importance for quality of life and metabolic control. *Diabetes Care*. 2002; 25(1):35–42. [PubMed: 11772898]
- Rosland AM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: A systematic review. *Journal of Behavioral Medicine*. 2012; 35(2):221–239. [PubMed: 21691845]
- Rubin RR, Peyrot M. Psychological issues and treatments for people with diabetes. *Journal of Clinical Psychology*. 2001; 57(4):457–478. [PubMed: 11255202]

- Sarkar U, Fisher L, Schillinger D. Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? *Diabetes Care*. 2006; 29(4):823–829. [PubMed: 16567822]
- Schoenthaler AM, Schwartz BS, Wood C, Stewart WF. Patient and physician factors associated with adherence to diabetes medications. *The Diabetes Educator*. 2012; 38(3):397–408. [PubMed: 22446035]
- Segal L, Leach MJ, May E, Turnbull C. Regional primary care team to deliver best-practice diabetes care: A needs-driven health workforce model reflecting a biopsychosocial construct of health. *Diabetes Care*. 2013; 36(7)
- Snoek FJ, Kersch NY, Eldrup E, Harman-Boehm I, Hermanns N, Kokoszka A, Skovlund SE. Monitoring of Individual Needs in Diabetes (MIND): baseline data from the cross-national Diabetes Attitudes, Wishes, and Needs (DAWN) MIND study. *Diabetes Care*. 2011; 34(3):601–603. [PubMed: 21266654]
- Steed L, Cooke D, Newman S. A systematic review of psychosocial outcomes following education, self-management and psychological interventions in diabetes mellitus. *Patient Education and Counseling*. 2003; 51(1):5–15. [PubMed: 12915275]
- Tol A, Baghbanian A, Rahimi A, Shojaeizadeh D, Mohebbi B, Majlessi F. The relationship between perceived social support from family and diabetes control among patients with diabetes type 1 and type 2. *Journal of Diabetes and Metabolic Disorders*. 2011; 10:1–8.
- Tourangeau, R. *The psychology of survey response*. Cambridge University Press; 2000.
- West DS, DiLillo V, Bursac Z, Gore SA, Greene PG. Motivational interviewing improves weight loss in women with type 2 diabetes. *Diabetes Care*. 2007; 30(5):1081–1087. [PubMed: 17337504]
- Wittchen HU. Reliability and validity studies of the WHO—Composite International Diagnostic Interview (CIDI): a critical review. *Journal of Psychiatric Research*. 1994; 28:57–84. [PubMed: 8064641]
- Wott CB, Carels RA. Overt weight stigma, psychological distress and weight loss treatment outcomes. *Journal of Health Psychology*. 2010; 15(4):608–614. [PubMed: 20460417]
- Zagarins SE, Allen NA, Garb JL, Welch G. Improvement in glycemic control following a diabetes education intervention is associated with change in diabetes distress but not change in depressive symptoms. *Journal of Behavioral Medicine*. 2012; 35(3):299–304. [PubMed: 21691844]

Table 1

Sample Characteristics by Sites

| Characteristic | Overall Sample (N=267) | Scripps (N=41) | UCSD (N=152) | TCOYD (N=74) |
|------------------------------------|------------------------|----------------|---------------|---------------|
| % Male (Female) | 44% (56%) | 34% (66%) | 55% (45%) | 27% (73%) |
| Age ^a | 57.97 (13.64) | 55.2 (8.82) | 58.38 (14.84) | 58.66 (13.21) |
| Ethnicity | | | | |
| Non-Hispanic White | 56% | 68% | 49% | 64% |
| Hispanic | 14% | 13% | 17% | 10% |
| Asian/Pacific Islander | 15% | 13% | 15% | 15% |
| African American | 9% | 0% | 13% | 4% |
| Native American | 2% | 3% | 1% | 3% |
| Other | 5% | 5% | 5% | 5% |
| * Years of education ^a | 5.44 (1.60) | 5.70 (1.51) | 5.26 (1.75) | 5.64 (1.27) |
| Body Mass Index (BMI) ^a | 30.94 (7.57) | 30.32 (6.40) | 31.44 (8.10) | 30.26 (7.04) |
| Years since diagnosis ^a | 5.06 (6.36) | .95 (.96) | 7.47 (7.06) | 2.56 (4.12) |
| DDS ^a | 2.40 (.99) | 4.63 (2.45) | 2.30 (1.00) | 2.59 (1.02) |

UCSD=University of San Diego

TCOYD=Taking Care of Your Diabetes

* Years of education is measured as 1=6 or fewer years, 2=7-9 years, 3=10-11 years, 4=high school graduate, 5=some college, 6=college graduate, 7=some graduate school, and 8=graduate or professional degree

^aMean (SD)

Table 2**Diabetes Distress Scale (DDS) and Subscales****Emotional Burden (ED)**

Feeling that diabetes is taking up too much of my mental and physical energy every day.

Feeling angry, scared, and/or depressed when I think about living with diabetes.

Feeling that diabetes controls my life.

Feeling that I will end up with serious long-term complications, no matter what I do.

Feeling overwhelmed by the demands of living with diabetes.

Physician-related Distress (PD)

Feeling that my doctor doesn't know enough about diabetes and diabetes care.

Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.

Feeling that my doctor doesn't take my concerns seriously enough.

Feeling that I don't have a doctor who I can see regularly about my diabetes.

Regimen-related Distress (RD)

Feeling that I am not testing my blood sugars frequently enough.

Feeling that I am often failing with my diabetes regimen.

Not feeling confident in my day-to-day ability to manage diabetes.

Feeling that I am not sticking closely enough to a good meal plan.

Not feeling motivated to keep up my diabetes self-management.

Interpersonal Distress (ID)

Feeling that friends or family are not supportive enough of my self-care efforts (e.g., planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).

Feeling that friends or family don't appreciate how difficult living with diabetes can be.

Feeling that friends or family don't give me the emotional support that I would like.

* Statements were measured on a 6-point Likert scale ranging from 1 = *not a problem* to 6 = *serious problem* (Polonsky et al., 2005)

Table 3
Correlations, Means, and Standard Deviations for Variables in the Analysis (N=242)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------------------------------|--------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|------|
| 1. Diabetes Distress Scale | - | | | | | | | | | | | | |
| 2. Gender (1=male, 2=female) | .20** | - | | | | | | | | | | | |
| 3. Age | -.15* | -.01 | - | | | | | | | | | | |
| 4. BMI | .30** | .18* | -.28* | - | | | | | | | | | |
| 5. Time since diagnosis | .03 | -.04 | .18* | -.01 | - | | | | | | | | |
| 6. Scripps Site | .02 | .08 | -.09 | -.04 | -.04 | - | | | | | | | |
| 7. TCOYD Site | .11 | .21* | .03 | -.06 | -.06 | -.26** | - | | | | | | |
| 8. Locus of Control | -.14* | .14* | .01 | -.11 | -.11 | -.04 | .20** | - | | | | | |
| 9. Self-efficacy | -.53** | .15* | -.01* | -.19* | -.19* | .04 | .08 | .27** | - | | | | |
| 10. HCP Support | -.40** | .05 | .04 | -.07 | -.07 | -.07 | -.09 | .09 | .40** | - | | | |
| 11. Support of loved one | -.17* | -.18* | .002 | -.18* | -.18* | -.04 | .04 | .10 | .21** | .11 | - | | |
| 12. Healthy diet | -.33** | -.07 | .03 | -.23* | -.23** | .01 | .19** | .50** | .38** | .02 | .17** | - | |
| 13. 30 minutes daily exercise | -.19** | -.14* | .04 | -.27* | -.27** | -.10 | .13 | .21* | .25** | .02 | .20** | .42** | - |
| Means | 2.41 | 1.57 | 57.33 | 31.00 | 4.93 | .18 | .26 | 4.75 | 3.54 | 10.00 | 7.43 | 4.62 | 3.54 |
| Standard Deviations | 1.01 | .50 | 13.92 | 7.53 | 6.00 | .39 | .44 | .44 | 1.09 | 2.49 | 1.91 | 1.96 | 2.32 |

* p<.05

** p<.01

Table 4

Regression Model of Diabetes Distress Scale on Study Variables (N=210)

| Variables | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|-----------------------|---------|-----|---------|------|---------|------|---------|------|
| | B | SE | B | SE | B | SE | B | SE |
| Demographics | | | | | | | | |
| Female | .26 | .14 | .11 | .12 | .17 | .11 | .16 | .11 |
| Age | -.01 | .01 | -.01* | .004 | -.01* | .004 | -.01* | .004 |
| Time since diagnosis | .001 | .01 | .001 | .01 | .01 | .01 | .01 | .01 |
| BMI | .03** | .01 | .02* | .01 | .02* | .01 | .01 | .01 |
| Psychological | | | | | | | | |
| Locus of Control | | | -.12 | .14 | -.12 | .13 | .02 | .14 |
| Self-efficacy | | | -.51** | .05 | -.41** | .06 | -.37** | .06 |
| Support | | | | | | | | |
| HCP Support | | | | | -.10** | .02 | -.11** | .02 |
| Support of loved one | | | | | -.02 | .03 | -.01 | .03 |
| Behaviors | | | | | | | | |
| Healthful Eating | | | | | | | -.08* | .04 |
| Exercise | | | | | | | .01 | .03 |
| R ² | .09** | | .39** | | .445** | | .458 | |
| R ² change | - | | .30 | | .054 | | .013 | |

*
 $p < .05$ **
 $p < .01$