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Probing for depression and finding diabetes: a mixed-methods analysis of depression interviews with adults treated for type 2 diabetes

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Abstract

Background—Depression has increased prevalence and consistently predicts poor health outcomes among patients with diabetes. The impact of stressors related to diabetes and its treatment on depression assessment is infrequently considered.

Methods—We used mixed methods to evaluate depressive symptoms in adults with type 2 diabetes. We categorized responses related to diabetes and its treatment during interviews ($n = 70$) using the Montgomery–Åsberg Depression Rating Scale (MADRS) and administered questionnaires to measure diabetes-related distress and depressive symptoms.

Results—Participants (M age = 56, $SD = 7$; 67% female; 64% Black; 21% Latino) had mild depression on average (MADRS $M = 10$, $SD = 9$). Half of those with symptoms spontaneously mentioned diabetes context; 61% said diabetes contributed to their symptoms when questioned directly. Qualitative themes included: overlapping symptoms of diabetes and depression; burden of diabetes treatment; emotional impact of diabetes; and the bidirectional influence of depression and diabetes. Diabetes was mentioned more often at higher levels of depression severity ($r = .38$, $p = .001$). Higher HbA1c was associated with mentioning diabetes as a context for depressive symptoms ($r = .32$, $p = .007$). Insulin-users mentioned diabetes more often than those on oral medications only ($p = .005$).

Limitations—MADRS is not a traditional qualitative interview so themes may not provide an exhaustive view of the role of diabetes context in depression assessment.

Conclusions and clinical implications—The burden of type 2 diabetes and its treatment often provide an explanatory context for depressive symptoms assessed by structured clinical interviews, the gold standard of depression assessment. Diabetes context may influence accuracy of assessment and should inform intervention planning for those needing treatment.

Keywords

Diabetes; Depression; Diabetes-related distress; Screening; Comorbidity

1. Introduction

Individuals with diabetes are more likely to experience depression compared to the general population (Anderson et al., 2001). Depression, in turn, is related to poorer glycemic control (Lustman et al., 2000), increased risk of complications (de Groot et al., 2001); greater mortality risk (e.g. Black et al., 2003; Egede et al., 2005; Katon et al., 2005); and poorer diabetes treatment adherence and self-management (Gonzalez et al., 2008b). These relationships suggest the potential importance of depression screening and assessment in identifying patients at risk for poor treatment outcomes (Holt and Van der Feltz-Cornelis, 2012). However, the methods used to assess depression throughout most of the literature from which the above patterns emerge are limited: they neither adequately capture the construct of major depressive disorder (MDD) nor do they adequately differentiate MDD from subclinical (i.e., not of sufficient severity to warrant a psychiatric diagnosis) levels of emotional distress (Gonzalez et al., 2011). First, the vast majority of studies have relied on self-report screening instruments with high rates of false positives for the identification of MDD cases (Roy et al., 2012). This reliance on self-report likely leads to significant heterogeneity and measurement error in the evaluation of depression in patients with diabetes (e.g. Fisher et al., 2007). Second, the psychiatric construct of MDD is insufficient to account for observed relationships between symptoms of emotional distress and diabetes self-management and treatment outcomes. For example, self-reported emotional distress is consistently associated with glycemic control and diabetes self-management but interview-assessed MDD is not (Fisher et al., 2007, 2010). Furthermore, depressive symptom severity scores that fall below the cutoff for MDD (i.e., subclinical emotional distress) are nevertheless associated with worse diabetes treatment adherence, poorer self-management (Gonzalez et al., 2007), and higher risk of complications and mortality (Black et al., 2003).

It has been suggested that the emotional distress frequently reported by diabetes patients can often reflect diabetes-related distress, a non-psychiatric construct representing the experience of significant emotional distress secondary to living with the burden of diabetes and its treatment (Fisher et al., 2012). Questionnaires have been developed to evaluate diabetes-related distress (Polonsky et al., 1995, 2005) and a considerable literature has developed to document consistent associations between increased diabetes-related distress and poor diabetes self-management and treatment outcomes (e.g. Fisher et al., 2007, 2008, 2010). Consistent and sizable positive correlations ($r = .48$ to $.54$; Gonzalez et al., 2008a; Fisher et al., 2010) between measures of diabetes distress and symptoms of MDD suggest significant overlap between these constructs.

Considerable evidence supports the role of diabetes as a life stressor that contributes to symptoms of depression. For example, depressive symptoms are more common among diagnosed type 2 diabetes patients versus those with undiagnosed diabetes or impaired fasting blood glucose (Knol et al., 2007); and among treated versus untreated patients (Golden et al., 2008). Furthermore, insulin-treated patients are more likely to report symptoms of MDD than patients on oral medications only (Aikens et al., 2008; Gonzalez et al., 2007). Diabetes-related somatic symptoms (Ludman et al., 2004) and complications (de Groot et al., 2001; Vileikyte et al., 2009) are also associated with increased depressive symptoms, as are comorbid physical illnesses (Egede, 2005).

Attention to contextual factors surrounding depressive symptoms – whether they meet the MDD criteria or not – could provide valuable information to guide effective, tailored treatment planning (Gonzalez et al., 2011). However, current guidelines in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000) specify that bereavement is the only life event or stressor clinicians should take into account when making diagnostic evaluations for MDD. In the upcoming fifth edition of the manual, it has been proposed to remove the bereavement exclusion and add a footnote for clinicians regarding how to differentiate bereavement and other “loss reactions” from a Major Depressive Episode (American Psychiatric Association, n.d.). This change may be more in line with the way experienced clinicians consider other life events beyond bereavement as exemptions to the diagnosis. A recent study demonstrated that clinical psychologists commonly take life context into account when diagnosing MDD and other disorders and rate symptoms as less abnormal if they occur in the context of a significant life stressor (Kim et al., 2012). Furthermore, causal attributions for depressive symptoms appear to influence the likelihood of being diagnosed with depression and receiving treatment in primary care practice (van den Boogaard et al., 2011). Thus, contextual explanations and causal models for depression appear to be implicated in evaluation of depressive symptoms, despite being largely ignored by current diagnostic guidelines for MDD.

The effect of patients' experiences with diabetes and its management on depression assessment remains in need of further investigation and could have implications for the conceptualization and measurement of depression in adults treated for type 2 diabetes. More important, the diabetes-related context that some patients provide to explain their depressive symptoms may offer important clues regarding causal mechanisms and could guide the selection of appropriate interventions. Therefore, the goal of the present study was to use a mixed-methods (qualitative and quantitative) approach to identify and describe the diabetes-related context that type 2 diabetes patients spontaneously use to explain their experience of symptoms assessed by semi-structured depression interviews. The study had three aims. First, we used content analysis to categorize responses mentioning experience with diabetes and its treatment as a context for depressive symptoms being evaluated. We rated each interview for frequency of participants endorsing diabetes as an explanatory context for depressive symptoms. Next, we examined quantitative relationships between the tendency to use diabetes as an explanatory context during the depression interview and self-reported diabetes-related distress. Finally, we examined differences by treatment regimen and

lifetime MDD diagnosis in diabetes-related distress and use of diabetes as an explanatory context for depressive symptoms.

2. Methods

We recruited adults (over 18 years) with type 2 diabetes through recruitment mailings, direct referrals, clinic screenings and flyers in affiliated primary care clinics and the Montefiore Clinical Diabetes Program in the Bronx, NY. Eligible participants were those who could read and write in English and who were being treated with medication for type 2 diabetes. This report presents data on a subset of the first 70 participants who completed the study including informed consent and all relevant measures. Data collected from baseline visits included HbA1c (A1c), clinical interviews, and self-report measures of diabetes distress and depression.

2.1. Measures

2.1.1. Interviews—Depressive symptoms were measured using the Montgomery–Åsberg Depression Rating Scale (MADRS). The MADRS is a semi-structured clinician-rated interview that assesses the magnitude of nine core depressive symptoms over the past week: reported sadness, inner tension, reduced sleep, reduced appetite, concentration difficulties, lassitude, inability to feel, pessimistic thoughts and suicidal thoughts (Montgomery and Åsberg, 1979). The interviewing clinician rates each symptom's severity from 0 to 6 using additional probing questions and anchor points. The interviewer also rates the participant's apparent sadness as a tenth item. A total score is derived from summing the 10 items, and can range from 0 to 60 (7–19 indicates mild depression; > 35 signals severe depression) (Snaith et al., 1986). The MADRS contains fewer somatic items than other depression scales (Svanborg and Åsberg, 2001), and thus should be less influenced by diabetes symptoms. MADRS questions do not inquire about the perceived cause(s) of participants' symptoms nor about diabetes specifically. Thus, any diabetes-related content resulted from participants volunteering this information without prompting. Internal reliability of the MADRS in the present sample was excellent ($\alpha = .85$). We added a final yes/no question at the end of the interview to inquire directly about participants' perceived link between diabetes and depressive symptoms: “Do you believe that diabetes contributes to or causes the symptoms of depression we just spoke about?”

History of MDD (current, past or recurrent) was assessed using the Mini-International Neuropsychiatric Interview (MINI), a structured diagnostic interview assessing DSM-IV and ICD-10 psychiatric disorders (Sheehan et al., 1998). Both the MADRS and MINI interviews were audio-recorded. Interviewers were eight clinical psychology Ph.D. students who received training from a licensed clinical psychologist with extensive experience with both interviews (JSG). Interviewers were supervised via review of audio-recordings in group-supervision meetings. On a periodic basis during group meetings, each interviewer and JSG provided ratings to achieve consensus and prevent rater-drift. We elected to base analysis on MADRS ratings because, in contrast to the MINI, follow-up probes to evaluate endorsed symptoms are standardized.

2.1.2. Self-reported measures—Depressive symptoms were also assessed via the Center for Epidemiological Studies—Depression (CES-D) questionnaire, a 20-item self-report measure of depressive symptoms over the past week (Radloff, 1977). The total CES-D score had excellent internal reliability in the current sample ($\alpha = .89$). Participants also completed the Diabetes Distress Scale (DDS), a 17-item measure assessing the experience of distress associated with diabetes over the past month across four domains: Emotional Burden, Physician-related Distress, Regimen-related Distress, and Interpersonal Distress (Polonsky et al., 2005). The total DDS score had excellent internal reliability in this sample ($\alpha = .95$).

2.2. Analyses

Frequencies, means and standard deviations were calculated to describe demographic variables. For qualitative data analysis, diabetes-related content from 70 interviews was transcribed and coded using content analysis (Pope and Mays, 2000). The coding group consisted of four clinical health psychology graduate students and a clinical health psychologist, which ensured investigator triangulation and supported the credibility of the data (Patton, 1999). Coders independently highlighted and labeled relevant phrases and described codes in each transcript. A coding group met to reach consensus on discrepancies in independent coding. Through group discussion, codes were grouped into themes. Two coders then transcribed and coded 14 additional interviews to establish that data saturation had been reached with existing themes. An audit trail documented the decision-making process at different coding stages and supported the dependability of the data (Russell and Gregory, 2003). MADRS interviews were assigned a MADRS Diabetes score from 0 to 9 based on the number of symptom questions for which participants endorsed diabetes-related explanations for their symptoms. Pearson correlations were calculated to examine the relationships between study variables including interview-based and self-report ratings of depression and diabetes distress, and A1c. Student's *t* tests assessed differences in distress and depression levels depending on diabetes medication regimen (insulin versus pills alone) and lifetime diagnosis of MDD. Effect sizes were calculated from *t* test results (Cohen provided guidelines for interpreting effect sizes as small: $d = .2$; medium: $d = .5$; and large: $d = .8$; Cohen, 1988).

3. Results

3.1. Participant characteristics

Seventy adults (M age 55.64; 67.1% female; 64.3% black; 21.4% Hispanic) participated in the study (Table 1). More than half the sample had no history of MDD (61.4%); 38.6% met criteria for either current, past or recurrent MDD. Sixty-two participants scored at least one point on the MADRS, 34 (48.6%) of whom mentioned diabetes to explain symptoms at least once in the interview. When questioned directly, 61.4% of participants ($n = 43$) said that diabetes contributed to their depressive symptoms. Fig. 1 shows frequencies of diabetes-related responses across MADRS questions.

3.2. Qualitative analysis of diabetes themes

3.2.1. Overlapping symptoms of depression and diabetes—Appetite and sleep disturbances are considered symptoms of depression as well as biological symptoms of diabetes or effects of diabetes medication. Thus, the MADRS questions about appetite and sleep changes often evoked responses related to diabetes symptoms. The majority of appetite responses came from participants on insulin, several of whom explicitly mentioned the impact of their medication on their appetite.

I find myself more hungry...Whenever I take the insulin that makes me more hungry. (55-year-old woman, insulin)

Others described having to adjust their eating – including eating when not hungry – due to attempts to prevent hypoglycemia, to not wanting to take pills on an empty stomach, or other reasons. In fact, several participants described forcing themselves to eat (an additional question probe on the MADRS) due to doctor recommendations for avoiding hypoglycemia.

Sometimes because I'm not hungry and I'm a diabetic, I can't go without eating because it'll drop my sugar down. So sometimes I have to make myself eat even if I'm not hungry, which my doctor told me, 'Don't go without eating.'; (51-year-old woman, pills)

These types of appetite-related responses are likely due to diabetes rather than symptoms of depression, as the MADRS appetite questions are intended to assess. Similarly, sleep-related responses often dealt with urinary frequency and other diabetes-related reasons for sleep interruption.

With the diabetes, I tend to go to the bathroom, so it's like three hours and then I'm up, then I'm back to sleep another two or three hours. (42-year-old man, insulin)

Polyuria, or frequent urination, is a common symptom of hyperglycemia. Several participants pointed to diabetes and high blood sugar as the cause of nighttime urinary frequency and sleep interruption. Others mentioned frequent nighttime bathroom trips without explicitly blaming diabetes. We included these responses in this theme, given that participants attributed diminished sleep to frequent bathroom trips rather than general insomnia and that the majority of participants endorsing this theme directly mentioned diabetes.

3.2.2. Coping with the burden of treatment—Participants expressed feeling distraught or overwhelmed about needing to adhere to diabetes medication and diet regimens; weight-related stress; and not being able to afford healthy foods they felt they should be eating to manage their diabetes. Participants expressed a sense of loss and frustration at needing to avoid beloved foods due to diabetes.

Dealing with the diabetes is another thing that depresses you. Cause I like to eat... and then [my] husband says, 'You can't have this, you can't have that.' (69-year-old woman, pills)

Others felt overwhelmed or hopeless about the medications they were required to take daily, while some expressed a strong desire to eventually reduce their medications.

I think a lot about, if I didn't have to take all these pills...if I didn't have to take an injection. It kind of screws up my head sometimes. (52-year-old man, insulin)

The prospect of being on multiple medications for the rest of their lives provided these participants with a bleak outlook. Given that diabetes is a chronic illness, participants struggled with the burden of making these major lifestyle changes in diet and medication and perceiving a need to continue them in all situations.

Several participants expressed frustration and hopelessness related to their weight and how diabetes affected it. Some were frustrated over having gained weight or needing to lose weight, while a smaller number were concerned that diabetes had resulted in rapid weight loss that they could not control. One participant stated:

I've gained so much weight, I've never been this big in my life...and part of the weight is due to the medication that I take. That really depresses me. (56-year-old woman, pills)

3.2.3. Emotional impact of diabetes—Participants expressed a range of emotions related to living with diabetes, which included guilt, frustration, fear, and worry. They were particularly bothered by not living up to their diabetes self-care goals as well as the ways that diabetes interfered with their lives. Some expressed guilt about simply having diabetes. As one participant said:

Guilt about having [diabetes]? Sure...People say 'Why me?' and I say, 'Why do I have diabetes?' I've always been a healthy person, to get diabetes so late in life. (49-year-old man, insulin)

Others expressed frustration about their diabetes being uncontrolled despite their efforts to manage it. As diabetes requires a demanding self-care regimen, participants reported feeling disheartened by not seeing results from their self-management efforts.

Dealing with the diabetes, not being able to control it...that depresses me because my doctor and I have tried everything and it doesn't seem to be working. (54-year-old woman, insulin)

In addition to describing feelings of guilt and frustration, several participants also described fear and worry about their diabetes worsening over time and developing complications. Some had witnessed amputations and other negative outcomes result from the illness in family members or close friends, which led to worry about their own outcomes.

[Amputations] run in the family. My brothers had their [legs] cut off...at an earlier age than I am. That's something that I worry about a lot...People don't know what diabet[ics] go through...It killed my brothers and sisters. (60-year-old man, insulin)

3.2.4. Bidirectional influence of diabetes and depression—Some participants raised diabetes as a causal context for the depressed mood they experienced, including one participant (62-year-old woman, insulin) who stated, "*I've been depressed, and I think diabetes has a lot to do with it.*" Others endorsed an understanding of diabetes and mood

being interconnected, describing both their blood sugar and moods as being changeable or unpredictable.

[My mood's] been up and down. One minute I'll feel cool and the next minute I'll feel really, uh...and then my sugars are out of control, they're up and down, up and down. I'm hoping that I can get the diabetes under control. (57-year-old woman, insulin)

Some participants also described their experience of mood changes as a result of blood sugar levels.

I've had diabetes for 20 years. I think sometimes it makes me moody...like I can get agitated from the sugar being high. (55-year-old woman, insulin)

3.3. Quantitative associations between depression and diabetes distress

Correlations among study variables are reported in Table 2. The CESD, DDS and MADRS diabetes score were all positively correlated with the MADRS total score. HbA1c was positively correlated with the MADRS diabetes score and the DDS, but not with the MADRS total score or the CESD. When comparing distress and depression scores for participants on insulin versus pills alone, those on insulin endorsed diabetes on the MADRS significantly more ($M = 1.68$, $SD = 1.86$) than those who were not on insulin ($M = .66$, $SD = 1.05$); $t(68) = 2.91$, $p = .005$ (Cohen's $d = .68$, medium effect size). MADRS total scores ($p = .94$) and DDS ($p = .34$) were not significantly different for participants on insulin compared to those on pills alone. The DDS was significantly higher for those with a lifetime MDD diagnosis ($M = 2.94$, $SD = 1.32$) versus those without MDD ($M = 2.18$, $SD = 1.24$); $t(67) = 2.43$, $p = .018$ (Cohen's $d = .59$, medium effect size). The MADRS total score was also significantly higher for those with a lifetime MDD diagnosis ($M = 14.81$, $SD = 10.09$) versus those without MDD ($M = 7.23$, $SD = 7.17$); $t(68) = -3.67$, $p = .001$ (Cohen's $d = .87$, large effect size). The MADRS Diabetes score was not significantly higher for those with MDD ($p = .58$).

4. Discussion

The current study provides evidence that, for an ethnically diverse sample of adults with treated type 2 diabetes, structured depression interviews elicited symptoms of depression that were often characterized by patients as occurring within the context of coping with diabetes and its treatment. Although probes for depressive symptoms did not directly assess the role of diabetes, many participants spontaneously described the influence of diabetes on the symptoms being evaluated. Major diabetes-related themes included appetite and sleep disturbances; coping with the diabetes treatment burden; and the emotional impact of diabetes. Participants expressed guilt about struggling to keep up with their self-care regimen; frustration over being unable to lose weight; hopelessness from not being able to control their illness despite their efforts; and worry about complications. These themes echo findings from other recent qualitative studies that have pointed to bidirectional influences of diabetes and depression, with diabetes and the burden of self-management negatively influencing mood, stress levels, relationships and functioning (Beverly et al., 2012; Gask et al., 2011).

Some participants in the current study pointed to diabetes as a direct cause for their depressive symptoms, and/or perceived their depressive symptoms and glycemic control as interconnected. In response to the additional question inquiring whether participants believed that their diabetes contributed to their symptoms of depression, 61% of participants said it did. Furthermore, A1c was significantly associated with both self-reported diabetes distress and frequency of describing diabetes as a causal context for depressive symptoms on the MADRS, but not with overall depression symptom severity.

In the current study, depressive symptoms and self-reported diabetes-related distress were more severe in participants with a lifetime MDD diagnosis when compared to those without a prior or current diagnosis of MDD. However, those with MDD were just as likely as those without to use diabetes as an explanatory context for their symptoms of depression. This pattern of results was also found when comparisons were made for those who met MDD criteria currently versus not (data not shown). The DDS and interview-based rating of frequency of diabetes context differ conceptually; whereas the DDS assesses severity of diabetes-related distress, our rating assessed how often participants spontaneously attributed their depressive symptoms to diabetes. Also, the DDS measures difficulties adhering to treatment and problems with the patient-provider relationship, aspects of diabetes-related distress that were not probed directly with the MADRS. Our findings suggest that the influence of diabetes on depression symptom assessment is relevant for those who meet diagnostic criteria for MDD as well as for those who do not.

Treatment regimen played a role in the expression of the negative emotional influence of diabetes in the current study. Participants on insulin more often pointed to diabetes as an explanatory context for depressive symptoms on the interview than participants on oral medications only. However, participants on insulin did not have significantly higher depression scores, or self-reported diabetes distress scores. Greater frequency of diabetes content for participants on insulin could be due to illness progression and/or dealing with a more demanding medication regimen, but we did not assess those constructs directly. Still, this pattern could suggest that insulin use amplifies the role diabetes plays in depression as well as depression assessment. Individuals on insulin were more likely to mention appetite changes, medication regimen-related distress, and specifically the impact of medication on their appetite. Additionally, participants on insulin were more likely to discuss fears about complications and the perception of diabetes and mood as interrelated. These findings are consistent with previous research demonstrating that patients on insulin are more likely to screen positive for MDD (e.g. Aikens et al., 2008; Gonzalez et al., 2007). Several other psychological factors could contribute to distress among diabetes patients on insulin, including the belief that insulin will complicate their lives; that being put on insulin means their diabetes is worsening and they are failing to control it effectively; that they will be likely to develop complications; and that they will be treated differently once on insulin (Rubin and Peyrot, 2001).

Qualitative approaches have been particularly useful for examining the complexities of living with diabetes (Ritholz et al., 2011), and in this study, the use of qualitative methods made it possible to capture the richness of the context surrounding patients' distress. The current findings lend additional support to recent analyses of MADRS interviews in adults

with type 1 diabetes (Tanenbaum and Gonzalez, 2012). This study found that about two-thirds of participants reporting depressive symptoms discussed diabetes as contributing to their distress. Taken together, both studies demonstrate that even gold-standard clinical interviews like the MADRS, which assess fewer somatic symptoms than other depression scales (Svanborg and Asberg, 2001) and was used in this study because it should be less influenced by overlapping symptoms, cannot entirely escape the impact of diabetes symptoms. Throughout MADRS interviews, participants endorsed appetite and sleep disturbances which, when examined more closely, appeared likely to be a result of diabetes symptoms rather than depression. This measurement issue points to the need for improved depression assessment methods that can account for symptom context and successfully distinguish diabetes illness burden from psychiatric disorders.

Recent recommendations have pointed to the importance of finding brief and cost-effective screening tools to assess depression in diabetes patients (Holt and Van der Feltz-Cornelis, 2012). Future research should focus on developing instruments for assessing depression that can adequately account for the context of symptoms due to chronic illness—something that may be challenging to accomplish with a brief screening tool. Incorporating symptom context would not only have important diagnostic implications, but could also validate patients' experiences. For example, older adults are more likely to accept their treatment for depression when doctors take the social context of their distress into account (Wittink et al., 2008). Furthermore, patients have been found to resist diagnoses of depression given in the absence of context and emphasize the social context associated with their distress (Kokanovic et al., 2012). However, other recent research has shown that while physicians may be aware of patients' emotional struggles and the burden that diabetes management adds, they faced barriers for addressing the emotional aspects of diabetes (Beverly et al., 2011). Beyond the challenges of limited appointment times, physicians found either limited referral options for mental health treatment or patient resistance to accepting referrals.

Primary care doctors may attribute their patients' depressive symptoms to personality factors (that are therefore unchangeable) and be unlikely to recommend a mental health referral unless a patient is suicidal (McPherson and Armstrong, 2009). Personality factors may indeed be important to consider given recent research demonstrating associations among affective temperaments, depressive symptoms and metabolic control; future research may benefit from further exploration of how temperament influences the relationship between distress and depression development (Gois et al., 2012a, 2012b, 2011). Physicians may be more likely to make suggestions for social interventions (joining a club, engaging in a hobby) rather than suggesting therapy. Lastly, a recent meta-analysis found that primary care doctors may have difficulty in accurately identifying those patients in need of intervention. Physicians were found to correctly identify 48.4% of distressed patients and only 33.8% of mildly depressed patients, while falsely diagnosing others (Mitchell et al., 2011). Therefore, physicians treating patients with diabetes may either be ill-equipped to treat or facilitate referrals for patients' emotional struggles, or not believe they are significant enough to warrant mental health treatment. To make improvements in this area and move toward the recommended integrated approach that considers depression as part of the patient experience of diabetes rather than a distinct clinical comorbidity (Fisher et al., 2012;

Gonzalez et al., 2011), a contextualized approach to conceptualizing patients' distress is needed.

4.1. Limitations

Our study's cross-sectional design is a limitation; it is not possible to draw conclusions about causal relationships between diabetes and depressive symptoms. In addition, our findings from a sample of predominantly ethnic-minority adults living in the Bronx, NY, may not be generalizable to all individuals with type 2 diabetes. Furthermore, the MADRS was not designed with the intention of exploring the explanatory context of depressive symptoms. A qualitative interview created for that purpose might be capable of eliciting richer data and expanding upon the themes found in the present study. However, this study provides an example of how the context of chronic illness may not only influence how depression is assessed but, perhaps more important, how patients naturally conceptualize their emotional experiences within their life context. As qualitative research can serve to generate hypotheses and our findings are exploratory in nature, further quantitative exploration is needed with a larger number of participants to examine the impact of diabetes context on depression assessment. Finally, given the proportion of minority participants in our sample, this study highlights the importance of considering the experiences of diabetes-related and depression in typically underrepresented populations. However, issues of race, ethnicity and social class were not directly explored in this study, so it is not possible to draw conclusions about the role of these contextual factors on the experience of living with diabetes for our participants.

5. Conclusions

A majority of participants in this study believed that their diabetes contributed to their symptoms of depression; this information is lost in measures that rely on symptom counts to assess depression symptom severity. Therefore, this study points to the need for further research on assessment and treatment methods that incorporate the context of chronic illnesses, as part of the process. Tailored treatments that acknowledge and address patients' explanatory contexts for depressive symptoms could be particularly effective.

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References

- Aikens JE, Perkins DW, Piette JD, Lipton B. Association between depression and concurrent type 2 diabetes outcomes varies by diabetes regimen. *Diabetic Medicine*. 2008; 25:1324–1329. [PubMed: 19046223]
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th. American Psychiatric Association; Washington, DC: 2000. text revision
- American Psychiatric Association. Diagnostic statistical manual of mental disorders. 5th Available from <<http://www.dsm5.org>>

- Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes. *Diabetes Care*. 2001; 24:1069–1078. [PubMed: 11375373]
- Beverly EA, Ritholz MD, Brooks KM, Hultgren BA, Lee Y, Abrahamson MJ, Weinger K. A qualitative study of perceived responsibility and self-blame in type 2 diabetes: reflections of physicians and patients. *Journal of General Internal Medicine*. 2012; 27:1180–1187. [PubMed: 22549299]
- Beverly EA, Hultgren BA, Brooks KM, Ritholz MD, Abrahamson MJ, Weinger K. Understanding physicians' challenges when treating type 2 diabetic patients' social and emotional difficulties: a qualitative study. *Diabetes Care*. 2011; 34:1086–1088. [PubMed: 21411508]
- Black SA, Markides KS, Ray LA. Depression predicts increased incidence of adverse health outcomes in older Mexican Americans with type 2 diabetes. *Diabetes Care*. 2003; 26:2822–2828. [PubMed: 14514586]
- Cohen, J. *Statistical power analysis for the behavioral sciences*. 2nd. Lawrence Erlbaum Associates; Hillsdale, NJ: 1988.
- de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: a meta-analysis. *Psychosomatic Medicine*. 2001; 63:619–630. [PubMed: 11485116]
- Egede LE. Effect of comorbid chronic diseases on prevalence and odds of depression in adults with diabetes. *Psychosomatic Medicine*. 2005; 67:46–51. [PubMed: 15673623]
- Egede LE, Nietert PJ, Zheng D. Depression and all-cause and coronary heart disease mortality among adults with and without diabetes. *Diabetes Care*. 2005; 28:1339–1345. [PubMed: 15920049]
- Fisher EB, Chan JCN, Nan H, Sartorius N, Oldenburg B. Co-occurrence of diabetes and depression: conceptual considerations for an emerging global health challenge. *Journal of Affective Disorders*. 2012; 142:S56–S66. [PubMed: 23062858]
- Fisher L, Skaff MM, Mullan JT, Arean P, Glasgow R, Masharani U. A longitudinal study of affective and anxiety disorders, depressive affect and diabetes distress in adults with type 2 diabetes. *Diabetic Medicine*. 2008; 25:1096–1101. [PubMed: 19183314]
- Fisher L, Skaff MM, Mullan JT, Arean P, Mohr D, Masharani U, Glasgow R, Laurencin G. Clinical depression versus distress among patients with type 2 diabetes: not just a question of semantics. *Diabetes Care*. 2007; 30:542–548. [PubMed: 17327318]
- Fisher L, Hessler DM, Polonsky WH, Mullan J. When is diabetes distress clinically meaningful? Establishing cut points for the Diabetes Distress Scale. *Diabetes Care*. 2012; 35:259–264. [PubMed: 22228744]
- Fisher LJ, 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; 33:23–28. [PubMed: 19837786]
- Gask L, Macdonald W, Bower P. What is the relationship between diabetes and depression? A qualitative meta-synthesis of patient experience of co-morbidity. *Chronic Illness*. 2011; 7:239–252. [PubMed: 21840916]
- Gois C, Barbosa A, Ferro A, Santos AL, Sousa F, Akiskal H, Akiskal K, Figueira ML. The role of affective temperaments in metabolic control in patients with type 2 diabetes. *Journal of Affective Disorders*. 2011; 134:52–58. [PubMed: 21641045]
- Gois C, Akiskal H, Akiskal K, Figueira ML. Depressive temperament, distress, psychological adjustment and depressive symptoms in type 2 diabetes. *Journal of Affective Disorders*. 2012a; 143:1–4. [PubMed: 22901331]
- Gois C, Akiskal H, Akiskal K, Figueira ML. The relationship between temperament, diabetes and depression. *Journal of Affective Disorders*. 2012b; 142(Supplement):S67–S71. [PubMed: 23062859]
- Golden SH, Lazo M, Carnethon M, Bertoni AG, Schreiner PJ, Diez Roux AV, Lee HB, Lyketsos C. Examining a bidirectional association between depressive symptoms and diabetes. *Journal of the American Medical Association*. 2008; 299:2751–2759. [PubMed: 18560002]
- Gonzalez JS, Delahanty LM, Safren SA, Meigs JB, Grant RW. Differentiating symptoms of depression from diabetes-specific distress: relationships with self-care in type 2 diabetes. *Diabetologia*. 2008a; 51:1822–1825. [PubMed: 18690422]

- Gonzalez JS, Peyrot M, McCarl LA, Collins EM, Serpa L, Mimiaga MJ, Safren SA. Depression and diabetes treatment nonadherence: a meta-analysis. *Diabetes Care*. 2008b; 31:2398–2403. [PubMed: 19033420]
- Gonzalez JS, Safren SA, Cagliero E, Wexler DJ, Delahanty L, Wittenberg E, Blais MA, Meigs JB, Grant RW. Depression, self-care, and medication adherence in type 2 diabetes. *Diabetes Care*. 2007; 30:2222–2227. [PubMed: 17536067]
- Gonzalez JS, Fisher L, Polonsky WH. Depression in diabetes: Have we been missing something important? *Diabetes Care*. 2011; 34:236–239. [PubMed: 21193621]
- Holt RIG, Van der Feltz-Cornelis CM. Key concepts in screening for depression in people with diabetes. *Journal of Affective Disorders*. 2012; 142:S72–S79. [PubMed: 23062860]
- Katon WJ, Rutter C, Simon G, Lin EHB, Ludman E, Ciechanowski P, Kinder L, Young B, Von Korff M. The association of comorbid depression with mortality in patients with type 2 diabetes. *Diabetes Care*. 2005; 28:2668–2672. [PubMed: 16249537]
- Kim NS, Paulus DJ, Nguyen TP, Gonzalez JS. Do clinical psychologists extend the bereavement exclusion for major depression to other stressful life events? *Medical Decision Making*. 2012; 32:820–830. [PubMed: 22523141]
- Knol MJ, Heerdink ER, Egberts ACG, Geerlings MI, Gorter KJ, Numans ME, Grobbee DE, Klungel OH, Burger H. Depressive symptoms in subjects with diagnosed and undiagnosed type 2 diabetes. *Psychosomatic Medicine*. 2007; 69:300–305. [PubMed: 17470664]
- Kokanovic, R.; Bendelow, G.; Philip, B. Depression: the ambivalence of diagnosis. *Sociology of Health and Illness*. 2012. Published online ahead of print. <http://dx.doi.org/10.1111/j.1467-9566.2012.01486.x>
- Ludman EJ, Katon W, Russo J, Von Korff M, Simon G, Ciechanowski P, Lin E, Bush T, Walker E, Young B. Depression and diabetes symptom burden. *General Hospital Psychiatry*. 2004; 26:430–436. [PubMed: 15567208]
- Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care*. 2000; 23:934–942. [PubMed: 10895843]
- McPherson S, Armstrong D. Negotiating “depression” in primary care: a qualitative study. *Social Science and Medicine*. 2009; 69:1137–1143. [PubMed: 19527919]
- Mitchell AJ, Rao S, Vaze A. Can general practitioners identify people with distress and mild depression? A meta-analysis of clinical accuracy. *Journal of Affective Disorders*. 2011; 130:26–36. [PubMed: 20708274]
- Montgomery S, Åsberg M. A new depression scale designed to be sensitive to change. *British Journal of Psychiatry*. 1979; 134:382–389. [PubMed: 444788]
- Patton MQ. Enhancing the quality and credibility of qualitative analysis. *Health Services Research*. 1999; 34:1189–1208. [PubMed: 10591279]
- Polonsky WH, Fisher L, Earles J, Dudl RJ, Lees J, Mullan J, Jackson RA. Assessing psychosocial distress in diabetes: development of the diabetes distress scale. *Diabetes Care*. 2005; 28:626–631. [PubMed: 15735199]
- Polonsky WH, Anderson BJ, Lohrer PA, Welch G, Jacobson AM, Aponte JE, Schwartz CE. Assessment of diabetes-related distress. *Diabetes Care*. 1995; 18:754–760. [PubMed: 7555499]
- Pope, C.; Mays, N. *Qualitative Research in Health Care*. 2nd. BMJ Books; London, UK: 2000.
- Radloff LS. The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401.
- Ritholz MD, Beverly EA, Weinger K. Digging deeper: the role of qualitative research in behavioral diabetes. *Current Diabetes Reports*. 2011; 11:494–502. [PubMed: 21932032]
- Roy T, Lloyd CE, Pouwer F, Holt RIG, Sartorius N. Screening tools used for measuring depression among people with Type 1 and Type 2 diabetes: a systematic review. *Diabetic Medicine*. 2012; 29:164–175. [PubMed: 21824180]
- Rubin RR, Peyrot M. Psychological issues and treatments for people with diabetes. *Journal of Clinical Psychology*. 2001; 57:457–478. [PubMed: 11255202]
- Russell CK, Gregory DM. Evaluation of qualitative research studies. *Evidence Based Nursing*. 2003; 6:36–40. [PubMed: 12710415]

- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R, Dunbar GC. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*. 1998; 59:22–33. [PubMed: 9881538]
- Snaith RP, Harrop FM, Newby DA, Teale C. Grade scores of the Montgomery–Asberg Depression and the Clinical Anxiety Scales. *British Journal of Psychiatry*. 1986; 148:599–601. [PubMed: 3779233]
- Svanborg P, Åsberg M. A comparison between the Beck Depression Inventory (BDI) and the self-rating version of the Montgomery-Asberg Depression Rating Scale (MADRS). *Journal of Affective Disorders*. 2001; 64:203–216. [PubMed: 11313087]
- Tanenbaum ML, Gonzalez JS. The influence of diabetes on a clinician-rated assessment of depression in adults with type 1 diabetes. *Diabetes Educator*. 2012; 38:693–702.
- van den Boogaard TM, Verhaak PFM, Dyck RV, Spinhoven P. The impact of causal attributions on diagnosis and successful referral of depressed patients in primary care. *Social Science and Medicine*. 2011; 73:1733–1740. [PubMed: 22036103]
- Vileikyte L, Peyrot M, Gonzalez JS, Rubin RR, Garrow AP, Stickings D, Waterman C, Ulbrecht JS, Cavanagh PR, Boulton AJM. Predictors of depressive symptoms in persons with diabetic peripheral neuropathy: a longitudinal study. *Diabetologia*. 2009; 52:1265–1273. [PubMed: 19399473]
- Wittink MN, Dahlberg B, Biruk C, Barg FK. How older adults combine medical and experiential notions of depression. *Qualitative Health Research*. 2008; 18:1174–1183. [PubMed: 18689531]

Fig. 1.
Number of diabetes responses for each MADRS question.

Table 1Descriptive Statistics ($n = 70$).

Variable	<i>n</i> (%)	M (SD)	Observed range
Sex (female)	47 (67.1)		
Race			
White	25 (35.7)		
Black	45 (64.3)		
Ethnicity			
Hispanic	15 (21.4)		
Non-Hispanic	55 (78.6)		
Age (years)		55.64 (6.46)	42–73
A1C		7.92 (1.98)	4.9–16.5
Medication regimen			
Insulin and pills	32 (45.7)		
Pills only	38 (54.3)		
Major depressive disorder			
Yes (current, past, or recurrent)	27 (38.6)		
No	43 (61.4)		
<u>Study variables</u>			
MADRS Total		10.16 (9.14)	0–40
MADRS Diabetes		1.13 (1.55)	0–7
MADRS Extra question			
Yes	43 (61.4)		
No	27 (38.6)		
CES-D		14.35 (11.85)	0–47
DDS		2.49 (1.31)	1–5.76

Table 2

Correlations among study variables.

Variable	1	2	3	4	5
1. MADRS Total	–	.38**	.79***	.49***	.08
2. MADRS Diabetes		–	.30*	.18	.32**
3. CES-D			–	.59***	–.03
4. DDS				–	.24**
5. AIC					–

* $p < .05$.
** $p < .01$.
*** $p < .001$.