Anxiety and diabetes: Innovative approaches to management in primary care

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Abstract

Type 2 diabetes mellitus is a chief concern for patients, healthcare providers, and health care systems in America, and around the globe. Individuals with type 2 diabetes mellitus exhibit clinical and subclinical symptoms of anxiety more frequently than people without diabetes. Anxiety is traditionally associated with poor metabolic outcomes and increased medical complications among those with type 2 diabetes mellitus. Collaborative care models have been utilized in the multidisciplinary treatment of mental health problems and chronic disease, and have demonstrated success in managing the pathology of depression which often accompanies diabetes. However, no specific treatment model has been published that links the treatment of anxiety to the treatment of type 2 diabetes mellitus. Given the success of collaborative care models in treating depression associated with diabetes, and anxiety unrelated to chronic disease, it is possible that the collaborative care treatment of primary care patients who suffer from both anxiety and diabetes could be met with the same success. The key issue is determining how to implement and sustain these models in practice. This review summarizes the proposed link between anxiety and diabetes, and offers an innovative and evidence-based collaborative care model for anxiety and diabetes in primary care.

Keywords: Diabetes, anxiety, primary care, comorbidity, collaborative care

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Introduction

Disparities

Type 2 diabetes mellitus. Diabetes mellitus affects approximately 29.18 million persons in the United States, which accounts for 9.3% of the American population.[1] Individuals with diabetes have difficulty producing insulin and/or effectively utilizing the insulin that the body generates. As a result, glucose accumulates in the blood and can lead to morbidity and mortality. Uncontrolled diabetes is associated with an increased risk of heart disease, stroke, vision loss, kidney failure, and amputations.[1] The seventh leading cause of death in the United States,[2] and Americans spend approximately $245 billion dollars of in direct and indirect costs of medical care associated with diabetes.[2] Those living with diabetes spend twice as much on medical expenses as their counterparts without diabetes.[1]

Type 2 diabetes mellitus (T2DM) is the most common form of diabetes, affecting approximately 95% of individuals with the disease.[3] In T2DM, the cells do not use insulin properly, either because of insufficient insulin production, insulin resistance, or both. As insulin deficiency increases over time, the pancreas loses its ability to produce insulin.[4] T2DM is linked to an increased prevalence of mental health problems, primarily depression and anxiety disorders.[5–9] Individuals with T2DM and a mental health condition are at increased risk for hyperglycemia,[10,11] diabetic complications,[12] coronary heart disease,[13] poor quality of life,[12,14] and increased health care costs[15] when compared to those with diabetes alone.

Anxiety and T2DM. Anxiety can be described as a feeling of worry, nervousness, or unease about an impending circumstance, or event, with an uncertain outcome. Symptoms of anxiety include avoidance of certain people, places or events, and physical sensations such as rapid heartbeat, dizziness, and sweating, and somatic complaints such as headaches and gastrointestinal distress.[16] Humans frequently experience states of anxiety in response to a stressful life experience; however, the anxiety is sometimes experienced on a more chronic and debilitating basis, at which point they may be diagnosed with clinically significant anxiety.[17] There are several clinically significant sub-types of anxiety disorders; the most commonly seen in primary care are generalized anxiety disorder (GAD), post-traumatic stress disorder, social anxiety disorder, and panic disorder.[18] A recent survey demonstrated that anxiety disorders are the most frequently diagnosed mental health condition in the

United States, with lifetime estimates reaching 32.5%, and a 19.1% prevalence rate for any anxiety disorder in the last year.[19] Previous studies have identified a robust association between anxiety and diabetes. Prevalence rates of clinically significant anxiety among individuals with diabetes range from 14% in a comprehensive review[6] to 55.10% in a Mexican population.[20] One study found that clinically significant anxiety was 20% higher among Americans with diabetes, compared to Americans without diabetes, after controlling for age, smoking, education, employment, physical activity, body mass index (BMI), and marital status.[21] Additionally, rates of GAD and phobias are considerably higher among diabetic populations when compared to community samples.[22,23]

While the aforementioned studies address clinically significant anxiety, individuals with diabetes are also likely to experience subclinical anxiety.[7] Presentations of subclinical anxiety are linked to decreased quality of life[24,25] and poor functioning.[24,26–28] Importantly, those who experience subclinical anxiety consume a large proportion of health care resources in the primary care setting, compared to those without anxiety.[29–31]

Research has produced two primary hypotheses regarding the association between anxiety and diabetes. The first hypothesis focuses on the physiological association between the two diagnoses. Chronic clinical and subclinical anxiety may cause T2DM or exacerbate existing T2DM by initiating the activation of the hypothalamic-pituitary-adrenal axis (HPA axis), which in turn triggers release of counter-regulatory hormones such as glucagon, epinephrine (adrenaline), norepinephrine (noradrenaline), cortisol, and growth hormone.[2,32] These counter-regulatory hormones increase glucose levels in the blood via catabolic processes like ketosis.[32] In small doses, these processes are benign, and even protective, but chronically elevated anxiety can lead to an excess of the counter-regulatory hormones, which can lead to insulin sensitivity, visceral adiposity, dyslipidemia, and hypertension, all of which increase the risk for developing T2DM.[7,32] Further, cortisol stimulates the sympathetic nervous system, which can elicit, or exacerbate the experience of anxiety.[33] Indeed, research has found that, among individuals predisposed to develop diabetes, stressful life experiences may be catalyst to the development of the disease.[34–37]

Another hypothesis regarding the association between diabetes and anxiety, which is derived from the Lazarus and Folkman transactional model of stress and coping (1984), suggests that diabetes leads to anxiety in two ways.[38,39] First, there is robust evidence that individuals experience symptoms of anxiety when they are diagnosed with diabetes.[38,40–46] A diagnosis of diabetes may induce anxiety because individuals perceive that the disease will necessitate undesirable lifestyle changes, cause them to lose control over their health, and lead to diabetes-related complications, such as diabetic retinopathy, neuropathy, sexual dysfunction, and macrovascular complications.[47]

Second, the daily management of diabetes may result in the experience of anxiety.[38] Diabetes self-care can involve dietary modifications, complicated medication regimens, exercise routines, smoking cessation, and blood glucose monitoring. Approximately 60% of individuals with diabetes report anxiety related to managing their T2DM, and this distress was associated with lower levels of adherence to diabetes care regimens, higher incidence of uncontrolled diabetes, and increased rates of diabetes-related complications.[48–50] One study demonstrated that individuals with anxious coping styles (i.e. avoidance, escape, and denial) showed reduced adherence to diabetes self-care regimens and poorer glycemic control.[51] Another study highlights the complex and reciprocal nature of this relationship, demonstrating that elevated anxiety was associated with subsequent poor self-care, and poor self-care was associated with subsequent elevated anxiety, after controlling for depressive symptoms as a covariate.[52]

In summary, several theories attempt to describe the relationship between anxiety and diabetes; some suggest that the emotional impact of a diabetes diagnosis, compounded with the burden of daily diabetes management, can lead to anxiety, while others propose that anxiety leads to, or exacerbates, T2DM through physiological mechanisms. Regardless of the direction or source of the relationship, the literature supports the importance of addressing both conditions simultaneously, as one condition cannot be treated in isolation from the other.

Collaborative care interventions to treat comorbid diabetes and mental health. Type 2 diabetes is increasingly managed in primary care due to the increasing prevalence of type 2 diabetes, and the strain on limited specialist resources. Treating T2DM in the primary care setting has demonstrated effectiveness comparable to diabetes treatment in a specialist setting, such as endicrinology.[52] Indeed, in a recent study of greater than 17,000 subjects, no difference in glycemic control after insulin initiation was seen between primary versus specialist care.[53]

However, the management of patients with diabetes and concomitant mental health conditions in primary care is fragmented, when diabetes is managed by the primary care doctor and mental health interventions are delivered by behavioral health providers (BHPs) outside the primary care office.[54,55] Historically, communication between physicians and behavioral health providers about shared patients has been infrequent and often non-existent,[56] thus facilitating the provision of health care in ''silos.'' This practice is inefficient for a variety of reasons. First, primary care patients who are referred to off-site mental health providers often fail to initiate treatment secondary to financial difficulties, transportation issues, and the inconvenience of taking time off work or procuring child care.[57]Research has shown that patients are 62% more likely to follow through with a mental health referral if those services are offered within the primary care practice.[58] Second, because health care providers are less likely to communicate about shared patients when they practice in different locations, the treatment plans of BHPs and physicians may be duplicative, or in direct conflict with each other.[57,59–64] This health care ''disconnect'' can effectively compromise patient care. Third, many primary care providers report having difficulty identifying quality mental health services

Table 1 Collaborative care interventions, based on HbA1c levels and anxiety and depression screening assessments.

	Anxiety/ depression screen	Health coaching session	Deep breathing exercise	Psychotropic medication management	Contact info for follow-up health coaching/ therapy	Depression interventions
HbA1c > 5.8 GAD-7 < 5 PHQ-9 < 5	X	X			X	
HbA1c > 5.8 GAD-7 score 5–9 PHQ-9 score 5–14	X	X	X	Clinician judgment	X	Clinician judgment
HbA1c > 5.8 GAD-7 > 10 PHQ-9 < 5	X	X	X	X	X	
HbA1c > 5.8 GAD-7 < 5 PHQ-9 > 10	X	X		X	X	X

GAD: generalized anxiety disorder; PHQ: patient health questionnaire.

to which they can refer patients, and if those services exist, they are frequently unable to accommodate the high patient volume seeking their services.[65] Research has shown that mental health care is twice as difficult to access than any other medical specialty.[66] Finally, privacy of health information is governed by Federal and State laws, including 42 C.F.R. Part 2, which requires patient consent for information to be disclosed regarding their substance abuse treatment. Behavioral health information has historically been associated with additional protection and privacy safeguards that are generally not required for standard medical health information, due to the sensitive nature of behavioral health conditions and the stigma that sometimes surrounds them. Typically, health care systems have restricted access to behavioral health records, even from physicians within the same healthcare system. When explicit protection is not in place, BHPs may choose to restrict access to their patient's behavioral health information if it is not directly relevant to their medical care. Sharing patient information between providers often takes time, administrative effort, and patient consent. The stress of navigating these additional barriers can potentially impede effective collaboration between providers about shared patients.

For the reasons mentioned above, recent healthcare policy changes have promoted significant system reorganization, with a goal of increasing the cohesiveness of services, and providing comprehensive care for our patients.[67] The collaborative care model (CCM) is one approach to managing concomitant diabetes and mental health issues in the primary care setting. First described by Coleman and Patrick,[68] collaborative care provides interventions for physical and behavioral health needs in the primary care setting, through systematic coordination and collaboration among health care providers from various disciplines. It is a healthcare philosophy that has many names, models, and definitions. Common derivatives of collaborative care include "Integrated Collaborative Care (ICC)", "Colocation", "Primary Care Behavioral Health (PCBH)" and "Care Management Model (CMM)."[69–72] ICC is synonymous with the broad definition of "collaborative care" and is defined as a range of models in which BHPs and primary care physicians systematically communicate to co-manage the mental health and biomedical needs of patients through collaboration and coordination of care.[70–73]

The "colocation" model offers traditional hour-long psychotherapy sessions in the primary care setting. Though the patient may benefit from the convenience of having their primary care and mental health care in the same setting, the services are offered separately without standardized communication and collaboration about treatment plans.[70,73] There may or may not be shared medical records between BHPs and physicians. In this model, the mental health services are not viewed as part of the patient's "medical care"; rather as an adjunct service to which a patient is formally referred.[69]

In the primary care behavioral health model (PCBH), mental health providers are embedded within the primary care setting. Ideally, the primary care provider introduces the mental health provider to the patient as part of the medial team during routine primary care visits.[71] As part of their interaction with the patient, mental health providers may facilitate self-management goal setting (SMG) related to chronic disease management and/or provide individual psychotherapy to process emotions or treat mental health diagnoses. The primary care provider and the mental health provider systematically share information via shared medical records.[69]

The care management model (CMM) was developed for use in patients with a specific clinical problem, such as depression. CMM uses a care manager, usually a member of the nursing staff who is employed by the primary care clinic, to follow a standard protocol of treatment to address the specific disease state.[69,71] The care manager may provide patient education regarding the specific disease state, engage the patient in SMG, or discuss coordination of care with the patient's multiple providers. They may engage in such interventions in-person, in the primary care setting, or via telephone between the patient's clinic visits.

Models of collaborative care have consistently demonstrated cost-effectiveness[59,61,62,74–77] and have been associated with increased satisfaction among both patients and health care providers.[78] Patients involved in collaborative care report improved satisfaction because they have the opportunity to address all their physical and mental health concerns in one setting.[79] Provider satisfaction improves because the integration of mental and physical health reduces confusion and communication barriers about diagnostic paradigms and treatment strategies.[57] While multiple iterations of collaborative care exist, the shared goals are better health outcomes for patients, better care experience for patients, and reduced costs for the patient and the health care system.[27,70–72,80] Here, collaborative care will be broadly defined as the integration of mental health providers and services into primary care.[81]

Several standardized CCMs of diabetes and mental health have been developed for use in primary care settings, all focused specifically on *depression* and diabetes.[82–87] These models involve routine depression screening among individuals with uncontrolled diabetes, on-site care managers providing between-visit phone calls to assess diabetes self-care adherence, and on-site behavioral health providing brief interventions and SMG during the clinic visit. CCMs of diabetes and depression yield improvements in depression-related outcomes,[87–91] increased adherence to diabetes and depression self-management,[92,93] and decreased rates of mortality, compared to usual care.[94] Limited quantitative data are available supporting the association of collaborative care with improvement in HbA1c; however, one study showed that the incorporation of health coaching into diabetes management was associated with accelerated HbA1c reduction and improved mood as measured by Hospital Anxiety and Depression Scale (HADS).[95]

Another case study involving care coordination with an interdisciplinary treatment team with patients diagnosed with depression, dementia, anxiety, and PTSD showed, over a six-month period, improvements in strength, social functioning, decreased caregiver burden, and compliance with treatment plan.[96]

Collaborative care interventions for diabetes and depression may also be helpful for those suffering from anxiety. Indeed, the extant literature suggests that nearly half of patients with depression also experience anxiety.[97] SMG may help individuals with anxiety gain a sense of control over their health, thus alleviating their symptoms of anxiety.[98] Between-visit phone calls to assess adherence and self-care can mitigate some of the anxiety that patients with diabetes feel about their diabetes care,[98] and many brief behavioral health interventions used in collaborative care involve elements of cognitive behavioral therapy (CBT), which is effective in treating anxiety, as well as depression.[98] Yet, there are evidence-based interventions for anxiety that are not incorporated into CCMs of depression and diabetes. Despite the high prevalence of anxiety among individuals with diabetes, to date no standardized CCMs have been developed specifically for the management of concomitant anxiety and diabetes.

Three studies have measured the impact of a CCM on outcomes for anxiety in a primary care setting, though not specifically among people with diabetes.[93–95] One study found that adults with anxiety who received collaborative care treatment for their anxiety symptoms experienced clinically and statistically significant improvements in anxiety outcomes, compared to individuals with anxiety who received care as usual.[99] These effects were present immediately after the collaborative care intervention was delivered, and up to 24 months post intervention.[99] Additionally, those in the study who received collaborative care for anxiety demonstrated increased medication adherence, improved mental health quality of life, and better patient satisfaction scores than those who received treatment as usual.[99]

In another study, assessing collaborative care for anxiety,[101] patients with anxiety received a telephone-based care management intervention that included psychoeducation and follow-up visits between their regularly scheduled in-office appointments versus usual care. The collaborative care intervention was associated with improved symptoms of anxiety, health-related quality of life, and work-related outcomes compared to standard care. The effects remained statistically significant one year post-intervention.[100]

Finally, a randomized controlled trial evaluated the effectiveness of a collaborative care intervention, called Coordinated Anxiety Learning and Management (CALM), compared to standard care among patients with anxiety.[101] Patients receiving the CALM intervention were given the choice of participating in CBT, medication management, or both, and they also had access to computerized CBT resources.[101] Results indicated that patients with anxiety disorders (with and without major depression), who received the CALM collaborative care intervention in the primary care clinic, demonstrated greater improvement in anxiety and depression symptoms, increased functional ability, and improved quality of care, compared to care as usual.[101]

Proposed collaborative care intervention for comorbid diabetes and anxiety. In response to the limited availability of CCMs for anxiety and diabetes, we suggest the following CCM, consisting of four evidence-based interventions for anxiety and diabetes, based on a multidisciplinary team approach to care where BHPs are integrated into a primary care setting.[102]

The first intervention in the CCM of anxiety and diabetes involves a screening assessment for anxiety and depression. This screening assessment will be administered by the BHPs to all patients with HbA1c levels > 5.8 who present for an appointment in the clinic. Screening for anxiety and depression among individuals with diabetes is widely recommended,[18,103] as accurate recognition of anxiety disorders in primary care is the first step in providing effective treatment. Anxiety symptoms will be assessed using the GAD – 7 self-report questionnaire.[104] The patient health questionnaire (PHQ) – 9[105] will be used to screen patients for symptoms of depression. Some patients who score > 5 on the GAD-7 will also report symptoms of

depression on the PHQ-9. Patients with anxiety who score between 5 and 14 on the PHQ-9 (scores 5–9 represent mild depressive symptoms; 10–14 represent moderate depression) will receive the collaborative care intervention for anxiety and diabetes, as well as pertinent additional interventions for depression (to be determined by the provider and BHP). Patients with PHQ-9 scores > 10, and GAD-7 scores < 5, will receive collaborative care interventions for depression and diabetes (See Table 1).

Following an assessment for anxiety and depression, BHPs will engage all patients in the second intervention in the CCM; a brief health coaching session, consisting of diabetes education and SMG. In 2008, the National Institute for Health and Care Excellence (NICE) disseminated the guideline that all patients with diabetes should be offered health coaching; specifically, a structured diabetes education and self-management program.[106] Diabetes health coaching is a patient-centered, evidence-based intervention, that draws from principles of motivational interviewing to encourage those with diabetes to make informed decisions about their diabetes care, problem solve to maximize behavior change, and to play an active role in the health care team with an overarching goal of improving their own diabetes-related outcomes and quality of life.[107] All patients will receive at least one health coaching session, which will include a review of diabetes education handouts, the development of a short-term health goal using motivational interviewing techniques, and an invitation to schedule follow-up health coaching sessions with BHPs to address symptoms of mental health issues and/or diabetes-related concerns.

The final intervention of the CCM for anxiety and diabetes will involve the BHP, leading the patient through a brief deep breathing exercise – the 4–7–8 (or relaxing breath) exercise.[108] Deep breathing exercises have been shown to improve glycemic control and blood pressure among individuals with T2DM.[109] A systematic review found that mindfulness-based interventions, including deep breathing exercises, improve depression, anxiety, and diabetes-related distress.[110] The patient will be given information on how to download the free My Calm Beat© smart phone app to help them practice their deep breathing exercise in their daily life, and the deep breathing exercise will be practiced in the room with the BHP. The patient will be encouraged to utilize the deep breathing exercise at least three times per day.

Patients who score > 10 on the GAD-7 will be eligible to participate in the fourth intervention of the CCM, which is psychotropic medication management. Previous research suggests that appropriate management of anxiolytic medication can improve glycemic control in adults with poorly controlled diabetes.[111] Primary care providers will utilize evidence-based guidelines and shared decision making techniques to approach medication management with patient.

At the end of the collaborative care intervention, all patients will be provided with contact information for the BHPs, and encouraged to schedule follow-up appointments for health coaching or psychotherapy sessions, if desired.

Summary and conclusions

Mental health and primary care are intricately linked, making it necessary and appropriate to address them in chorus. Recent healthcare policies and federal research agencies call for the evaluation of treatments that address concomitant diabetes and mental health issues.[112–118] While the extant literature has identified a high prevalence of anxiety among individuals with T2DM, there are no evidence-based protocols of treatment for individuals with these comorbid issues. Research on CCMs of mental health and diabetes has been encouraging, but more research is needed to identify effective, sustainable, and cost-effective models of implementation in primary care settings across disease states. Given the success of CCMs for treatment for depression and diabetes, and the effect of collaborative care on anxiety alone, primary care patients may benefit from a standardized collaborative care protocol for addressing anxiety and diabetes, focusing on how best to implement and sustain these models in practice.

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