

Problems That Extend Visit Time and Cost in Diabetes Care: 1. How Depression May Affect the Efficacy and Cost of Care of Diabetic Patients

Steven B. Leichter, MD, FACP, FACE and Yanci See

In theory, depression should stand out as a condition that would negatively affect the success of therapy in diabetic patients or patients with impaired glucose tolerance. Depression is known to negatively alter eating patterns, sleep patterns, and activity levels. All of these influences could adversely affect the success of lifestyle modification in diabetic patients. In addition, depression may reduce the ability of patients to carry out complex tasks, such as those required for diabetes self-care.

Given these links, it is surprising that the available literature on interactions between the two conditions is so sparse. Recently, a major review of the possible interactions was published for psychiatrists.¹ This emphasized how many influences insulin resistance and diabetes might exert on depression. Therefore, it also seems important to examine the possible effects depression may have on diabetes.

Effects of Depression on Diabetes Control and Diabetic Crisis

Psychiatric conditions increase the frequency of diabetic crisis in children and adolescents, and depression is an important component of that influence.^{2,3} Depression may also play a role in the occurrence of "brittle" diabetes.⁴ Therefore, identifying depression and instituting treatment have been cited as important clinical interventions for people with type 1 diabetes who have recurrent diabetic crises.^{5,6}

These observations may underscore a much broader, negative interaction between depression and the clinical course of diabetes. Gilmer et al.⁷ sur-

veyed the determinants of long-term health care costs and utilization in a large diabetic population. They found that depression, like coronary heart disease, significantly increased the costs of care related to diabetes. Depression increased costs by 50%, whereas persistent elevation in hemoglobin A_{1c} (A1C) levels increased costs by 11%. Another important interaction between depression and diabetes has just been published by Katon et al.⁸ They assessed the influence of depression on characteristics for cardiac risk in diabetic patients. Diabetic patients with depression were more likely to have an A1C > 8%, a BMI > 30 kg/m², and serum triglyceride levels > 400 mg/dl and were more likely to smoke than patients without depression. These and other studies emphasize the clinical importance of the interactions between the two conditions.

Influences of Depression on Incidence and Prevalence of Diabetes

There is growing evidence that the existence of depression may increase the incidence and prevalence of diabetes. Depression worsens the prevalence and severity of insulin resistance in adult patients.⁹ In addition, the existence and severity of depression correlates positively with the severity of insulin resistance in patients at risk of developing diabetes.¹⁰

Although available studies are few, the data suggest that the impact of depression on the occurrence and severity of diabetes may be greater than is generally appreciated, in part because the prevalence of depression appears to be significantly higher in diabetic patients.¹¹

The existence of depression also may predict a higher future risk of diabetes in certain populations.^{12,13} The reverse may also be true. The presence of central obesity or hyperglycemia may increase the prevalence of depressive symptoms in men¹⁴ and women.¹⁵

Effects of Depression on Glycemic Control and Clinical Status in Diabetic Patients

Despite this growing database on the interactions of depression and diabetes, there are surprisingly few studies on the impacts of depression on glycemic control and clinical status. One study suggested that the existence of depression reduces diabetic patients' ability to cope with the self-care needs of their condition. However, it did not find a relationship between depression and hyperglycemia in these patients.¹⁶ These results may have occurred because A1C values were not exceptionally high in the study population. A similar set of data were reported by Lin et al.¹⁷ last year. In both studies, depression clearly worsened the self-care behaviors of the subjects. Other studies have claimed that depression worsens glycemic control.¹¹

Worsening of glycemic control would be expected in depressed diabetic patients, given the specific observations made about their self-care habits. Depressed patients in the study by Lin et al.¹⁷ exercised less often; were more likely to omit prescribed oral antidiabetic, antihypertensive, and lipid agents; and weighed more. Akimoto et al.¹⁸ reported that depressed patients had less optimal glycemic control than nondepressed patients when assessed in follow-up of a

2-week patient education program. The worsening of glycemic control was related to worsening of self-care behaviors. Depression was also found to compromise patient self-care behaviors and worsen glycemic control in a recent U.S. study.¹⁹

Implications for Outpatient Care

We have previously shown that the more complex the clinical needs of diabetic patients, the longer and the more expensive each outpatient visit can be.²⁰ Depressed diabetic patients appear to require more costly care than patients without depression.⁷ At least part of these differences relate to nonadherence to medication regimens and worsened self-care skills.

These increased costs will also translate into the office setting for each patient. A patient who has failed to adhere to a medical prescription and has neglected essential aspects of self-care will have worse clinical status and require more intensive and lengthy attention. Thus, it is important to identify conditions that will increase the complexity and length of office visits and effectively treat these issues. These conditions will not only worsen a patient's clinical status, but also measurably increase the costs of service to that patient.

Therefore, depression stands out as a candidate condition that may serve as a model for issues that complicate the clinical situation in diabetes and worsen the financial aspects of service delivery. This review strongly suggests that providers screen diabetic patients with any clinical suggestion of depression and treat them effectively.

Our recent study²¹ suggests practical methods of including psychological support within a clinical diabetes practice for providers who wish to emphasize this aspect of care. The American Diabetes Association²² has recommended that the

selection of psychotropic agents exclude, where possible, those drugs that may themselves worsen weight gain or glycemic control in diabetic patients. Providers who follow these suggestions may notice not only improvement in the clinical status of their patients, but also an increase in the efficiency of service to those individuals.

REFERENCES

- ¹Sacks FM: Metabolic syndrome: epidemiology and consequences. *J Clin Psychiatry* 65 (Suppl. 18):3–12, 2004
- ²Rewers A, Chase HP, Mackenzie T, Walravens P, Roback M, Rewers M, Hamman RF, Klingensmith G: Predictors of acute complications in children with type 1 diabetes. *JAMA* 287:2511–2518, 2002
- ³Skinner TC: Recurrent diabetic ketoacidosis: causes, prevention and management. *Horm Res* 57:78–80, 2002
- ⁴Gill GV, Lucas S, Kent LA: Prevalence and characteristics of brittle diabetes in Britain. *Q J Med* 89:439–443, 1996
- ⁵Brink SJ: Diabetic ketoacidosis. *Acta Paediatr Scand* 88:14–24, 1999
- ⁶Liss DS, Waller DA, Kennard BD, McIntire D, Capra P, Stephens J: Psychiatric illness and family support in children and adolescents with diabetic ketoacidosis: a controlled study. *J Am Acad Child Adolesc Psychiatr* 37:536–544, 1998
- ⁷Gilmer TP, O'Connor PJ, Rush WA, Crain AL, Whitebird RR, Hanson AM, Solberg LI: Predictors of health care costs in adults with diabetes. *Diabetes Care* 28:59–64, 2005
- ⁸Katon WJ, Lin EH, Russo J, Von Korff M, Ciechanowski P, Simon G, Ludman E, Bush T, Young B: Cardiac risk factors in patients with diabetes and major depression. *J Gen Intern Med* 19:1192–1199, 2004
- ⁹Musselman DL, Betan E, Larsen H, Phillips LS: Relationship of depression to diabetes types 1 and 2: epidemiology, biology, and treatment. *Biol Psychiatry* 54:317–329, 2003
- ¹⁰Timonen M, Laakso M, Jokelainen J, Rajala U, Meyer-Rochow V, Keinänen-Kiukaanniemi S: Insulin resistance and depression: cross-sectional study. *BMJ* 330:17–18, 2005
- ¹¹Katon WJ, Von Korff M, Lin EH, Simon G, Ludman E, Russo J, Ciechanowski P, Walker E, Bush T: The Pathways Study: a randomized trial of collaborative care in patients with diabetes and depression. *Arch Gen Psych* 61:1042–1049, 2004
- ¹²van den Akker M, Schuurman A, Metsemakers J, Buntinx F: Is depression related to subsequent diabetes mellitus? *Acta Psych Scand* 110:178–183, 2004
- ¹³Kessing LV, Nilsson FM, Siersma V, Andersen PK: Increasing risk of developing diabetes in depressive and bipolar disorders? *J Psych Res* 38:395–402, 2004
- ¹⁴Ahlberg AC, Ljung T, Rosmond R: Depression and anxiety symptoms in relation to anthropometry and metabolism in men. *Psychiatry Res* 112:101–110, 2002
- ¹⁵Wing RR, Matthews KA, Kuller LH, Meilahn EN, Plantinga P: Waist to hip ratio in middle-aged women: associations with behavioral and psychosocial factors and with changes in cardiovascular risk factors. *Arterioscler Thromb* 11:1250–1257, 1991
- ¹⁶Williams JW Jr, Katon W, Lin EHB, Nöel PH, Worchel J, Cornell J, Harpole L, Fultz BA, Hunkeler E, Mika VS, Unützer J: The effectiveness of depression care management on diabetes-related outcomes in older patients. *Ann Intern Med* 140:1015–1024, 2004
- ¹⁷Lin EH, Katon W, Von Korff M, Rutter C, Simon GE, Oliver M, Ciechanowski P, Ludman EJ, Bush T, Young B: Relationship of depression and diabetes self-care, medication adherence, and preventive care. *Diabetes Care* 27:2154–2160, 2004
- ¹⁸Akimoto M, Fukunishi I, Kanno K, Oogai Y, Horikawa N, Yamazaki T, Morokuma Y: Psychosocial predictors of relapse among diabetes patients: a 2-year follow-up after inpatient diabetes education. *Psychosomatics* 45:343–349, 2004
- ¹⁹McKellar JD, Humphreys K, Piette JD: Depression increases diabetes symptoms by complicating patients' self-care adherence. *Diabetes Educ* 30:485–492, 2004
- ²⁰Leichter SB: Cost and reimbursement as determinants of the quality of diabetes care: 1. Direct cost determinants. *Clin Diabetes* 19:142–144, 2001
- ²¹Leichter SB, Dreelin E, Moore S: Integration of clinical psychology in the comprehensive diabetes care team. *Clin Diabetes* 22:129–131, 2004
- ²²American Diabetes Association: Consensus development conference on anti-psychotic drugs and obesity and diabetes (Consensus Statement). *Diabetes Care* 27:596–601, 2004

Steven B. Leichter, MD, FACP, FACE, is co-director of the Columbus Research Foundation and president of Endocrine Consultants, PC, in Columbus, Ga. He is a professor of medicine at Mercer University School of medicine in Macon, Ga. Yanci See is a pharmaceutical company representative based in Columbus, Ga.