

# Depression and Diabetes

*Edited by*

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# ***Preface***

The association between depression and diabetes was first described in the seventeenth century by Thomas Willis, an English physician and anatomist, who stated, 'Diabetes is caused by sadness or long sorrow'. Indeed, in modern times, a systematic review found that depression earlier in life increased the risk of development of type 2 diabetes by up to 37%.

Evidence of a bidirectional relationship between depression and diabetes has also been recently documented in large prospective studies. Comorbid depression is associated with an increased risk of poor glycemic control, diabetes complications and mortality. Incident diabetes complications have also been found to be risk factors for subsequent development of depressive episodes.

In this book, authors on the cutting edge of research in patients with comorbid depression and diabetes describe the most up-to-date findings. The importance of the research on depression and diabetes has been emphasized in recent years because of the modern-day epidemic of obesity and diabetes that is emerging in both high and low income countries. The direct medical and indirect personal and familial costs of this epidemic are starting to get international attention. In the United States, the cost of diabetes already is estimated to represent about 10% of all medical costs and is expected to increase by 50-100% over the next decade. The public health importance and the scientific issues related to the comorbidity of depression and diabetes have led to an international scientific collaboration, the Diabetes and Depression Initiative, which is bringing together a number of organizations and experts, several of whom have participated in the production of this volume.

In this exciting new text, Cathy Lloyd and colleagues describe the epidemiology of depression and diabetes,

including the prevalence and course of depression in patients with type 1 and 2 diabetes, evidence of bidirectional links between these two disorders, and associations of depression with adverse health habits (i.e. smoking and obesity), poor disease control, medical complications and mortality. Khalida Ismail reviews the putative biologic links between depression and diabetes, which may explain why depression in early life is a risk factor for development of type 2 diabetes as well as an important factor in risk of complications and mortality in those with type 2 diabetes.

Leonard Egede reviews the extensive data on the increased medical and personal, familial and employment-related costs of comorbid depression and diabetes. These data are extremely important to health policy planners in emphasizing the potential benefit of screening patients with diabetes for depression. The epidemiologic data have shown that depression is a risk factor for poor disease control, diabetes macrovascular and microvascular complications and mortality, and Egede's data add to these findings by showing the high direct medical and indirect costs, such as days off work and decreased productivity.

Wayne Katon and Christina van der Feltz-Cornelis describe the clinical trials that have been completed in patients with depression and diabetes, including pharmacologic, psychotherapy and collaborative care trials. This extensive research demonstrates that depression can be effectively treated by both evidence-based depression-focused psychotherapy and antidepressant medications, and that collaborative care is an effective health service model to deliver these treatments to large, primary care-based populations. Collaborative care is associated not only with improved quality of depression care and depressive outcomes, but also with a high likelihood of savings in total medical costs.

Richard Hellman and Paul Ciechanowski review the important patient-physician factors that need to be emphasized to provide guideline level diabetes care. Their chapter focuses on the interaction of depression, cognitive dysfunction, glycemic control and diabetes complications and provides state-of-the-art recommendations about how to improve quality of biopsychosocial care for patients with diabetes.

In the final chapter, Juliana Chan and colleagues describe the important cultural issues in patients with depression and diabetes in both high and low income countries. Public health campaigns aimed at decreasing the incidence of obesity and type 2 diabetes and improving screening and treatment of depression will clearly need to understand the sociocultural causes and meanings of these illnesses in diverse populations.

This volume is part of a WPA series focusing on the comorbidity of depression with various physical diseases. Forthcoming volumes will deal with depression and heart disease and depression and cancer.

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# **CHAPTER 1**

## ***The Epidemiology of Depression and Diabetes***

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In recent years there has been a heightened interest in the psychological well-being of people with diabetes. Current epidemiological evidence suggests that at least one third of them suffer from clinically relevant depressive disorders [1-3]. Furthermore, people with depressive disorders have an increased risk of developing diabetes [4]. Indeed, the prognosis of both diabetes and depression – in terms of severity of disease, complications, treatment resistance and mortality – as well as the costs to both the individual and society [5] is worse for either disease when they are comorbid than it is when they occur separately [6, 7]. However, in spite of the huge impact of comorbid depression and diabetes on the individual and its importance as a public health problem, questions still remain as to the nature of the relationship, its causes and consequences, as well as potential ways of preventing and treating these two conditions. This chapter aims to outline the epidemiological evidence as it stands, as well as point the way for future research in this area.

## **RATES OF DEPRESSION IN PEOPLE WITH DIABETES**

Depression is usually defined by the number of symptoms present, usually within the past two weeks. In order to diagnose major depression using DSM-IV or ICD-10 criteria, a clinical interview is conducted and a number of symptoms have to be present ([Table 1.1](#)). Most epidemiological research on the prevalence of depression uses self-report instruments (for example the Centre for Epidemiologic Studies - Depression Scale [8] or the recently devised Patient Health Questionnaire – 9, PHQ-9 [9]) for detecting depression or depressive symptomatology, and most instruments that are used measure symptoms that approximate clinical levels of disorder ([Table 1.1](#)).

Rates of depression in people with diabetes are significantly increased and are thought to be at least doubled for those with diabetes compared to those without any chronic disease [1]. A recent report from the World Health Survey [10] estimated the prevalence of depression (based on ICD-10 criteria) in 245,404 individuals from 60 countries around the world. The overall one-year prevalence of self-reported symptoms of depression in individuals with diabetes was 9.3%. This study showed that the greatest decrements in self-reported health were observed in those with both depression and diabetes, more so than those with depression and any other chronic disease [10] ([Figure 1.1](#)).

Other studies have reported prevalence rates of depression of 24–30% [1,2,11]. Recently it has been suggested that although up to 30% of individuals with diabetes report depressive symptoms, only about 10% have major depression [12]. However, the published studies differ widely in terms of the methods used to measure depression, which makes any conclusions premature. Rates of depressive symptoms have been found to be higher in those studies where self-report instruments were used compared to diagnostic interviews [1]. Furthermore, in a recent report, Gendelman *et al.* [13] showed that prevalence rates were even higher if reports of elevated symptoms were combined with the use of antidepressant medication. This suggests that the available evidence should be considered with particular methodological differences in case ascertainment kept in mind.

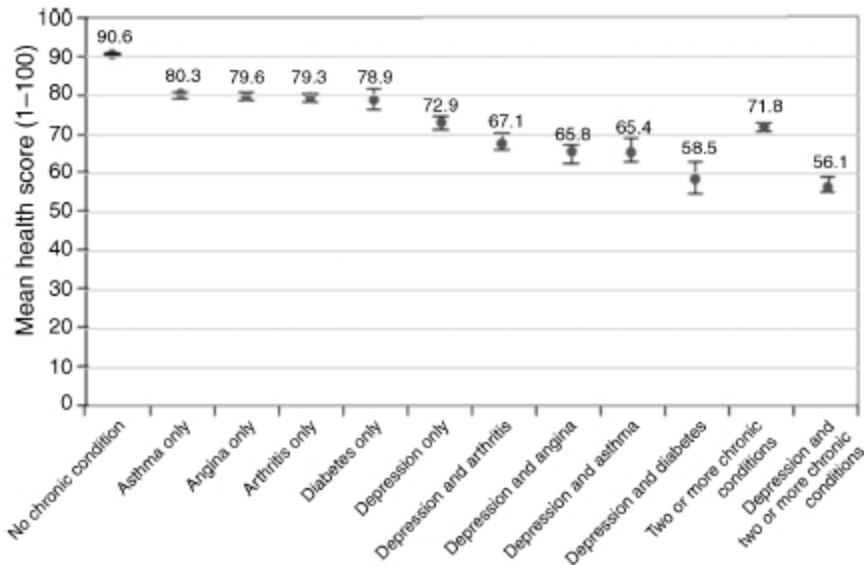
**[Table 1.1](#)** Symptoms listed in the DSM-IV criteria for major depressive disorder and symptoms of depression measured using self-report instruments

<b>DSM-IV criteria (at least five symptoms present nearly every day for 2 wk and causing significant distress or functional impairment)</b>
Depressed mood
Markedly diminished interest or pleasure in all or almost all activities

Significant weight loss/gain or decreased/increased appetite
Insomnia or hypersomnia
Psychomotor agitation or retardation
Fatigue or loss of energy
Feelings of worthlessness/guilt
Diminished ability to concentrate/make decisions
Recurrent thoughts of death or suicide
<b>Symptoms of depression measured using self-report instruments</b>
Feeling sad/depressed mood
Inability to sleep
Early waking
Lack of interest/enjoyment
Tiredness/lack of energy
Loss of appetite
Feelings of guilt/worthlessness
Recurrent thoughts about death/suicide

DSM-IV criteria extracted from the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision, Copyright 2000. American Psychiatric Association.

**Figure 1.1** Global mean health by disease status. (Saba Moussavi et al., Depression, chronic diseases and decrements in health: results from the World Health Surveys, The Lancet, 2007, by permission of Elsevier)



Rates of depression have been found to be particularly high in individuals with type 2 diabetes, with less evidence to suggest that rates are also increased in those with type 1 diabetes [3]. Any potential differences are confounded by age, and it is known that older age is a risk factor for higher prevalence of depression in those with other health problems [14, 15]. There may also be an increased prevalence of psychological morbidity in young adults with type 1 diabetes [16–19]. Some reports have indicated that the prevalence of depression does not appear to differ according to type of diabetes [1, 20, 21]. One study [22] reported that those with major depression were more likely to be on insulin treatment rather than on oral agents or diet alone, and this may be related to the increased burden of the self-management regimen in these individuals.

## INTERNATIONAL VARIATIONS IN RATES OF DEPRESSION IN PEOPLE WITH DIABETES

There may be regional/cultural differences in the prevalence of depression. However, this is difficult to establish with available data. Much of the research to date has been on the comparison of prevalence rates generally, and few published studies address culture or ethnicity as a specific factor within or across populations. Of those reports, studies have suggested that individuals from African American backgrounds have higher rates of diabetes and depression compared with Caucasian populations [23, 24]. Other studies have shown that Hispanic people have higher levels of comorbid depression compared with African Americans or Caucasian individuals [25–28]. Several studies have suggested that comorbid depression may also be much more common in native Americans with type 2 diabetes [29, 30].

In one of the few published studies of comorbid depression in the developing world, carried out in Bangladesh, Asghar *et al.* [29] reported that nearly one third (29% males, 30% females) of those with diabetes had clinically significant levels of depression, compared with only 6% of males and 15% of females without diabetes. In Pakistan, levels of depression have been reported to be lower, with prevalence rates of nearly 15% amongst those with diabetes compared to 5% amongst those without diabetes [31]. Prevalence rates in Europe have been shown to vary, although consistently higher in people with diabetes compared to those without [32,33]. High rates of depression have also been observed in Australia in both individuals with type 1 and type 2 diabetes [11, 34].

It is clear that, although there may well be international variations in rates of comorbid depression and diabetes, there remains further work to be done to clarify whether those variations reflect socioeconomic/ other environmental differences, whether race or culture play a part, or whether at least some of this difference is related to variations in

assessment methods or the cultural applicability of those measurement tools. These possibilities still need to be fully examined in future studies.

## **RISK FACTORS FOR DEPRESSION IN PEOPLE WITH DIABETES**

A range of factors may be implicated in increasing the risk of developing depressive symptoms, both in terms of an initial episode of depression and with regard to the persistence, recurrence and severity of depressive episodes. A number of risk factors identified in individuals without diabetes also apply to those with diabetes, although others may differ. Some of the key risk factors that have been identified are listed in [Table 1.2](#). Elevated depression levels have been found in general populations in women, younger people and also those of older age (especially those with physical health problems), individuals living alone, those who report a lack of social support, and those who have lower socioeconomic status. In individuals with diabetes, the following additional risk factors for depression have been found to be important: occurrence of late or acute complications, persistently poor glycaemic control and insulin therapy in type 2 diabetes [35, 36] ([Table 1.2](#)).

In the general population, risk factors for an *initial* depressive episode include gender [37], major stressful life events [38–40] and socioeconomic conditions [41]. Maternal depression has been shown to increase the risk for depression in children and adolescents [42, 43], although this has not been confirmed in other studies [16]. Low birth weight and foetal undernutrition have also been associated with both depression and diabetes [44,45]. Other factors, including lifestyle and health behaviours, may also play a part in increasing risk for depression in people with

diabetes. However, the temporal association between these variables remains unclear and requires further investigation.

**Table 1.2** Risk factors for depression in diabetes

<b>Non-diabetes specific risk factors</b>	<b>Diabetes specific risk factors</b>
Female gender	Manifestation of diabetes
Lack of social support	Occurrence of late complications
Low socioeconomic status	Persistent poor glycaemic control
Younger age; older age and physical health problems	Need for insulin therapy in type 2 diabetes
Occurrence of critical life events	Hypoglycaemia problems

A number of studies have reported a greater prevalence of depression in women with both type 1 diabetes and type 2 diabetes, similar to that observed in the general population [16, 21, 46]. A recent study showed even greater differences between men and women when use of antidepressant medication was included [13]. Indeed, medication use was almost twice as common in women with type 1 diabetes compared to men. There may be gender differences in the experience of depressive symptoms as well as in the reporting of symptoms and help-seeking behaviour. However, there are few studies that have examined these issues in depth [20, 47].

Although depression is not a part of normal ageing [48, 49], prevalence rates of severe depressive episodes/major depressive disorder are higher amongst certain groups of older people, in particular, individuals with a comorbid medical illness [50]. However, to date, little epidemiological data has been available with which to examine rates of depression in older people with diabetes [14, 15, 33, 51]. To further complicate the picture, several studies have reported that depressive symptoms are more common in younger individuals, in both type 1 and type 2 diabetes [16, 52]. Collins *et al.* [51] also reported lower rates of depression in older individuals with type 1 diabetes, suggesting that age might have a protective effect.