

# An Introduction to Psychiatry in Endocrinology

Anne M. Doherty and Seán F. Dinneen

## Introduction

Modern developments in research and services have demonstrated the need for better integration of mental and physical healthcare in various areas of medicine, including endocrinology. Years of research have shown the importance of the stress response and the hypothalamic–pituitary–end organ axes in the aetiology of depression and many common mental disorders.

In the nineteenth century, the eminent London psychiatrist Henry Maudsley noted that ‘diabetes is a disease which often shows itself in families in which insanity prevails’. In more recent years, the evolving literature on the topic has not only made it evident that diabetes is more common among people who have mental disorders but also shown that mental disorders are more common among people living with diabetes, thyroid disease and obesity. Depression, for example, is twice as common in people with diabetes compared with the general population. Diabetes is also diagnosed at a disproportionately higher rate among patients with a diagnosis of a psychotic disorder. Overall, there is a high proportion of mental disorders in any population of people with diabetes, and where these comorbidities are present, they contribute to the mortality gap between people with major mental illness and the general population.

In recent decades, research efforts have moved on from demonstrating the association between mental disorders and endocrinology conditions to developing tailored treatments for patients with these comorbidities. Research in the past decade has suggested that integrated care may be a key approach to the clinical management of comorbid diabetes and depression, and further research is likely to show that this may be generalisable to other mental and physical comorbidities. In many clinical centres, especially in the areas of obesity and gender medicine, endocrinologists and psychiatrists, psychologists or other mental health specialists work together to provide care that integrates the needs of the body and the mind.

Patients with schizophrenia and other psychotic disorders are at greater risk of developing disorders such as metabolic syndrome, prediabetes and diabetes. It remains unclear whether this relates in some way to the nature of psychosis, but we know that atypical antipsychotics certainly contribute to a significant degree, with olanzapine and clozapine having a particularly large impact on metabolic syndromes (see Chapter 3). Other (typical and atypical) neuroleptic medications have central effects on the release of hormones such as prolactin.

The aetiology of depression is considered to be multifactorial, with various factors, including genetics, life events and stress, contributing to the development of depressive symptoms via the hypothalamic–pituitary–adrenal (HPA) axis, and there are also newer

theories on this matter regarding inflammation and the HPA–gut axis. There is some evidence that inflammation may represent a shared pathway for depression and type 2 diabetes (1). Hyperthyroidism can result in symptoms of depression and anxiety; these are discussed in more detail in Chapter 6. Furthermore, an Addisonian crisis may present in a very similar way to an agitated depression (i.e. depression with increased rather than diminished psychomotor activity).

The epidemiology of mental and endocrine disorders is complicated by the complex relationship between these conditions. The larger psychiatric epidemiological studies have not examined endocrinological comorbidity. We know that people with depression have a higher risk of being diagnosed with diabetes. Likewise, there are high rates of comorbidity between many mental disorders and type 1 diabetes, type 2 diabetes, obesity, thyroid disease, parathyroid disease, Addison's disease, Cushing's syndrome, etc. (2–7). Some neuropsychiatric symptoms may be explained entirely by comorbid endocrine conditions and may resolve when these are treated.

## Clinical Needs of Specific Groups

Throughout this book, we discuss the needs of specific groups of patients who have comorbidities with endocrine and mental disorders. Those patients who are seen predominantly in a medical setting will often receive their psychiatry input from a liaison psychiatry or psychological medicine team. However, those who have a mental disorder as their predominant illness with secondary metabolic syndrome due to either the mental disorder or the treatment of it are likely to be treated chiefly in secondary care mental health settings with management of endocrine comorbidities by specialists in endocrinology or primary care medicine. Therefore, it is important that both sets of professionals have a good understanding of the other side of the comorbidity so that they can best manage and integrate patient care. There are specific complexities that relate to older patients and those with cognitive impairment. Furthermore, patients with the combination of diabetes and eating disorder deserve special attention because of the significant risk of insulin omission (particularly in type 1 diabetes) and the associated poor outcomes. Throughout this book, we discuss service delivery considerations relating to how patients with these combinations of complex comorbidities are best managed and what services need to do in order to meet patients' needs and to optimise their overall treatment and care.

## Overview of Clinical Developments in Endocrinology

In the 1990s, with an increasing recognition of endocrinopathies occurring in patients post organ transplantation, many medical centres developed joint endocrine–transplant clinics to encourage a multidisciplinary approach to metabolic disorders, bone loss and issues with fertility in this cohort of patients. More recently, the introduction of the checkpoint inhibitor class of cancer immunotherapies has resulted in a plethora of endocrinopathies being recognised as side effects of these agents, and endocrinologists and medical oncologists are increasingly working together to tackle the challenging clinical issues that can arise when, for example, patients undergoing cancer treatment develop Addison's disease, thyroid disorders or type 1 diabetes. This pattern of endocrinologists working closely with specialists from other disciplines has not been the norm in the interface between endocrine disorders and psychiatric conditions. Gender dysphoria and bariatric medicine may be the exceptions, as careful assessment of a patient's premorbid psychological state is recognised

as a key determinant of long-term success with the planned (gender transition/affirmation or weight loss) intervention. These issues are discussed in greater detail in Chapters 10 and 11.

Type 2 diabetes is by far the most common endocrine disorder encountered by psychiatrists. While a comprehensive overview of the management of type 2 diabetes is beyond the scope of this book, it is important that practising psychiatrists have some familiarity with recent developments in diabetology, which include the following:

- (1) A recognition of the importance of programmes of self-management (behaviour change) education for patients newly diagnosed with type 2 diabetes or even prior to diagnosis (in which case these are referred to as diabetes prevention programmes).
- (2) The introduction of new classes of oral (SGLT-2 inhibitor) and injectable (GLP-1 receptor agonist) therapies that have the potential to reduce cardiovascular events as well as lower plasma glucose.
- (3) A rise in population-wide screening programmes for diabetic complications, with retinal and foot screening programmes now recognised as having essential roles in reducing vision loss and limb loss from diabetes.

## Psychiatry in the General Hospital

The speciality of liaison psychiatry or psychological medicine emerged in the latter decades of the twentieth century and relates to the expert management of mental health problems in the acute hospital setting. Liaison psychiatry was first recognised as a faculty of the Royal College of Psychiatrists in the UK in 1997. It has been recognised as a sub-speciality of the American Psychiatric Association since 2004, and in the USA it is known as psychosomatic medicine or consultation–liaison psychiatry.

A liaison psychiatry team will usually include psychiatrists who are specialists in the management of mental health problems in the context of physical illness and working in physical health settings, as well as junior doctors or psychiatrists in training; specialist mental health nurses; clinical or health psychologists with an interest in the overlap between mental and physical health; and perhaps social workers, occupational therapists and pharmacists.

A properly resourced liaison psychiatry team will provide a comprehensive service to patients in the acute hospital setting who may have mental health needs alongside their physical health needs. They will ideally be adequately resourced not only to see patients presenting to the emergency department with acute psychiatric illness, including self-harm and psychosis, but also to provide assessment of and treat patients on medical and surgical wards who require mental healthcare alongside their acute medical or surgical healthcare needs. Liaison psychiatry services may also run outpatient clinics for patients who have comorbid mental and physical health problems. These will include people with functional conditions (or ‘medically unexplained’ symptoms) or anxiety that presents with predominantly physical symptoms, as well as chronic conditions such as diabetes, where the comorbid mental illness is creating a barrier to adequate self-management.

In endocrinology, the liaison psychiatrist or liaison psychiatry team can work with an endocrinology team to improve the outcomes for their patients through integration of their mental and physical healthcare. There are specific areas where this is valuable – often these are scenarios or conditions that are not considered to be related to psychiatry by non-specialists. Such an example is the assessment of people presenting with recurrent

unexplained episodes of diabetic ketoacidosis, which is a red flag for psychiatric assessment (see Chapter 9). In diabetes, for example, patients may develop a number of psychological barriers to good diabetes management in addition to having a comorbid mental disorder. Such psychological barriers may include a fear of hypoglycaemia; a fear of needles; weight and shape concerns; or even a disabling fear of developing the end-stage complications of diabetes, precipitating a state of denial. Once these barriers are identified, they can become targets for treatment, such as a cognitive behavioural therapy (CBT) model of treatment. CBT models focus on examining the person's thoughts, feelings, physical sensations and behaviours, considering how they interact with one another and working with the patient to find a more adaptive way of relating to their diabetes.

## Innovative Models of Service Delivery

Internationally, there are a number of key examples of embedded mental health services in endocrinology teams, such as those at King's College Hospital in London. Often these endocrinology-specific mental health services are integrated with one aspect of endocrinology care, such as diabetes or bariatric medicine or in gender clinics. There are also service models such as the TEAMcare delivery model developed by the late Wayne Katon and colleagues in the USA.

TEAMcare is a novel initiative that was developed in Seattle in the early twenty-first century. Dr Katon and colleagues devised a treatment programme for patients who had comorbid depression along with diabetes or heart failure. This programme was delivered in primary care predominantly by a mental health nurse who provided psychological therapies mainly based on a CBT model. This nurse had access to a psychiatrist if psychotropic medication was required, and the primary care physician provided the cardiac and diabetes care. This service model was found to be effective both clinically and in terms of cost-effectiveness (8, 9). A number of papers from this group have demonstrated that integrating mental and physical healthcare in this way is successful in terms of both patients' health and the efficiency of the healthcare organisation (10, 11).

In south London, Khalida Ismail and her group have delivered a number of complex interventions in both research and clinical settings. One of these was the A Diabetes and Psychological Therapies (ADaPT) study, which was a randomised controlled trial (RCT) of CBT versus motivational interviewing (MI) or a combination thereof delivered by diabetes nurses. The ADaPT study found that a combination of CBT and MI was most effective at improving glycaemic control (12, 13). The D-6 study, which also randomised basic CBT and MI to support the self-management of patients with type 2 diabetes, did not find any improvements associated with these interventions (14). Ismail's south London group developed the experimental 3 Dimensions of Care for Diabetes (3DFD) programme, which was an intensive intervention focusing on patients with poorly controlled diabetes ( $\text{HbA}_{1c} > 75 \text{ mmol/mol}$ ) and offering patients in this group a complex intervention. This intervention was tailored to the patients' needs and included input from psychiatry, psychology and social support, with the aim of identifying and meeting the needs of the patients, especially those presenting with barriers to the optimal management of their diabetes. This non-randomised study reported significant improvements in the intervention group compared with a comparison group, with an improvement in mean  $\text{HbA}_{1c}$  of 16 mmol/mol in the intervention group, as well as improvements in blood pressure, weight, lipids and psychological measures. Unfortunately, due to the complex and expensive nature of the

intervention, it was no cheaper than regular care, but it is worth noting that the analyses did not factor in the impact of the observed reduction in HbA1c of 16 mmol/mol, which is typically associated with significant reductions in a patient's risk of developing macrovascular and microvascular complications, and therefore may be associated with long-term reductions in the cost of care (15, 16).

A systematic review of collaborative care by Atlantis et al. concluded that collaborative care significantly improved depression and glycaemic control in individuals with diabetes and depression. However, the overall weighted mean difference was small, the meaning of collaborative care varied widely and most of the studies had limited generalisability outside of the USA (17). A cluster RCT of collaborative care in a UK primary care setting found a modest improvement in depressive symptoms at four months but did not examine glycaemic control or any physical health outcomes (18). Subsequent analysis showed that it was a cost-effective intervention based on improvements in quality-adjusted life-years (19).

Similar models of care have been implemented in Sweden and the UK for older patients with depression alongside physical multi-morbidity, and these models have been found to be acceptable to patients and practical to implement (20, 21).

## Conclusion

Comorbidities of endocrine and psychiatric conditions are common. Both conditions need to be treated, and the evidence is growing that an integrated approach may yield better outcomes, but this requires an additional level of expertise in working across the domains, and often personal flexibility in teams that are reaching out beyond their usual areas of practice. Where collaborative care or integrated care systems or interventions have been implemented, they have shown improved outcomes across the domains, but apart from in bariatric medicine and gender medicine, these are not yet considered essential components of treatment. There is a need for more research into the management of complex comorbidities in order to build on this evidence base further and to promote fully integrated care for people with these interlocking comorbidities.

## References

- Moulton CD, Pickup JC, Rokakis AS, Amiel SA, Ismail K, Stahl D. The prospective association between inflammation and depressive symptoms in type 2 diabetes stratified by sex. *Diabetes Care*. 2019; 42(10): 1865–72.
- Luppino FS, de Wit LM, Bouvy PF, Stijnen T, Cuijpers P, Penninx BW, et al. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry*. 2010; 67(3): 220–9.
- Barnard KD, Skinner TC, Peveler R. The prevalence of co-morbid depression in adults with type 1 diabetes: systematic literature review. *Diabet Med*. 2006; 23(4): 445–8.
- Ali S, Stone MA, Peters JL, Davies MJ, Khunti K. The prevalence of co-morbid depression in adults with type 2 diabetes: a systematic review and meta-analysis. *Diabet Med*. 2006; 23(11): 1165–73.
- Suliburk JW, Perrier ND. Primary hyperparathyroidism. *Oncologist*. 2007; 12(6): 644–53.
- Siegmann EM, Muller HHO, Luecke C, Philipson A, Kornhuber J, Gromer TW. Association of depression and anxiety disorders with autoimmune thyroiditis: a systematic review and meta-analysis. *JAMA Psychiatry*. 2018; 75(6): 577–84.
- Musselman DL, Nemeroff CB. Depression and endocrine disorders: focus on the thyroid and adrenal system. *Br J Psychiatry Suppl*. 1996; (30): 123–8.

- 8 Katon WJ, Lin EH, Von Korff M, Ciechanowski P, Ludman EJ, Young B, et al. Collaborative care for patients with depression and chronic illnesses. *N Engl J Med.* 2010; 363(27): 2611–20.
- 9 Katon W, Russo J, Lin EH, Schmittdiel J, Ciechanowski P, Ludman E, et al. Cost-effectiveness of a multicondition collaborative care intervention: a randomized controlled trial. *Arch Gen Psychiatry.* 2012; 69(5): 506–14.
- 10 McGregor M, Lin EH, Katon WJ. TEAMcare: an integrated multicondition collaborative care program for chronic illnesses and depression. *J Ambul Care Manage.* 2011; 34(2): 152–62.
- 11 Lin EH, Von Korff M, Ciechanowski P, Peterson D, Ludman EJ, Rutter CM, et al. Treatment adjustment and medication adherence for complex patients with diabetes, heart disease, and depression: a randomized controlled trial. *Ann Fam Med.* 2012; 10(1): 6–14.
- 12 Ismail K, Maissi E, Thomas S, Chalder T, Schmidt U, Bartlett J, et al. A randomised controlled trial of cognitive behaviour therapy and motivational interviewing for people with type 1 diabetes mellitus with persistent sub-optimal glycaemic control: a Diabetes and Psychological Therapies (ADaPT) study. *Health Technol Assess.* 2010; 14(22): 1–101, iii–iv.
- 13 Ridge K, Bartlett J, Cheah Y, Thomas S, Lawrence-Smith G, Winkley K, et al. Do the effects of psychological treatments on improving glycemic control in type 1 diabetes persist over time? A long-term follow-up of a randomized controlled trial. *Psychosom Med.* 2012; 74(3): 319–23.
- 14 Ismail K, Winkley K, de Zoysa N, Patel A, Heslin M, Graves H, et al. Nurse-led psychological intervention for type 2 diabetes: a cluster randomised controlled trial (Diabetes-6 study) in primary care. *Br J Gen Pract.* 2018; 68(673): e531–40.
- 15 Ismail K, Stewart K, Ridge K, Britneff E, Freudenthal R, Stahl D, et al. A pilot study of an integrated mental health, social and medical model for diabetes care in an inner-city setting: Three Dimensions for Diabetes (3DFD). *Diabet Med.* 2020; 37(10): 1658–68.
- 16 Doherty AM, Gayle C, Morgan-Jones R, Archer N, Laura L, Ismail K, et al. Improving quality of diabetes care by integrating psychological and social care for poorly controlled diabetes: 3 Dimensions of Care for Diabetes. *Int J Psychiatry Med.* 2016; 51(1): 3–15.
- 17 Atlantis E, Fahey P, Foster J. Collaborative care for comorbid depression and diabetes: a systematic review and meta-analysis. *BMJ Open.* 2014; 4(4): e004706.
- 18 Coventry P, Lovell K, Dickens C, Bower P, Chew-Graham C, McElvenny D, et al. Integrated primary care for patients with mental and physical multimorbidity: cluster randomised controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. *BMJ.* 2015; 350: h638.
- 19 Camacho EM, Davies LM, Hann M, Small N, Bower P, Chew-Graham C, et al. Long-term clinical and cost-effectiveness of collaborative care (versus usual care) for people with mental–physical multimorbidity: cluster-randomised trial. *Br J Psychiatry.* 2018; 213(2): 456–63.
- 20 Augustsson P, Holst A, Svenningsson I, Petersson EL, Björkelund C, Björk Brämberg E. Implementation of care managers for patients with depression: a cross-sectional study in Swedish primary care. *BMJ Open.* 2020; 10(5): e035629.
- 21 Taylor AK, Gilbody S, Bosanquet K, Overend K, Bailey D, Foster D, et al. How should we implement collaborative care for older people with depression? A qualitative study using normalisation process theory within the CASPER plus trial. *BMC Fam Pract.* 2018; 19(1): 116.