

## Summary

### Web-based cognitive behaviour therapy for depression in adults with Type 1 or Type 2 diabetes

**Chapter 1** provides the general introduction to the contents of this doctoral thesis. In summary, this chapter states that depression is a common comorbid health problem in adults with type 1 or type 2 diabetes mellitus. Depression is known to have serious adverse effects, not only on the quality of life of diabetes patients, but also on diabetes outcomes. Therefore, it is of great importance that depression in diabetes is adequately treated. Evidence suggests that treatment of depression in people with diabetes is both efficacious and cost effective and may result in improved overall diabetes outcomes. Addressing disease-specific emotional distress in depression treatment has been advised in previous studies, to increase effect sizes and to benefit the impact on diabetes outcomes. Using the internet to deliver psychological treatment can overcome isolation of time, mobility, and geography and thus increase reach and facilitate access to effective depression treatment, against relatively low costs. Primary aim of this thesis is to study the effectiveness of a web-based cognitive behavioural therapy (CBT) for adults with type 1 and type 2 diabetes in a randomised controlled trial (RCT). Secondary aims are to describe the design of the RCT, describe the development of the intervention, its reach and study whether its effectiveness differs for patients with more severe psychological problems compared with those with less severe problems. Furthermore, the relation between depressive symptoms, diabetes-specific emotional distress and glycaemic control has been studied in data from the baseline assessment of a depression in diabetes screening study carried out in three tertiary diabetes clinics in the Netherlands.

**Chapter 2** describes the design of the randomised trial, which uses a wait-list control group. The intervention consists of an 8-week, moderated self-help course that is tailored to the needs of persons living with diabetes and is offered on an individual basis. Participants receive feedback on their homework assignments by e-mail from a personal coach, which is a medical or clinical psychologist. Power analyses showed that 286 patients (143/143) were needed to detect an effect size of 0.35. Measurements were performed at baseline, directly after completing the web-based intervention and at 1, 3, 4 and 6 months follow-up. Patients in the control condition were placed on a waiting list, and followed the course 12 weeks after randomisation. Primary outcomes were depressive symptoms, measured with the Centre for Epidemiologic Studies Depression Scale (CES-D). Secondary outcomes were diabetes-specific emotional distress, measured with the Problem Areas in Diabetes scale (PAID) and glycaemic control, indicated by glycosylated haemoglobin (HbA<sub>1c</sub>). All questionnaires were administered via the Internet.

**Chapter 3** describes the study on diabetes-specific emotional distress that is hypothesized to mediate the relationship between depression and glycaemic control in patients with type 1 and type 2 diabetes. Data were derived from the baseline assessment of a depression in diabetes screening study carried out in three tertiary diabetes clinics in the Netherlands. Most recent glycosylated haemoglobin (HbA<sub>1c</sub>) measurement was obtained from medical records. The CES-D and PAID were used to measure depression and diabetes-specific emotional distress respectively. Linear regression was performed to examine the mediating effect of diabetes-distress. Complete data were available for 627 outpatients with type 1 (n = 280) and type 2 (n = 347) diabetes. Analyses showed that diabetes-distress mediated the relation between depression and glycaemic control and not differently for both disease types. From these results we conclude that in explaining the association between depression and glycaemic control, diabetes-specific emotional distress appears to be an important mediator. Addressing diabetes-specific emotional problems as part of depression treatment in diabetes patients may help improve glycaemic outcomes.

**Chapter 4** describes the development and reach of the web-based CBT programme for adults with type 1 and type 2 diabetes. Adding diabetes-specific topics to the effective online Dutch version of Lewinsohn's Coping with Depression course resulted in a web-based CBT depression programme with incorporated diabetes-specific topics. The diabetes-specific topics were incorporated, based on advice from a diabetes patient panel and from health care professionals (diabetes nurse practitioner, a dietician, and a medical psychologist) and using diabetes-specific topics from a CBT group programme for treatment of emotional distress in type 1 diabetes patients. The intervention consisted of an 8-lesson self-help course with minimal guidance by coaches, called [www.diabetergestemd.nl](http://www.diabetergestemd.nl). Some examples of diabetes-specific topics that were incorporated in the course were: worrying about diabetes-specific complications, coping with reactions from environment on diabetes, and communicating with health care professionals. In the framework of a randomised trial, the intervention attracted serious interest of 540 diabetes patients. After screening, 255 diabetes patients were enrolled. Less than half had a history of

depression treatment; 80% reported the diabetes-specific approach to be an important reason for signing up. A web-based diabetes-specific depression treatment was successfully developed. The programme attracting many diabetes patients who appreciate the diabetes-specific approach of the intervention, underscores the need for a depression intervention specifically tailored to diabetes patients.

**Chapter 5** presents the results from the RCT in which the effectiveness of web-based CBT depression treatment in adults with type 1 and type 2 diabetes is being studied. The RCT was conducted in 255 adult diabetes patients with elevated depressive symptoms. The web-based CBT was effective in reducing depressive symptoms (with intention-to-treat analyses:  $P = 0.04$ ,  $d = 0.29$  and clinical improvement 41% vs. 24%  $P < 0.001$ ; and per protocol analyses  $P < 0.001$ ,  $d = 0.70$ , 56% vs. 24%  $P < 0.001$  at one month follow-up). Additionally, the intervention reduced diabetes-specific emotional distress ( $P = 0.03$ ). We found no beneficial effect of the intervention on glycaemic control ( $P > 0.05$ ), perhaps due to the study sample having relatively well-controlled diabetes. The web-based CBT depression treatment showed effective in reducing depressive symptoms in adults with type 1 and type 2 diabetes patients and additionally showed to reduce diabetes-specific emotional distress.

**Chapter 6** presents finding from secondary analyses of the RCT. After the effectiveness of the web-based CBT was confirmed, a question that remained was whether the effectiveness differed for patients with seriously impaired mental health compared with patients with less severe mental health problems. Data of the RCT were used to test whether the effectiveness of web-based diabetes-specific CBT for depression differed in patients with and without diagnosed major depressive disorder (MDD), diagnosed anxiety disorder, or elevated diabetes-specific emotional distress (DM-distress). MDD, anxiety disorder, and elevated DM-distress showed to be no significant effect-modifiers.

The web-based diabetes-specific CBT depression treatment is therefore assumed to be suitable for use both in patients with severe mental health problems and in those with a less severe clinical profile.

**Chapter 7** provides the general discussion of this thesis. In light of our results and previous research we can conclude that web-based CBT is an effective way of treating depression in type 1 and type 2 diabetes patients. Implications of the results, limitations of the study and future directions are being provided.