

The Climate Sadness program of Internet-based treatment for depression: A pilot study

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Abstract

This paper reports the results of an open trial of an Internet based clinician-assisted computerized cognitive behavioural treatment (CaCCBT) program for depression. Thirteen participants meeting Diagnostic and Statistical Manual of the American Psychiatric Association – 4th Edition (DSM-IV) criteria for Major Depression were recruited. Participants completed 6 on-line lessons and weekly homework assignments, received frequent email contact from a clinical psychologist, and contributed to a moderated online discussion forum with other participants. Paired sample *t*-tests and effect sizes (Cohen's *d*) were calculated using an intention-to-treat design. Seventy seven percent of participants completed the 6 lessons during the 9 week program. The pre- to post-treatment effect size on the Patient Health Questionnaire – 9 Item (PHQ-9) was 1.0. Participants found the Internet treatment program acceptable and satisfactory. Mean therapist time spent per patient during the program was 208 minutes. These encouraging results are consistent with previous literature indicating that Internet-based programs for depression combined with clinical guidance can result in clinically significant improvements in outcomes for patients. These data provide further support for the development of Internet-based treatment for common mental disorders.

Keywords: Clinician assisted computerized cognitive behavioural therapy; depression; treatment; Internet

Depression is a common mental disorder with 12 month prevalence in Australia and New Zealand of approximately 6.3% (Andrews, Henderson, & Hall, 2001) and 5.7% (Wells, Oakley Browne, Scott, McGee, Baxter, & Kokoua, 2006), respectively. Depression is the most disabling of the common mental disorders, accounting for one third of the disability due to mental

disorders (Andrews, Issakidis, Sanderson, Corry, & Lapsley, 2004). It can be treated effectively using antidepressants and or psychological treatments including face to face cognitive behavioural treatments. However, in Australia only approximately 60% of people report seeking treatment in the preceding 12 months and of those, only 50% receive appropriate treatment (Sanderson, Andrews, Corry, & Lapsley, 2003).

One strategy for increasing the quality of education and treatment options for people with depression is the use of computers or Internet-based techniques to deliver cognitive behavioural treatment for depression (Marks, Cavanagh, & Gega, 2007; Proudfoot, 2004; Titov, 2007). This has been described as computerized cognitive behavioural treatment, or CCBT (Titov, 2007). The efficacy of CCBT programs at treating symptoms of depression appears to increase with the levels of therapist support provided (Spek, Cuijpers, Nyklíček, Riper, Keyzer, & Pop, 2007). For example, a randomized controlled trial (RCT) of a self-guided CCBT program for depression with no therapist support (Clarke, Reid, Eubanks, O'Connor, DeBar, Kelleher, Lynch, & Nunley, 2002) failed to reveal differences between treatment and control groups at post-treatment. However, self-guided CCBT programs combined with reminders to complete the program (Christensen, Griffiths, & Jorm, 2004; Clark, Eubanks, Reid, Kelleher, O'Connor, DeBar, Lynch, Nunley, & Gullion, 2005; Mackinnon, Griffiths, & Christensen, 2008) have resulted in modest clinical improvements in people with depression, with reported effect sizes (Cohen's *d*) between 0.2 – 0.5.

In contrast, clinician assisted CCBT (CaCCBT) programs for depression (Proudfoot, Goldberg, Mann, Everitt, Marks, & Gray, 2003; Selmi, Klein, Greist, Sorrell, & Erdman, 1990; Wright, Wrights, Albano,

Basco, Raffield, & Otto, 2005) have consistently reported clinical results both superior to CCBT programs, and comparable in clinical outcomes to face to face programs. For rural or remote consumers Internet-based treatment programs may be more convenient than face to face programs. To our knowledge, only one CaCCBT Internet-based treatment program for depression has been reported (Andersson, Bergstrom, Hollandare, Carlbring, Kaldø, & Ekselius, 2005). In that two arm RCT, treatment group participants had regular email contact with a therapist, participated in a discussion forum, and completed on-line lessons, while the control group had access to a different discussion forum. Post-treatment, the treatment group had made statistically and clinically significant improvements in symptoms of depression relative to the control group, with gains generally sustained at 6 month follow-up. The level of clinical efficacy of that trial are consistent with those reported by other Internet-based CaCCBT treatment programs for common mental disorders including social phobia (e.g., Andersson, Carlbring, Holmstrom, Sparthan, Furmark, Nilsson-Ihrfelt, Buhrman, & Ekselius, 2006; Carlbring, Gunnarsdóttir, Hedensjö, Andersson, & Ekselius, 2007; Titov, Andrews, Choi, Schwencke, & Mahoney, 2008a; Titov, Andrews, Johnston, Schwencke, & Choi, in press; Titov, Andrews, & Schwencke, 2008b; Titov, Andrews, Schwencke, Drobny, & Einstein, 2008c) and panic disorder (e.g., Carlbring, Nilsson-Ihrfelt, Waara, Kollenstam, Buhrman, Kaldø, Söderberg, Ekselius, & Andersson, 2005; Kiroopoulos, Klein, Austin, Gilson, Pier, Mitchell, & Ciechowski, 2008; Klein, Richards, & Austin, 2006).

Given the numerous potential advantages of Internet-based treatment programs for depression, the aim of the present study was to explore the efficacy of a CaCCBT Internet-based program for the treatment of depression in a small, open design, pilot study with 13 people with a diagnosis of depression. The present study is part of a larger program examining the potential for providing education and treatment programs via the Internet for people with common mental disorders. Using a similar methodology as employed here, we have recently reported encouraging results for an Internet based treatment program for social phobia (Titov et al., 2008a; Titov et al., 2008b; Titov et al., 2008c; Titov et al., in press).

The three hypotheses tested in the present study were: participants would show significant improvements on measures of depression; participants would show reductions on measures of psychological distress and disability and; thirdly, that participants would rate the procedure as acceptable.

Method

Recruitment

Participants were recruited via a website designed for the overall research program (www.climateclinic.tv). This website provides information about common mental disorders, including depression, and a link to apply online to join a treatment program. The first stage of the recruitment process involved participants completing questionnaires online to determine that they: (i) Were a resident of Australia; (ii) were at least 18 years of age; (iii) had access to a computer, the Internet, and use of a printer; (iv) were not currently participating in CBT; (v) were not using illicit drugs or consuming more than three standard drinks/day; (vi) were not currently experiencing a psychotic mental illness or severe symptoms of depression (defined as a total score > 23 or responding > 2 to Question 9 (suicidal ideation) on the Patient Health Questionnaire-Nine Item; PHQ-9 (Kroenke, Spitzer, & Williams, 2001); (vii) but, had a total score above 5 (indicating mild depression) on the PHQ-9; and (viii) if taking medication, had been taking the same dose for at least 1 month and did not intend to change that dose during the course of the program. Applicants who did not meet one or more of these criteria were immediately informed via an on-screen message and were sent an email thanking them for their application, regretting that they did not meet the inclusion criteria and encouraging them to discuss their symptoms with their primary care physician.

Participants who met the inclusion criteria then completed the following screening questionnaires online: The Social Phobia Screening Questionnaire (SPSQ) (Furmark, Tillfors, Everz, Marteinsdóttir, Gefvert, & Fredrikson, 1999); the Generalized Anxiety Disorder – 7 Scale (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006), and several questions about the frequency and severity of panic attacks. Applicants also completed a 25 item questionnaire enquiring about demographic details including treatment history.

Sixteen met the inclusion criteria and were telephoned by the researchers to confirm the diagnosis and to supply more details about the program. One applicant could not be contacted by telephone. The remaining applicants were administered the depression section of the Mini International Neuropsychiatric Interview Version 5.0.0 (MINI) (Sheehan, Lecrubier, Sheehan, Amorim, Janavs, Weiller, Hergueta, Baker, & Dunbar, 1998) during a telephone interview to determine whether they meet DSM-IV (American Psychiatric Association, 2000) diagnostic criteria for depression. Two applicants were excluded from this study because they reported psychotic symptoms. They were advised about more appropriate treatment options. The study was approved by the Human Research Ethics Committee (HREC) of St Vincent's Hospital (Sydney,

Australia) and the HREC of the University of New South Wales (Sydney, Australia).

Participants

Thirteen people (10 female; 3 male) met all inclusion criteria and agreed to participate in the trial. Their mean age was 43.80 years ($SD = 7.99$). Eight reported being married or in a de facto relationship, 3 reported they were single, and 2 reported they were separated or divorced. Six were in full time employment, 6 were in part-time employment, and one was an at home parent. Approximately 70% of participants reported having previously talked to a health professional about their symptoms of depression, and the same percentage reported currently taking medication for depression. Participants reported using the Internet for an average of 13 hours per week ($SD = 8.45$), with a range from 1 to 30 hours. Ninety two percent of participants reported that they were either *confident* or *very confident* using computers and the Internet.

Outcome Measures

One week prior to beginning the trial participants were asked to complete the following questionnaires administered online: The PHQ-9, the Depression Anxiety Stress Scales (DASS) (Lovibond, & Lovibond, 1995), the Positive and Negative Affect Scales (PANAS) (Watson, Clark, & Tellegen, 1988), the Kessler 10 (K-10) (Kessler Andrews, Colpe, Hiripi, Mroczek, Normand, Walters, & Zaslavsky, 2002), the World Health Organization Disability Assessment Schedule II (WHODAS-II) (World Health Organization), and the Credibility/Expectancy Questionnaire (CEQ) (Deville, & Borkovec, 2000). The DASS is a widely used measure of symptoms of depression and anxiety, the K10 measures psychological distress, the WHODAS-II measures disability, and the PANAS measures positive and negative affect. With the exception of the CEQ, all questionnaires were re-administered again one week post-treatment, while the PHQ-9 and DASS were also administered mid-treatment (at week 4). All of these measures are considered reliable, valid, and appropriate for both clinical and research purposes, with recent research indicating that online administration of questionnaires results in acceptable reliability of responses (Garb, 2007). Changes in the PHQ-9 and DASS were considered the primary outcome measures, while changes in the PANAS, K10, and WHODAS-II were the secondary outcome measures.

Treatment Program

The Sadness program consists of four components: six online lessons, homework assignments, participation in an online discussion forum, and regular email contact with a mental health clinician. The six online lessons were written by SP and consist of best practice

principles and techniques typically used in CBT programs for depression. The Sadness program is part of the Climate program of web-based education and treatment resources about common mental disorders (www.climate.tv). Part of the content of each lesson in the Sadness program is presented in the form of an illustrated story about a young woman with depression who, with the help of a clinical psychologist, learns how to gain mastery over her symptoms. Principles and techniques of CBT described in the Sadness program include behavioural activation, cognitive restructuring, problem solving, and assertiveness skills. Each lesson begins with a summary of the material described in the previous lesson. Each lesson also includes a printable summary and homework assignment. Participants were expected to complete the homework tasks prior to completing the next lesson. Participants were also expected to regularly post messages and homework assignments on a secure and confidential online discussion forum, using an alias. The forum software was phpBB 3.0.1.

The therapist moderated the treatment group forum and aimed to respond to postings within 24 hours. After completing each lesson participants were emailed by the therapist. The themes of the therapist's emails varied from reinforcement for continued participation and efforts, encouragement to practice the relevant treatment skills, encouragement to complete lessons and homework assignments, and enquiries about progress and responses to questions from participants.

Treatment Procedure

The treatment program operated for 9 weeks and all participants began the Sadness program at the same time. Participants were advised to complete one lesson every 7-10 days and to complete the six lessons within 9 weeks of starting. Feedback on questions was generally provided within 24 hours, and reminder emails were sent if necessary. Participants who had not logged into the program for 2 weeks and had not returned emails were telephoned by the therapist.

Therapist

One clinical psychologist (SP) provided all clinical contact with participants. A research assistant provided administrative support to collate data.

Statistical Analyses

Changes in outcome measures were evaluated using paired samples *t*-tests. All analyses involved an intention-to-treat design. Data concerned with treatment satisfaction were not formally analysed. To examine the effects of treatment expectancy, Pearson's correlation coefficients were calculated between CEQ scores and change scores on the PHQ-9 and DASS.

Results

Attrition

One participant withdrew from the program during treatment as her depression became extremely severe, and she was referred to a psychiatrist. Two participants remained in contact with the clinician throughout the program, but did not complete all lessons. Post-treatment data was obtained from 11/13 participants. Consistent with the intention-to-treat paradigm, the most recently available scores from the 2 participants who did not complete the post-treatment questionnaires were carried forward for analysis.

Results of Outcome Measures

Paired sample *t*-tests (Table 1) revealed statistically significant improvements across treatment for the PHQ-9, DASS, PANAS-Negative Affect Scale, K-10, and WHODAS-II. Large effect sizes were found for the PHQ-9 (0.98), DASS (0.96), K-10 (1.12) and WHODAS-II (1.03) and a moderate effect size was found on the PANAS-Negative Affect Scale (0.60). No significant correlations (*r*) were found between CEQ scores and changes scores on the PHQ-9 and DASS (*p* > .05).

Table 1
Results of Outcome Measures

Measure	Pre-Treatment	Post-Treatment	Effect Size (Cohen's <i>d</i>)
	<i>M</i> <i>SD</i>	<i>M</i> <i>SD</i>	
PHQ-9	13.31 ^a 2.43	8.46 ^a 6.59	0.98
DASS	47.62 ^a 13.99	29.85 ^a 22.29	0.96
PANAS – Positive Affect	19.77 6.55	21.23 8.33	0.19
PANAS – Negative Affect	25.46 ^a 7.96	20.23 ^a 9.45	0.60
K-10	28.46 ^b 3.91	22.00 ^b 7.18	1.12
WHODAS-II	38.89 ^a 12.58	25.21 ^a 13.86	1.03

PHQ-9: Patient Health Questionnaire – 9 Item; DASS: Depression Anxiety Stress Scales; PANAS – Positive Affect: Positive and Negative Affect Scales – Positive Affect Scale; PANAS – Negative Affect: Positive and Negative Affect Scales – Negative Affect Scale; K-10: Kessler 10; WHODAS-II: World Health Organization Disability Assessment Schedule – 2nd Edition

Table Note: Similar superscripts indicate means are significantly different (paired samples *t*-tests): a: *p* < .05. b: *p* < .01.

Clinical Outcomes

At pre-treatment 12/13 (92%) participants had a PHQ-9 score over 10, which indicates a diagnosis of depression and moderate symptoms, while 1/13 had a PHQ-9 score of 8, indicating mild symptoms of depression. At post-treatment, 6/13 (46%) had a PHQ-9 score under 5, indicating no depression, 3/13 (23%) had a PHQ-9 score of between 5 and 10, indicating mild symptoms of depression, but not warranting a description of depression, while 4/13 (31%) continued to have a PHQ-9 score above 10.

Treatment Satisfaction

Participants indicated differing levels of satisfaction with the overall treatment, with 7/11 (64%) of participants reporting being either *very satisfied* or *mostly satisfied*, 3/11 (28%) reporting being *neutral/somewhat satisfied*, and 1/11 (9%) reported being *very dissatisfied*. However, all responding participants rated the quality of the treatment modules as *excellent* or *good*, and all rated the quality of Internet correspondence with the therapist as *excellent* or *good*.

When asked to provide a rating from 1 to 10, where 10 indicates a high level of agreement, on average participants rated the treatment as very logical (9/10); they reported feeling very confident that the treatment would be successful at teaching them techniques for managing their symptoms (8/10); and they reported a high level of confidence in recommending this treatment to a friend with depression (8/10).

Time/Contact Events Per Participant

The mean therapist time per participant was 208 min including monitoring of the discussion forum and feedback. An additional average 25 min per patient was required for administrative purposes, including the diagnostic telephone interview. A review of email and forum contact showed that a total of 164 emails were sent to treatment group participants (mean = 13 emails per participant), with 14 forum postings made to the entire group by the therapist.

Discussion

The aim of the present study was to explore the clinical efficacy of a clinician-assisted Internet-based CCBT treatment program for depression using an open trial design. Thirteen participants meeting diagnostic criteria for depression began the program, and 77% completed the six lessons in the required time.

The first hypothesis, that participants would show significant improvements on measures of depression, was supported. The mean within group effect size (Cohen's *d*) for the PHQ-9 and DASS was 1.0, comparable to that observed in face to face treatment

(Haby, Donnelly, Cory, & Vos, 2005). This indicates that the intervention was effective in reducing symptoms of both depression and anxiety. The second hypothesis, that participants would also show reductions on measures of psychological distress and disability was also supported, with large effect sizes of 1.1 and 1.0 for the K-10 and WHODAS-II, respectively. These results indicate that, in addition to reductions in symptoms of anxiety and depression, participation in the treatment program was also associated with changes in participants' everyday functional abilities. Finally, the third hypothesis, that participants would find the treatment program acceptable, was also supported. That is, 77% of participants completed the program, while 64% of participants reported being either *very satisfied* or *mostly satisfied* with the program.

The magnitude of the effect size for the primary outcome measures is consistent with those reported by another Internet-based CaCCBT program for depression (Andersson et al., 2005), and considerably larger than those obtained from CCBT programs, without therapist support (e.g., Christensen et al., 2004; Clarke et al., 2002; Clarke et al., 2005). The mean amount of time spent by the therapist per patient during treatment (mean = 208 minutes) is also broadly consistent with that reported by Andersson et al. (2005) in that study, and with Internet-based CaCCBT treatment programs for other common mental disorders including social phobia (Titov et al., 2008a; Titov et al., 2008b; Titov et al., 2008c) and panic disorder (Wims, Titov, & Andrews, submitted). No relationship was found between treatment expectancy and change scores on the primary outcome measures, although replication with a large sample is required before any conclusions can be made about this. In summary, the results of the present study indicate that the treatment procedure employed in the Sadness program has encouraging clinically efficacy, completion rates comparable to those associated with face to face treatment (Kaltenthaler, Sutcliffe, Parry, Beverley, Rees, & Ferriter, 2008) and the procedure was acceptable to participants.

Limitations

The absence of a control group obviates the conclusions that may be drawn from this pilot study. This issue will be addressed in a forthcoming RCT that will compare a waitlist control condition with a treatment group.

In conclusion, the results of the present study are encouraging and are consistent with a previous report of the efficacy of Internet-based CaCCBT for treatment people with depression. If this finding is confirmed in RCTs and in effectiveness trials such techniques could help to improve access to treatment programs particularly for those who may not otherwise be able to access face to face treatment services.

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