Treatment of Major Depression: Effectiveness of Cognitive-Behavioural Therapy with an Internet Course as a Central Component

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Abstract

Cognitive-behavioural therapy (CBT) is moderately effective for depression, but it tends to be expensive and inconvenient for clients. This article describes an attempt to provide a more cost-effective and convenient treatment for major depression by using the Internet to provide the bulk of the treatment. Nine adults with major depression participated in the study, and six of these individuals completed the treatment. The clients who completed treatment had a mean of 3.7 individual sessions and showed substantial improvement, equivalent to similar individuals who received far more face-to-face sessions in studies of traditional CBT for depression. The results suggest that it is feasible, at least with some clients, to use the Internet to provide a major part of CBT for depression and to thereby reduce cost and inconvenience to clients.

Keywords: *Depression, cognitive behavioural therapy; treatment; internet; effectiveness; case studies.*

Introduction

Major depression is a common, disabling disorder (Kessler et al., 2003; Murray & Lopez, 1996). Depression is a top-ranking cause of non-fatal disease burden (Moussavi et al., 2007). Unfortunately, most individuals with depression are not treated (Andrews, Issakidis, Sanderson, Corry, & Lapsley, 2004).

Two meta-analyses have shown the efficacy of cognitive-behavioral therapy (CBT) for depression (Westen & Morrison, 2001; Butler, Chapman, Forman, & Beck, 2006). A significant impediment to the wider use of CBT for depression lies in the shortage of trained therapists (Andersson et al., 2005; Beck, 2005) and the cost and inconvenience of therapy.

One possible way to provide CBT more cheaply and conveniently involves the internet. Griffiths, Lindenmeyer, Powell, Lowe and Thorogood (2006) observed that in parallel with the expansion of the internet there has been an increase in the number of health interventions offered online. The reasons identified include the internet's capacity to deliver rich and easily updated information to a large audience at low cost, with the opportunity for asynchronous communication; comparatively low health servicing costs and providing help where none might be locally or conveniently available; less perceived stigma in cases of psychological disorders; and increased sense of control by enabling users to undertake the intervention at their own pace.

Existing internet interventions for depression provide one of the following options: (a) internet treatment information, such as *BluePages* (Centre for Mental Health Research, 2008); (b) interaction built into the program without therapist intervention, similar to an interactive book, for example the site *Feel Better* described by Clarke et al. (2002); or (c) treatment via emails. Email treatment reduces the impersonality inherent in entirely internet-based treatment and the debilitating loneliness often felt by a client with depression (Korn & Greist, 2004).

Studies of the efficacy of entirely internet-based treatment for depression have produced mixed results, with some trials showing a positive effect (Clarke et al., 2005; Christensen, Griffiths, & Jorm, 2004) and others not (Clarke et al., 2002). However, it is possible to mix both face-to-face therapy and internet treatment. Christensen, Griffiths, Mackinnon and Brittliffe (2006) observed that effective online depression treatment programs usually provide a phone or email component. A meta-analysis of internet treatment for symptoms of depression, including some studies where participants also received supportive contact from a therapist, showed a small effect size, d = 0.32 (Spek et al., 2007).

Wright et al. (2005) tested *in-office* cognitive therapy that included a large computer component and found that it was as effective as traditional face-to-face treatment for depression. Of course, material presented on an office computer can be presented via the internet, enabling clients to work on treatment at home. Proudfoot et al. (2003) tested an 8-session computer-based treatment program for

depression and anxiety and found that users reported that the program was helpful.

The present study examined the viability of a combination of internet-based CBT and as-needed in-person individual CBT. Making the treatment almost entirely internet-based has a potential convenience and time advantage over treatment in a clinician's office. Including the option of in- person sessions has the advantage of flexibility of treatment to accommodate different clients. Taylor and Luce (2003) foresaw that treatment components adjunctive to face-to-face psychotherapy sessions (as in the present study) might become one of the most powerful uses of the internet.

Experts on internet treatment have suggested several treatment elements, including building in live therapist input and creating a supportive relationship with the participant (Clarke et al., 2002); presenting learning material in self- contained modules with a test at the end with feedback (Andersson et al., 2005; Christensen et al., 2004); using multimedia self-help exercises (Wright et al., 2005); including feedback (Wright et al., 2005; Christensen et al., 2004); and comparing results against face-to-face studies (Clark et al., 2002).

The principles for online treatment proposed by the International Society for Mental Health Online (2006) echo those of the National Board for Certified Counselors Inc. and Center for Credentialing and Education, Inc. (undated), and highlight the importance of informing clients on privacy, risks and benefits of online treatment, and safeguards, as well as ensuring that the client has sufficient computer and writing skills. However, in line with the view of Fenichel, Jones, Meunier, Munro and WalkerSchmucker (2005), given password protection and other security techniques, online psychotherapy is no more unsafe than face- to-face treatment.

McKendree-Smith, Floyd and Scogin (2003) argued that self-help programs and face-to-face interventions should include assessment. Well used self-tests such as the Goldberg Depression Scale (Goldberg, Bridges, Duncan-Jones, & Grayson, 1988) are in the public domain and can be linked to a treatment website, subject to copyright conditions. The tests can also be used to help the therapist assess progress and to provide feedback to the client.

The research questions for the present study were as follows:

1. Can major parts of a cognitive-behavioural treatment for depression be delivered effectively via the internet?
2. What are the potential cost savings of this internet treatment element compared with the usual completely face-to-face treatment?

Method

Participants

Two general practitioners and two psychologists, all in Sydney (Australia), referred individuals with symptoms of depression to the first author, a private practice psychologist who served as the therapist in the study. Following the suggestions of Andersson et al. (2005) and Clark et al. (2002) about internet treatment, we decided to exclude anyone who had severe or psychotic depression. In total, nine participants entered treatment. No one was excluded from the study. All participants spoke English fluently; all were at professional/managerial occupational levels. Five of the nine participants were male. The mean age of the sample was 34.97 (*SD* = 10.37). The study was approved by the university research ethics committee, and all participants gave informed consent.

Measures

Beck Depression Inventory (BDI). The self-report BDI (Beck, Steer, & Brown, 1996) has been widely used in depression treatment studies because of its good reliability and validity (e.g., Beck, Steer, & Garbin, 1988; Uher et al., 2008). The BDI ranges in scores from 0 to 63 and has norms for four categories - minimal, mild, moderate and severe.

Goldberg Depression Scale (GDS). This self-report scale (Goldberg et al., 1988) has good evidence of reliability and validity (Goldberg et al., 1988; Holm, Holm, & Bech, 2001). The GDS ranges in scores from 0 to 90 and has norms for three categories - mild, moderate and severe.

Hamilton Depression Rating Scale (HDRS). This interview-based scale (Hamilton, 1960) is commonly used in depression treatment studies. It has good internal consistency and inter-rater reliability, and scores on it correlate highly with other measures of depression, such as the BDI (e.g., Uher et al., 2008). The HDRS ranges in scores from 0 to 34 in three categories - mild; mild to moderate; and moderate to severe.

Mood Monitor. The mood monitor was created for this study to provide clients with a simple measure of progress. Clients rated their mood over the previous three days at morning, noon, and evening (1=absolutely lousy, 5=medium, and 10=absolutely happy) and they calculated the average.

Treatment Evaluation Questions. These items, created for the study, asked participants for comments about the treatment, and for information

about the extent to which they applied the principles learned in treatment to real life.

Procedure

All in-person meetings occurred in the private practice office of the first author (the therapist). The therapist saw each referred client individually and offered the person the opportunity to participate in an experimental treatment procedure which consisted of a combination of an online course on CBT skills and face-to-face treatment. Participants undertook the course on their own and contacted the therapist by email approximately weekly. If they felt the necessity for face-to-face sessions to address particular difficulties in the course or had any other issues interfering with their capacity to pursue their treatment, they could arrange individual sessions with the therapist. The level of depression was assessed at pre-intervention with a clinical interview, the clinical interview-based HDRS, and by the self-report BDI. Participants were selected on the basis that (a) they met the diagnostic criteria for major depression according to the DSM-IV (American Psychiatric Association, 2004), and (b) their BDI scores showed depression at the mild to moderate levels, namely below the BDI score of 29 and at, or above 14 (Beck et al., 1996).

Seven administrations of the online Goldberg Depression Scale, which clients accessed on an internet site (Goldberg, 2006), provided the participants and the therapist with feedback on their progress during treatment. Completion of the BDI and HDRS at post-treatment and 3 months later provided additional data.

Treatment

The therapist started by explaining to each client that the likely length of the project was between 4 and 6 weeks, that the project was entirely voluntary and that participants were free to leave at any time, and that one-on-one treatment, if needed, could take another 6 to 9 weekly 1-hour sessions.

Clients were informed that they would first undertake the online course, beginning with the first module and then continuing to advance module by module, over a total of 14 modules. Each module covered at least one important CBT principle, as suggested by Andersson et al. (2005) and Christensen et al. (2004). The modules presented core knowledge, as well as material for enrichment purposes through links to other sites. Leisure sites including games, humour and music were also linked in order to reward the participant's efforts with enjoyable activities. Six of the modules ended with exercises requiring the application of the information to practical day-to-day situations in the life of the participant. Clients submitted material to the therapist as part of the exercise. Nine modules provided the participant with a simple mood monitor form for simple feedback. The clients also saw their scale scores each of the seven times they completed the Goldberg Depression Scale.

The course modules included (1) an introduction and explanation of procedures, and the first Goldberg scale result to be emailed to the therapist; (2) looking at things differently – a discussion on the role of cognitions in emotion; (3) practicing looking at things differently, exercises on the application of the Epictetus principle (that what we think determines how we feel), mood monitor scores and Goldberg scale results to be completed for submission to the therapist; (4) development and management of stress – knowledge test, mood monitor score to be submitted to the therapist; (5) stress symptoms and their relationship to the survival system; (6) continuation of presentation of stress symptoms; their relationship to the survival system; completion of an exercise based on personal experience of a recent stressful situation, mood monitor score and Goldberg scale result for submission; (7) relaxation training, with breathing exercises; (8) additional relaxation training, with progressive muscle relaxation; (9) basic meditation technique, test on experiences in the application of meditation, mood monitor score and Goldberg scale result for submission; (10) introduction to CBT – using Socratic questioning to find our own answers, avoiding self-defeating thinking (such as catastrophising and overgeneralisation of negative experiences), behavioural exposure, test on the CBT model based on recall of recent experience of depressed mood and associated thoughts and behaviour, mood monitor score for submission; (11) CBT key concepts – core beliefs, conditional rules, automatic thoughts, linking thoughts and mood and behaviour, assignment to apply exposure by returning to a place avoided since becoming depressed, mood monitor score and Goldberg scale result for submission; (12) CBT tools: finding automatic thoughts, identifying irrational beliefs, discussing rules of Aristotelian logic; assignment to apply exposure to a second behavioural experience, and mood monitor score for submission; (13) more CBT tools: discussing remaining rules of logic; (14) analysing thoughts – common negative thoughts of depressed individuals; exercise on analysing negative depressive thoughts, mood monitor score and Goldberg scale result for submission; and (15) strategy summary. The modules can be viewed at www.consultantpsychologist.com/treatment. To access them, use client as the username and module as the password.

The therapist informed the clients that the course was individualised to the extent that there was no fixed time schedule for module completion and that the website could be accessed at any time. They would move from module to module at their own

pace. The therapist invited the clients to communicate any difficulties or other issues they wished by email and to arrange for face-to-face sessions to address "sticking points" or if their depression deteriorated to the extent that their ability to apply the skills learned became impaired. The therapist put no limit on the number of sessions that a client could attend. The therapist advised the clients that following completion of the online component they would complete the BDI and the HDRS. If either measure indicated that depression continued at clinical levels, the therapist invited the client to undertake face-to-face sessions.

Results

Four men and two women ranging in age from 26 to 47 years, with a mean of 32.2 years and a standard deviation of 8 years, completed the treatment course. These individuals took from 26 days to 153 days to complete the course, with an average of 86.5 and a standard deviation of 44.8. These participants required a range of one to nine face-to-face sessions each, including the intake/diagnostic session. The average number of face-to-face sessions per client was 3.7 (*SD* = 6.2). Dealing with client emails took about 1 hour of therapist time per person over the course of treatment.

Two of the six completers required no sessions after completing the course. The internet course worked adequately for them without individual face-to-face therapy. They commented that even though they did not need to have any sessions, the availability of sessions assured them of help in mastering concepts that could not be grasped solely online.

Table 1 shows means and standard deviations for the BDI and the HDRS at the pre-treatment, post-treatment, and follow-up stages. Together, the clients who completed treatment showed a large decrease in depression level.

Table 1
BDI and HDRS means and standard deviations at each intervention phase

Phase	N	BDI (SD)	HDRS (SD)
Pre-treatment			
All clients	9	25.78 (2.49)	26.00 (5.39)
Completers	6	26.50 (1.50)	25.50 (3.00)
Post-treatment			
Completers	6	5.00 (3.2)	4.00 (0.80)
Follow-up			
Completers	6	4.80 (1.50)	4.20 (1.50)

Note: BDI = Beck Depression Inventory; HDRS = Hamilton Depression Rating Scale

Table 2 shows the results of comparisons of BDI and HDRS scores over time. The results indicate a significant reduction in means on both BDI and HDRS from before to after the online course, with maintenance of improvement through 3-month follow-up.

Table 2
Comparisons of BDI and HDRS means for treatment completers at different phases (N = 6)

	BDI		HDRS	
Comparisons	*t*	*p*	*t*	*p*
Pre – post-treatment	14.85	<.01	13.15	<.01
Post – follow-up	.12	ns	1.35	ns
Pre – follow-up	65	<.01	17.35	<.01

Note: BDI = Beck Depression Inventory; HDRS = Hamilton Depression Rating Scale; post-treatment was conducted following completion of the internet course and follow-up 3 months later

Three clients withdrew from the study after completing part of the treatment. They each reported that they managed to overcome their depression with the aid of principles learned through the course. One of the two female non-completers improved to the extent that she felt that she did not need to go on to complete the treatment. The other female non-completer married just after completing the first course module and felt that her life had changed for the better. The male non-completer considered that a combination of contracting work he enjoyed and applying thought-challenging skills learned in the course would provide him with the means to manage his depression.

Participants completed the Goldberg Depression Scale as they progressed through the course. Scores on this measure reflected the path of progress through the course. Figure 1 depicts Goldberg scores for individual clients over the course.

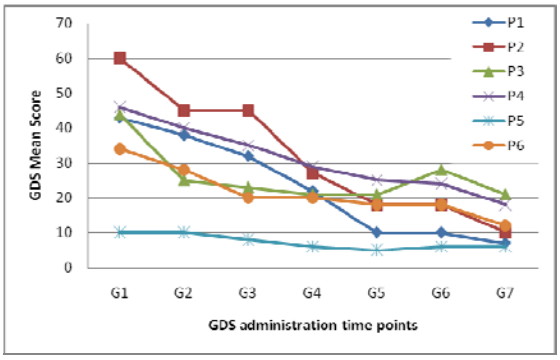

Figure 1. *Goldberg Depression Scale (GDS) mean scores for individual participants (P1 – P6) over the course of treatment*

Table 3 provides a description of client backgrounds and progress through the intervention. Each description is based on information provided through face-to-face treatment sessions, emails, and questionnaires completed by clients. The attractions to undergoing the intervention included the ability to blend treatment with the demands of life, the availability of face-to-face sessions if needed, being in charge of one's own treatment and using the internet (particularly for those who have an affinity with information technology). In the view of the clients, the most helpful elements in the course included changing thinking patterns and problem-solving. The clients indicated that they were able to apply key CBT principles effectively in their day-to-day functioning. All completers succeeded in addressing their depression by taking steps to resolve the issues confronting them or by looking at their problem in a different light.

Table 3
Key factors of participant experience by self-report for completers and non-completers

Participants	History of depression	Attractions to intervention	Number of face-to-face sessions*	Significant component(s)	Behaviour change
Completers					
A	Long-term, antidepressants ineffective	In charge, sessions, blend with life	9	Epictetus, negative thought challenging	Lifted depression, began university courses
B	Marital problems, antidepressants ineffective	In charge, sessions, blend with life	6	Epictetus	Problem-solved marital issues, work performance improved, depression lifted
C	Depression due to loneliness, damaging relationship, association with criminal activity	In charge, Internet user, likes IT, sessions, blend with life	2	Epictetus, logic challenging	Resolved issues, continued with University courses, depression lifted
D	Depression after trauma, antidepressants ineffective, loneliness without children, relapses	In charge, sessions, blend with life	3	Problem-solving	Problem-solved key issue of reuniting family, depression lifted
E	Depression due to culture clash, and relationship break up, worsened by steroid use leading to criminal behaviour	In charge, IT experience, blend with life	1	Logical thought challenging	Able to manage ongoing conflict with mother-in-law without aggression or relapsing into depression
F	Depression due to possible forced return to Iran with dire consequences, loneliness	Pursuit of own treatment through the Internet, sessions, blend with life	1	Epictetus	Redefined predicament in a different light and decided to problem-solve, depression lifted
Non-completers					
G	Depression due to family discord due to current partner and child from a previous marriage	Blend with life, not having to devote time away from her family	0	Problem-solving	Negotiated changes with her partner, which resolved her depression.
H	Depression due to adjustment to civilian life after a career in the defense forces	Technical challenge in pursuing treatment through the Internet, parallel sessions, blend with life	0	Problem-solving	Found satisfying work, which lifted his depression
I	Depression due to earlier trauma and life difficulties since childhood	No travel involved; sessions if needed.	0	None	Depression lifted due to changed life circumstances

* Number includes intake/diagnostic session

All six treatment completers reported that they found the intervention valuable. Their depression scale scores indicated that they succeeded in reducing their depression to subclinical levels.

Discussion

The study showed that the six individuals who completed the internet-based depression course with an average of only 3.7 face-to-face sessions experienced large reductions in depression. The results provide preliminary evidence that internet treatment combined with as-needed face-to-face treatment can be a viable method of helping individuals overcome depression.

To evaluate how our treatment results compare to those involving completely face-to-face CBT treatment for depression, we looked for a recent study that reported pre and post data on the BDI. An uncontrolled cognitive treatment study by Cahill et al. (2003) met our criteria for pre- and post-BDI scores and included a large number of adult participants (N = 58). For the purpose of comparison, Table 4 presents pre-treatment and post-treatment results for the present study and the Cahill et al. study. The comparison shows that the present treatment produced effects at least as large as the completely face-to-face treatment, with an average of about 8 fewer individual sessions per client. The use of an internet-based CBT component appears to have made the treatment less expensive in terms of therapist time, with no apparent loss in efficacy. The treatment, being delivered mostly via the internet at a pace set by the client, also had the advantage of convenience for clients. The present findings are consistent with prior studies that show that face-to-face CBT for depression tends to be at least moderately effective (Butler, Chapman, Forman, & Beck, 2006; Westen & Morrison, 2001). The findings also are consistent with studies that have found internet–delivered CBT alone for depression to be at least somewhat effective (Christensen, Griffiths, & Jorm, 2004; Clarke et al., 2005). The present study adds evidence to these prior findings and suggests that a combination of the two treatment delivery formats can also be effective, with clients receiving an individualised level of face-to-face treatment.

Six of the nine clients in the present study (67%) completed the intervention. This completion percentage is generally in line with rates of completion of purely face-to-face treatment in recent depression treatment studies (e.g., 60%, Cahill et al., 2003%; 72%, Agras et al., 2000; 75%, Halmi et al., 2005; and 78%, Goudsmit, 2001). Because the reasons given for withdrawal from the present study involved rapid improvement, the withdrawal does not necessarily mean the treatment failed the non-completers.

Table 4
Comparison of present study and a recent studyof traditional CBT for depression

	Cahill et al (2003)	Present study
Began treatment	58	9
Pre-treat BDI mean (SD)	28.38 (10.27)	25.8 (2.5)
Average no. of 1-hour sessions per participant	11.6	3.7
Completers (%)	35 (60)	6 (67)
Post-treat BDI mean (SD)	10.30 (10.22)	5.0 (3.2)
Mean decrease in BDI	18.08	20.8

Note: Cahill et al. reported no follow-up data

The study methods and findings have several limitations, however. First, the availability of the intervention is limited to depressed individuals who, apart from not having psychotic symptoms, have (1) access to the internet, (2) the requisite information technology skills, (3) adequate English literacy to understand the information presented, and (4) the ability to communicate via email. Second, the small size of the sample limits the generalisability of the findings and the comparability of results with those of other studies. Third, the lack of a control group and randomisation of the sample make it difficult to be confident that the treatment led to improvement, rather than, say, regression toward the mean.

Future research with a large sample and random assignment could provide important additional information about the value of CBT involving a combination of internet and individual-therapy components. The present study was on depression. Although this disorder deserves attention given its high prevalence, other disorders including panic disorder, generalized anxiety, and phobias also deserve attention with regard to the value of including internet-based components in treatment.

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Research Profile

John Jacmon is a registered psychologist in private practice in Sydney. He was first registered in 1974 in Victoria. His work is mainly clinical and counselling. He treats mood and anxiety disorders. His approach is mainly cognitive behavioural. He is bilingual and attracts clients from a Greek background who need treatment to be provided in their first language. His work includes the preparation of court assessments for defendants in criminal law cases and acts as an expert witness in legal hearings. His major research interest lies in extending online treatment to individuals who are not able to attend conventional face-to-face sessions.

John Malouff is an associate professor of psychology and director of clinical training at the University of New England in Armidale. journal articles. He studies the efficacy of the treatments for psychological disorders. The treatments include types of individual psychotherapy, self-help books, online treatment, and combinations of these methods. He also studies methods of increasing client adherence to therapy assignments. This research focuses on the value of vicarious reinforcement. Currently, he is also carrying out a series of studies with the goal of identifying the fundamental psychological characteristics of romantic and marital relationships.

Neil Taylor is an associate professor in science and technology education and higher degrees research coordinator at the School of Education of the University of New England. His major research interests are environmental and science education in developing countries. He has co-edited 4 books and published over 80 journal articles in these areas. He previously worked at the University of the South Pacific in Fiji and the University of Leicester in the United Kingdom.