

# COMPUTERIZED COGNITIVE BEHAVIOUR THERAPY: A SYSTEMATIC REVIEW

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**Abstract.** Depression, anxiety disorders and phobias are common mental health problems associated with considerable occupational and interpersonal impairment. Although there is substantial evidence to support the use of cognitive behaviour therapy (CBT) in the treatment of these disorders, access is limited. Computerized cognitive behaviour therapy (CCBT) is one of a variety of aids to self-management that offer patients the potential benefits of CBT with less therapist involvement than therapist led CBT (TCBT). In this systematic review of the efficacy of CCBT, 16 studies were identified. Of these 11 were RCTS and the remaining 5 were pilot or cohort studies. The quality of studies ranged from poor to moderate (although the criteria used precluded the highest rating). In the studies comparing CCBT with TCBT, five studies showed CCBT have equivalent outcomes to TCBT. One study of depressed inpatients found TCBT to be significantly more effective than CCBT. Four studies found CCBT to be more effective than treatment as usual (TAU). Two studies found CCBT to be no more effective than TAU. Two studies compared CCBT with bibliotherapy. Of these, one study found CCBT to be as effective as bibliotherapy and one found bibliotherapy to be significantly more effective than CCBT on some outcome measures. Although the results of this review are not conclusive, CCBT is potentially useful in the treatment of anxiety disorders, depression and phobias. From the results of this review, we make three recommendations to improve the quality of research in this field, and suggest four areas requiring further research.

*Keywords:* Cognitive behaviour therapy, medical informatics computing, anxiety, depression.

## Introduction

Depression, anxiety disorders and phobias are prevalent mental health problems associated with considerable occupational and interpersonal impairment. There is substantial evidence to support the use of cognitive behaviour therapy (CBT) in the treatment of these disorders (Department of Health, 2001). However, CBT is often inaccessible to health service users due to problems with delivery such as too few therapists, difficulty combining therapy with work and family commitments, expense, waiting lists, and patients' reluctance to enter therapy. This prevents the use of cognitive behaviour therapy within the NHS by many patients who might benefit from its use. The principles of "stepped care" (Katon et al., 1999), suggest that briefer, simpler and most accessible therapies should first be offered, and more complex, expensive and effortful therapies only if the patient has not responded to the simpler approach. Despite NHS

policy advice recommending stepped care in psychological therapy (Department of Health, 1996), most CBT continues to be delivered by specialist therapists in secondary mental health services. Lovell and Richards (2000) suggest that traditional service delivery systems reach only a small proportion of people who could benefit from CBT and argue for multiple points of access, including the widespread availability of self-help methods in primary care. A recent research review of self-help interventions in mental health reported that almost all are based on CBT principles, and that computers may best be seen as another way of providing access to self-help materials (Lewis et al., 2003)

Computerized cognitive behaviour therapy (CCBT) is thus one of a variety of aids to self-management that offer patients the potential benefits of CBT but with less therapist involvement than therapist led CBT (TCBT). CCBT provides CBT delivered via a computer interface or over the telephone with a computer led response. The computer programme is interactive making appropriate responses to patient input. If effective, it has the potential to offer the benefits of CBT within a stepped care approach to people suffering from anxiety, depression and phobias. People who are housebound and unable to access health services due to their phobic anxiety disorders may find CCBT particularly useful. CCBT is a potentially cost effective way of offering CBT to patients. This paper systematically reviews the research evidence on CCBT in order to assess the efficacy of CCBT in treating anxiety, depression and phobias. It summarizes the key points of the Health Technology Assessment report on CCBT (Kaltenthaler et al., 2002) and the National Institute of Clinical Excellence (NICE) guidance on the use of CCBT (NICE, 2002).

## Methods

### *Study selection*

Studies on CCBT were identified through searching Medline, Embase, the Cochrane Library, Cinahl, PsycINFO, Biological Abstracts, HMIC and NHS CRD databases in September and October 2001. The terms used for searching included population search terms (e.g. depression, anxiety, panic, agoraphobia, phobia) and were combined with "cognitive therapy" terms (e.g. cognitive therapy, behavio(u)r therapy, psychotherapy) and computer terms (medical informatics computing, computer-assisted instruction, multimedia). This was supplemented by more specific searches on named packages. No date, language or study/publication type restrictions were applied to the searches. In addition to the searches, reference lists of ordered papers were checked for relevant references. Various health services research related resources were consulted via the Internet. These included health economics and HTA organizations, guideline producing agencies, generic research and trials registers and specialist sites. Citation searches were conducted on key papers and authors using the Science and Social Science Citation Index Facilities. Further details of the search terms and sources used are available on request from the authors.

We included studies dealing with adults with depression, or anxiety with or without depression (as defined by individual studies). This included people with generalized anxiety disorder, panic disorder, agoraphobia, social phobia and specific phobias. Studies were included of CCBT delivered alone, or as part of a package of care either via a computer interface or over the telephone with a computer led response (Interactive Voice Response). Comparators included current standard treatments including therapist led CBT (TCBT), non-directive

counselling, routine management (including drug treatment) and alternative methods of CBT delivery. Outcomes included in the search strategy were improvement in psychological symptoms, interpersonal and social functioning, and quality of life. Other factors included the amount of time therapists spent with patients, patient preference, satisfaction, and acceptability of treatment. Study types included randomized controlled trials and non-randomized studies.

The following disorders were excluded from this review: post traumatic stress disorder, obsessive compulsive disorder, post-natal depression bipolar disorder, depression with psychotic symptoms, Tourette's syndrome, schizophrenia, psychosis, serious suicidal thoughts or unstable medical conditions in the past 6 months and alcohol or substance abuse. Studies were also excluded for the following reasons:

- patients receiving psychosurgery or electroconvulsive therapy
- papers describing a computer package but not reporting the results of a study
- CCBT as adjuvant therapy, where CCBT formed an additional therapy component alongside TCBT
- "virtual reality" software for exposure to feared stimuli in therapist-led behaviour therapy.

### *Quality assessment*

The quality of the randomized controlled trials (RCTs) was assessed by the Jadad criteria (Jadad et al., 1996). The non-randomized trials (non-RCTs) were assessed using criteria modified from the Users' Guides to Evidence-Based Medicine (Levine et al., 1994). Other aspects of quality assessment such as length of follow-up, choice of outcome measures and intention to treat analysis were also assessed.

### *Data extraction and synthesis*

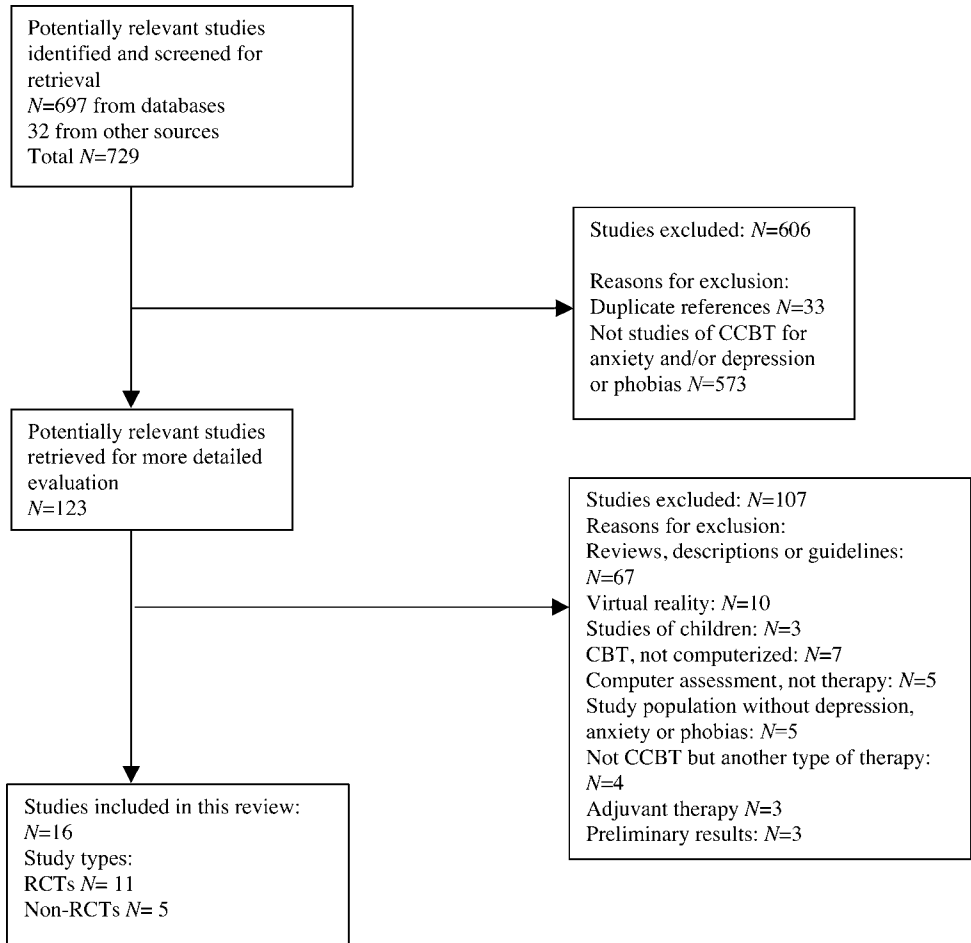
Data were extracted by one researcher and checked by another using customized data extraction forms, any disagreements were resolved by discussion. Data synthesis in the form of meta-analysis was considered to be inappropriate due to the variety of the CCBT packages used in the trials as well as the variety of comparators and outcome measures used in the trials.

## **Results**

Figure 1 shows the details of study selection and exclusion. Table 1 shows the 11 RCTs and 5 non-RCTs included in this review. Tables 2 and 3 show details of the study characteristics for the RCTs and non-RCTs respectively. The CCBT components of the package under investigation are described in Table 1 column 2 while comparators are listed in Table 2, column 4. Tables 4 and 5 show the results of reported outcomes for the RCTs and non-RCTs respectively.

### *Quality of studies*

The Jadad criteria were used to assess the quality of the 11 RCTs. These criteria include three categories: randomization (including method to generate the sequence of randomization and whether or not the method was appropriate), double blinding and description of withdrawals



**Figure 1.** Summary of flow of study selection and exclusion

and dropouts. The maximum number of possible points is five. Scores for the 11 RCTs ranged from one to three with three studies achieving three (Grime, 2001; Marks et al., unpublished; Proudfoot et al., 2003).

No studies were double blinded that resulted in loss of points. However, blinding is in practice difficult in trials of psychological therapies, as patients and therapists must usually be aware what therapy is taking place. Four of the total 16 studies (Bowers, Stuart, & MacFarlane, 1993; Carr, Ghosh, & Marks, 1988; Marks et al., unpublished) used a blinded assessor to assess outcome. Three of the total 16 studies gave no description of dropouts from the trials (Ghosh, Marks, & Carr, 1988; Newman, Kenardy, Herman, & Taylor, 1997; Wright, Wright, Basco, Albano, & Raffield, 2001). Five of the studies were not published in peer-reviewed journals. The study by Wright (2001) was presented as a poster, the study by Grime (2001) as a dissertation while the studies by Jones et al., Marks et al., and Proudfoot et al. were

**Table 1.** Studies included in the review

Study	CCBT components (Package)	Study type	Patient population
Bowers et al., 1993	CBT, (Overcoming Depression); Programme responds to patient's key words and uses case scenarios. No behavioural tasks included in the homework.	RCT	Inpatients with major depression
Carr et al., 1988	Self exposure; patients planned their exposure treatment, keyed in completed homework and selected further tasks	Comparative study	Phobias (85% agoraphobia, 10% social phobias, 5% specific phobias-animals)
Ghosh et al., 1988	Self exposure	RCT	Phobias
Grime (dissertation), 2001	CBT (Beating the Blues); revised form of Beating the Blues for employed people who also received conventional care (including medication and counselling)	RCT	Work related anxiety, depression and stress
Jones et al., unpublished	Self-help CBT anxiety management package based on "Stresspac"(printed); three sessions of unsupervised computer use plus relaxation tape and printed materials equivalent to Stresspac	RCT	Generalized Anxiety Disorder
Klein & Richards, 2001	Internet based cognitive therapy programme; one week of monitoring, one week of programme then one week of post intervention assessment. Programme included nature, effects and causes of panic and useful and non-useful ways of managing panic.	RCT	Panic disorder
Marks et al., unpublished	Self-exposure therapy (FearFighter) (FF), step-by-step personalized exposure programme with homework diaries, feedback on progress and trouble shooting advice	RCT	Panic disorder with agoraphobia or agoraphobia without panic, social phobia or specific phobia
Newman et al., 1997	CBT with palmtop computer; computer had diary and therapy components; computers were carried at all times and used whenever clients felt anxious or wanted to practise.	RCT	Panic disorder

Table 1. (Cont.)

Study	CCBT components (Package)	Study type	Patient population
Osgood-Hynes et al., 1998	Psychotherapy using 9 treatment booklets and 11 telephone calls to a computer aided Interactive Voice Response (IVR) system (COPE)/included constructive thinking, pleasant activities and assertive communication; individualized treatment recommendations and feedback	Open cohort trial	Mild to moderate depression, major depression and/or dysthymia
Proudfoot et al., unpublished	CBT (Beating the Blues); programme customized to patient's specific problems, each session built on the previous one.	Pilot study (beta-test)	Anxiety/depression
Proudfoot et al., 2003	CBT (Beating the Blues); same as described in Proudfoot (unpublished)	RCT	Anxiety, depression or phobias
Selmi et al., 1990	CBT; agenda setting, comparison of current and past weeks, discussion of the relationship between automatic thoughts and feelings, increasing mastery and pleasure in daily activities, techniques to control automatic thoughts and role of underlying beliefs in depression.	RCT	Major and minor depression
Shaw, Marks, & Toole, 1999	Self exposure and relaxation (FearFighter) (FF), (2 pilot tests); nine steps including principles of self-exposure, goal setting, rehearsing and rerating goals, anxiety management and relaxation	Cohort studies	Agoraphobia, claustrophobia and panic
Smith et al., 1997	Self exposure therapy using interactive animations; three versions of the same computer programme-1. relevant exposure with feedback, 2-relevant exposure no feedback and 3-irrelevant exposure with feedback	RCT	Spider phobia
White et al., 2001	CBT (based on Stresspac written materials); based on their on-line assessment computer recommended options from learning relaxation, controlling panic attacks and stressful thoughts, facing up to stress, sleep advice and coping with the future.	Pilot study	Anxiety disorder
Wright et al., (poster), 2001	CBT (Cognitive Therapy: a Multimedia Learning Program); core CBT concepts also included a handbook to use along with the software.	RCT	Major depression

**Table 2.** Study characteristics-RCTs

Study	Study quality	Co-therapy or medication	Comparator	Sample size	Outcomes	Instruments
Bowers et al., 1993	RCT; Jadad score: 2; randomized but no method described, description of dropouts.	All patients received antidepressant medication	Therapy delivered CBT (TCBT) and treatment as usual (TAU)(milieu therapy, occupational therapy, vocational rehabilitation, informal staff talks)	22 CCBT group: 6 TCBT group: 8 TAU group: 8	Depression ratings	BDI & HRSD
Ghosh et al., 1988	Blind assessors RCT; Jadad score: 1; randomly chosen but no description of method, no description of dropouts.	No psychotropic drugs in 2 weeks prior to trial entry	Book instructed exposure therapy (B group) and therapist instructed exposure therapy (T group). The computer group was C group	134 screened, of whom 119 were suitable, 35 refused treatment leaving 84 who accepted. 13 dropped out before completion leaving 71 patients: 19 in T group, 24 in B group and 28 in C group	Improvement in phobias	Fear Questionnaire, 2 phobic problems, 4 phobic targets, work and home adjustment and social and private leisure
Grime (dissertation), 2001	Blind assessor RCT; Jadad score: 3; randomized and appropriate method used, description of dropouts.	All participants continued with whatever care they were receiving	Conventional care including medication and counselling	48 recruited, 24 in each group	Anxiety and depression	HADS anxiety and depression scores, Attributional Style Questionnaire (ASQ)
Jones et al., unpublished	RCT; Jadad score: 2; randomized with appropriate method described.	Not reported	1) Printed Stresspac + 3 weekly appointments and relaxation tape 2) current care with GP	170 recruited and 119 completed follow-up Computer group: 121 Printed Stresspac: 24 Current care: 25	Anxiety depression and BSI general symptom index scores and clinically significant change	HADS Anxiety and Depression Scales, STAI, BSI

Table 2. (Cont.)

Study	Study quality	Co-therapy or medication	Comparator	Sample size	Outcomes	Instruments
Klein & Richards, 2001	RCT; Jadad score: 2; randomized, description of dropouts.	9 (41%) reported use of anxiety medication but no alteration in dosage levels. No contact with any mental health professional	Self-monitoring	Internet treatment group: 11 Self-monitoring group: 12	Panic frequency, anticipatory fear of panic, general anxiety levels, general depression levels, self-efficacy, body vigilance, anxiety sensitivity	Prime MD, Panic attack record form, daily record form, Self-Efficacy questionnaire, body vigilance scale, anxiety sensitivity index.
Marks et al., unpublished	RCT; Jadad score: 3; randomized and appropriate method described, dropouts described. Blinded assessors	Not on benzodiazepine or diazepam equivalent of > 5mg/d, no change in antidepressants in the last 4 weeks.	Clinician guided self-exposure (C) and computer and audiotape guided self-relaxation without exposure (R).	129 screened and 35 were unsuitable. Of the 94 eligible patients; 90 patients entered study FF: 35 C: 38 R: 17	Blind assessment and self ratings of phobia and/or panic	Main Problem and Goals, Global Phobia item on Fear Questionnaire (FQ) and Work/Social Adjustment scale (WSA)
Newman et al., 1997	RCT; Jadad score: 1; randomized trial but, method unclear, dropouts not described.	Anxiety medication taken by 2 clients in CCBT group and 2 clients in TCBT group.	Cognitive behavioural therapy with therapist (TCBT) (clients in this group also used the computer but in diary mode only)	20 clients identified, and 18 included (9 clients and 1 dropout per group)	Panic and treatment satisfaction	Treatment satisfaction measure. Fear Questionnaire Total Phobia Rating and Agoraphobia subscale, Mobility Inventory for Agoraphobia, Agoraphobic Cognitions Questionnaire, Body Sensations Questionnaire and number of panic attacks during the week previous to each assessment point.



Proudfoot et al., unpublished	RCT; Jadad score: 3; randomized and appropriate method described, description of dropouts	41% in treatment as usual group (TAU) and 42% of Beating the Blues group (BtB) were prescribed anti-depressant or anxiolytic medication. After randomization, 4 patients in the BtB group received counselling and 4 were subsequently prescribed anti-depressant medication.	TAU which included medication, discussion of problems with GP, provision of practical/ social help, referral to counsellor, practice nurse or mental health professionals or further physical investigation.	310 patients referred, 167 met inclusion criteria, 89 randomized to BtB and 78 to TAU	Depression, anxiety and work and social adjustment	Beck Depression Inventory II (BDI II), Beck Anxiety Inventory (BAI) and Work and Social Adjustment (WSA)
Selmi et al., 1990	RCT; Jadad score: 2; randomized but no method reported, description of dropouts	Not reported	Therapist administered CBT (TCBT) and waiting list control (WLC)	36 (12 in each group)	Depression	Beck Depression Inventory (BDI), Hamilton Rating Scale for Depression (HRS), SCL-90-R depression scale, SCL-90-R global symptoms scale, Automatic Thoughts Questionnaire (ATQ)
Smith et al., 1997	RCT; Jadad score: 2; Randomized trial with description of dropouts	No current anxiolytic medication	3 versions of the same computer programme were compared.	49 subjects met entry criteria. Of these 4 dropped out or were excluded and 45 were included in analysis (15 in each group)	Spider phobia severity	Spider Questionnaire (SPQ), Spider Questionnaire (SQ), Phobic Targets (PT), Work and Adjustment Rating Scales (WARS), Homework questionnaire (HW)-designed by the authors.
Wright et al., (poster), 2001	Jadad score: 1 randomized but no method described and no description of drop outs	All subjects were drug-free	Standard cognitive therapy or waiting list	45 (15 in each group)	Depression	BDI and Hamilton Rating Scale for Depression (HRSD)

**Table 3.** Study characteristics-non-RCTs

Study	Study quality	Co-therapy or medication	Comparator	Sample size	Outcomes	Instruments
Carr et al., 1988	Comparative study: partially randomized (computer group randomized); comparator, dropouts described.	Not reported	Exposure therapy with therapist	23 patients in computer group (first to complete formed sample), 20 in therapy group	Main fear, global phobia, total phobia, anxiety-depression (all self rated using a standardized Fear Questionnaire) phobic problems, phobic targets (clinician rated using standard assessment form).	Standardized Fear Questionnaire; clinician rated standard assessment form
Osgood-Hynes et al., 1998	Blind assessor Open cohort study; no comparator, description of dropouts, all measures self-rated.	Eight patients (20%) were on antidepressant medication, on a stable dose	None	41	Depression and Work and Social Adjustment scores	HAM-D, Patient Global Impression (PGI) of Improvement (computer administered) and the Work and Social Adjustment (WSA) Scale (computer administered)
Proudfoot et al., unpublished	Pilot study; No comparator, drop-outs clearly described.	Not currently receiving treatment from a psychiatrist, psychologist, counsellor, community psychiatric nurse, social worker or nurse for depression/anxiety	None	20	Improvement in anxiety and depression	Beck Depression Inventory II (BDI II), Beck Anxiety Inventory (BAI), Work and Social Adjustment Scale (WSA), Attributional Style Questionnaire (ASQ)
Shaw et al., 1999	Cohort studies: no comparator, description of dropouts.	Antidepressant medication remained the same	None	Pilot test 1: 17 Pilot test 2: 6	Improvement in phobia	Fear Questionnaire, Work and Social Adjustment Scale and Suicide Screen, rating of triggers
White et al., 2001	Pilot study: no comparator, description of dropouts.	Half were currently using anti-depressants, 8% beta-blockers and 12% benzodiazepines	None	33 entered into study, 26 completed treatment	Anxiety and depression	HAD Anxiety (HAD-A), HAD Depression (HAD-D), Brief Symptom Inventory–General Severity Index (BSI-GSI), Brief Symptom Inventory-Positive Symptom Total (BSI-PST). Beck Anxiety Inventory (BAI) and Beck Depression Inventories (BDI) were measured at each session.

**Table 4.** Results of reported outcomes (psychological symptoms and interpersonal and social functioning) RCTs

Study	Results				Conclusions	
Bowers et al., 1993	<i>Depression ratings (<math>\pm</math>SD)</i>				Only patients in the TCBT group improved. CCBT was no better than TAU.	
		<b>BDI</b>	<b>BDI</b>	<b>HRSD</b>		<b>HRSD</b>
		Pre-Tx	Post Tx	Pre-Tx		Post Tx
	TCBT	32.9 $\pm$ 12.8	9.0 $\pm$ 6.1*	20.3 $\pm$ 3.3		6.2 $\pm$ 2.2**
	CCBT	32.0 $\pm$ 11.2	16.8 $\pm$ 3.8*	23.2 $\pm$ 2.9		13.3 $\pm$ 5.1**
	TAU	29.6 $\pm$ 10.4	14.1 $\pm$ 5.2	21.1 $\pm$ 2.6	9.3 $\pm$ 3.7	
	*post treatment BDI scores differ at $p < .046$ , **post treatment HRSD scores differ at $p < .007$					
Ghosh et al., 1988	All 3 treatment groups improved significantly on all measures ( $p < .001$ ) by the end of treatment, this continued to 3 month follow-up and was maintained at 6 month follow-up.				All three groups improved although C group had most time with therapist.	
Grime (dissertation), 2001	<i>Mean <math>\pm</math> SD of unadjusted HADS depression scores and mean difference between groups adjusted for baseline depression scores</i>				This sample was not necessarily clinically depressed and the main outcome measure for the study was absenteeism. Although the BtB group had significant improvement on some scores at the end of treatment and one month later these were not significant at 3 and 6 months.	
	<b>CCBT</b>	<b>CC</b>	<b>AMD (95% CI)</b>	<i>p</i>		
	Tx end					
	5.38 $\pm$ 3.93 ( $n = 16$ )	8.61 $\pm$ 3.86 ( $n = 23$ )	-3.07 (-5.79-0.35)	0.028		
	1 month post treatment					
	5.00 $\pm$ 3.32 ( $n = 15$ )	8.53 $\pm$ 3.82 ( $n = 19$ )	-2.72 (-5.32-0.13)	0.04		
	Results at 3 and 6 months post treatment were not significant.					
	<i>Mean <math>\pm</math> SD of unadjusted HADS anxiety scores and mean difference between the groups adjusted for baseline anxiety scores.</i>					
	<b>CCBT</b>	<b>CC</b>	<b>AMD (95% CI)</b>	<i>p</i>		
	1 month post treatment					
8.20 $\pm$ 3.95 ( $n = 15$ )	12.00 $\pm$ 3.61 ( $n = 19$ )	-3.19 (-5.87-0.51)	0.021			
end of treatment and 3 and 6 months post treatment were not significant.						

Table 4. (Cont.)

Study	Results			Conclusions
	<i>Mean ± SD of unadjusted negative attributional style scores and mean difference between groups adjusted for baseline negative attributional style scores.</i>			
	<b>CCBT</b>	<b>CC</b>	<b>AMD (95% CI)</b>	<i>p</i>
	Tx end			
	12.09 ± 3.00 (n = 16)	14.71 ± 2.86 (n = 23)	-2.32 (-4.11-0.54)	0.012
	1 month post tx			
	12.75 ± 3.04 (n = 15)	14.87 ± 2.28 (n = 19)	-1.95 (-3.77-0.13)	0.037
	Results at 3 and 6 months were not significant			
	<i>Mean ± SD of unadjusted composite attributional style scores and mean difference between groups adjusted for baseline composite attributional style scores</i>			
	<b>CCBT</b>	<b>CC</b>	<b>AMD (95% CI)</b>	<i>p</i>
	Tx end			
	2.89 ± 3.68 (n = 46)	0.01 ± 2.92 (n = 23)	2.21 (0.11-4.30)	0.04
	Scores 1, 3 and 6 months post treatment were not significant. Positive attributional style scores were not significant at any time point. AMD = adjusted mean difference			
Jones et al., unpublished	Patients offered printed Stresspac (written treatment programme) showed a greater improvement than controls in HADS anxiety ( $p = .04$ ) and HADS depression ( $p = .01$ ) scores and in the BSI General Symptom Index (NS). No other results were significant.			Stresspac written material appeared more effective than computer based therapy. There were considerable problems with trial design and implementation.
Klein & Richards, 2001	<p><b>Panic frequency:</b> condition by time interaction <math>F(1, 19) = 12.63, p &lt; .01</math>; effect size 0.40, power 0.92. Significant decrease in panic frequency for tx group only <math>t(8) = -2.53, p &lt; .05</math>.</p> <p><b>Anticipatory fear of panic:</b> condition by time interaction <math>F(1, 19) = 12.26, p &lt; .01</math>; effect size 0.39, power 0.91. Significant decrease in treatment group only <math>t(8) = -3.30, p &lt; .05</math>.</p> <p><b>General anxiety:</b> condition by time interaction <math>F(1, 19) = 8.92, p &lt; .01</math>, effect size 0.32, power 0.81. Decrease for treatment group <math>t(8) = -2.68, p &lt; .05</math>.</p>			There were significant reductions in all outcome measures except anxiety sensitivity and depressive affect. This study had a very short follow-up period.

**General depression:** condition by time not significant

Self-efficacy: condition effect  $F(1, 19) = 13.52, p < .01$  with effect size of 0.42 and power of 0.94, time effect  $F(1, 19) = 9.08, p < .01$ , effect size 0.50, power 0.95, condition by time interaction  $F(1, 19) = 6.52, p < .05$ , effect size 0.26, power 0.68, significant increase for treatment group only  $t(8) = -2.92, p < .05$

**Body vigilance:** condition effect  $F(1, 19) = 4.94, p < .05$ , effect size 0.21, power 0.56, significant time effect  $F(1, 19) = 6.61, p < .01$ , effect size 0.42, power 0.86, condition by time interaction  $F(1, 19) = 7.91, p < .05$ , effect size 0.29, power 0.76. decrease for treatment group only  $t(8) = 4.27, p < .01$ .

**Anxiety sensitivity:**  $F(1, 19) = 7.46, p < .01$  for both groups together, effect size 0.28, power 0.74. No other comparisons statistically significant.

*Between group differences on main outcome measures (completers)*

**Pre treatment**

	FF ( <i>n</i> = 35)	C ( <i>n</i> = 38)	R ( <i>n</i> = 17)
<i>Self assessment</i>			
Main problem	7.2 ± 1.0	7.3 ± 1.0	7.1 ± 0.9
Goals	7.0 ± 1.1	7.0 ± 1.2	7.1 ± 1.2
FQ(GP)	5.4 ± 1.0	6.3 ± 1.4	6.7 ± 1.3
WSA total	15.7 ± 7.8	16.6 ± 9.0	15.2 ± 8.1
<i>Blind assessor</i>			
FQ (GP)	5.4 ± 1.0	5.6 ± 1.4	5.7 ± 1.1
WSA total	14.7 ± 3.9	16.8 ± 9.2	15.8 ± 7.6

**Post treatment**

	FF ( <i>n</i> = 20)	C ( <i>n</i> = 29)	R ( <i>n</i> = 16)
<i>Self assessment</i>			
Main problem			
	3.9 ± 2.0	3.6 ± 1.6	6.4 ± 1.4
Goals	2.9 ± 1.6	3.1 ± 1.7	6.7 ± 1.6
FQ (GP)	3.8 ± 2.3	3.3 ± 1.8	5.7 ± 1.9
WSA total	10.0 ± 10.5	11.8 ± 8.2	11.9 ± 7.7

Marks et al.,  
unpublished

Both clinician therapy group and FF group improved more than those in the relaxation group and the clinician group spent 73% more time with the clinician.

Table 4. (Cont.)

Study	Results			Conclusions
<i>Blind assessor</i>				
Main problem				
	3.1 ± 1.5	3.6 ± 1.3	5.8 ± 1.1	
Goals	2.9 ± 1.9	3.1 ± 1.7	6.8 ± 1.1	
FQ(GP)	3.1 ± 1.2	3.2 ± 1.3	5.3 ± 1.3	
WSA total	7.2 ± 5.8	10.0 ± 7.1	15.3 ± 7.1	
<b>1 month follow-up</b>				
	FF	C	R	
	(n = 19)	(n = 27)	(n = 14)	
<i>Self assessment</i>				
Main problem				
	3.2 ± 2.0	3.4 ± 1.5	6.5 ± 1.4	
Goals	2.3 ± 1.6	2.5 ± 1.5	6.7 ± 1.4	
FQ (GP)	3.1 ± 1.7	3.2 ± 1.6	5.7 ± 1.7	
WSA total	7.5 ± 7.8	9.4 ± 7.2	13.4 ± 9.4	
FQ (GP) = Fear Questionnaire Global Phobia, WSA = Work Social Adjustment Scale				
<b>Between group statistics</b>				
<i>Self assessment</i>				
Main problem	9.2	2,52	<0.001	
Goals	20.6	2,52	<0.001	
FQ (GP)	5.5	2,51	0.006	
WSA total	0.4	2,51	NS	
<i>Blind assessor</i>				
Main problem	17.9	2,60	<0.001	
Goals	31.0	2,61	<0.001	
FQ (GP)	7.1	2,55	0.002	
WSA total	4.2	2,55	0.019	

Effect sizes from pre to post treatment for TCBT and CCBT respectively of 3.6 and 3.9 (Main Problem), 3.3 and 3.9 (Goals), 2.8 and 1.7 (FQ Global Phobia self), 1.9 and 2.1 (FQ Global Phobia blind assessor) and 1.2 and 0.9 (WSA Total blind assessor).

Newman et al.,  
1997

<i>Mean (SD)</i>				
<b>Baseline</b>	<b>Post-test</b>	<b>Follow-up</b>	<b>F ratios for time effects (dfs)</b>	
<i>Mobility Inventory [Accompanied subscale]</i>				18.74* (2, 32)
TCBT				
2.39 (0.92)	1.44 (0.39)	1.47 (0.57)		
CCBT				
2.39 (0.93)	1.73 (0.89)	1.83 (0.95)		
<i>Mobility Inventory [Alone subscale]</i>				28.75* (2,32)
TCBT				
3.62 (0.71)	1.91 (0.82)	2.01 (0.98)		
CCBT				
2.64 (1.03)	1.82 (0.89)	2.01 (1.01)		
<i>Agoraphobic Cognitions Questionnaire</i>				10.54* (2,32)
TCBT				
37.67 (9.11)	28.78 (9.46)	26.00 (7.86)		
CCBT				
31.78 (10.68)	22.67 (6.14)	24.11 (7.10)		
<i>Panic attacks</i>				26.86* (2,30)
TCBT				
6.11 (3.92)	0.22 (0.67)	0.44 (0.73)		
CCBT				
6.11 (3.52)	1.56 (2.07)	0.38 (0.74)		
<i>Fear Questionnaire [Agoraphobic subscale]</i>				20.82* (2,30)
TCBT				
22.67 (7.95)	10.00 (6.71)	12.13 (9.40)		
CCBT				
16.00 (10.99)	7.56 (8.75)	8.00 (8.17)		
<i>Fear Questionnaire [Total Phobia Rating]</i>				36.02* (2,30)
TCBT				
56.44 (19.02)	25.67 (12.63)	26.22 (19.61)		
CCBT				
48.78 (22.24)	25.56 (23.23)	27.22 (24.34)		

At the end of treatment TCBT was superior to CCBT on some measures however there were no differences at follow-up.

Table 4. (Cont.)

Study	Results				Conclusions		
Proudfoot et al., 2003	<i>Body Sensations Questionnaire</i>			18.37* (2, 30)			
	TCBT						
	58.56 (9.18)	32.89 (15.67)	34.56 (13.25)				
	CCBT						
	52.89 (11.06)	34.78 (12.90)	39.89 (12.33)				
	* <i>p</i> < .0005						
	<i>Mean ± SD (n)</i>						
	<b>BDI</b>		<b>BtB</b>		<b>TAU</b>		
	Pre	25.38 ± 11.05 (53)			24.08 ± 9.78 (53)	35% of patients dropped out of the BtB group however those patients who remained in the BtB group had significant improvement at the end of treatment and maintained this at the end of the 6 month follow-up.	
	Post	12.04 ± 10.45 (47)			18.36 ± 12.65 (50)		
	1 month	12.50 ± 12.33 (48)			16.10 ± 11.99 (39)		
	3 months	9.00 ± 9.22 (37)			14.29 ± 11.66 (38)		
	6 months	9.61 ± 10.06 (44)			16.07 ± 13.06 (42)		
	<b>BAI</b>						
	Pre	18.33 ± 9.61 (51)			19.39 ± 9.72 (51)		
	Post	10.19 ± 8.92 (43)			14.82 ± 11.57 (44)		
	1 month	10.37 ± 8.64 (41)			12.06 ± 9.98 (36)		
	3 months	8.82 ± 9.36 (33)			11.1 ± 8.46 (37)		
	6 months	8.73 ± 7.66 (40)			11.32 ± 9.61 (38)		
<b>WSA</b>							
Pre	19.89 ± 9.29 (54)			18.46 ± 8.25 (52)			
Post	12.21 ± 8.00 (48)			14.82 ± 9.54 (50)			
1 month	12.02 ± 9.43 (48)			14.54 ± 10.00 (39)			
3 months	10.16 ± 8.59 (44)			12.21 ± 8.94 (39)			
6 months	9.11 ± 8.97 (45)			12.10 ± 10.11 (42)			
Selmi et al., 1990	Before Tx	After Tx	ES	Follow-up	ES	Both treatment groups improved significantly more than the control group.	
	<b>BDI*</b>						
	CCBT						
	21.42 ± 3.96	10.33 ± 5.18	-0.88	6.17 ± 5.57	-1.47		
	TCBT						
23.18 ± 7.19	11.64 ± 8.20	-0.74	8.27 ± 8.84	-1.25			



WLC				
22.92 ± 5.02	18.50 ± 9.32		20.67 ± 9.89	
<b>HRS*</b>				
CCBT				
14.33 ± 4.01	5.83 ± 2.62	-1.96	4.92 ± 2.31	-1.42
TCBT				
15.09 ± 4.55	6.36 ± 4.08	-1.58	4.54 ± 2.66	-1.47
WLC				
15.57 ± 5.00	13.83 ± 4.74		14.50 ± 6.76	
<b>SCL-90-R Depression<sup>†</sup></b>				
CCBT				
1.76 ± 0.61	1.11 ± 0.72	-0.71	0.73 ± 0.57	-1.21
TCBT				
1.91 ± 0.63	1.16 ± 0.54	-0.64	0.89 ± 0.80	-1.05
WLC				
1.98 ± 0.55	1.65 ± 0.76		1.92 ± 0.98	
<b>SCL-90-R Global<sup>†</sup></b>				
CCBT				
1.10 ± 0.31	0.67 ± 0.38	-0.45	0.49 ± 0.31	-1.11
TCBT				
1.02 ± 0.48	0.66 ± 0.33	-0.43	0.53 ± 0.48	-1.02
WLC				
1.03 ± 0.34	0.85 ± 0.40		0.98 ± 0.44	
<b>ATQ*</b>				
CCBT				
78.75 ± 20.27	54.33 ± 18.03-0.91		49.08 ± 16.72	-1.20
TCBT				
90.73 ± 25.20	62.73 ± 23.53-0.65		50.64 ± 19.95	-1.15
WLC				
82.08 ± 17.30	84.17 ± 32.73		85.33 ± 30.23	

Effect sizes (ES) based on control group means and standard deviations after tx or at follow-up. \*scores of 2 groups given therapy significantly different at post tx and follow-up from control group ( $p < .05$ ). <sup>†</sup>two groups given therapy were significantly different at follow-up from control group scores ( $p < .05$ ).

Table 4. (Cont.)

Study	Results	Conclusions																																																								
Smith et al., 1997	<p>Subjects in each group fell pre test to post test and further at follow up on both the SPQ <math>F(2,70) = 23.0, p &lt; .0001</math> and SQ <math>F(2,70) = 27.7, p &lt; .0001</math>. Ratings of phobic problem and four phobic targets all showed significant reduction (<math>p &lt; .001</math> for all). The WARS rating of general morbidity also showed a significant fall (<math>p &lt; .001</math>). No significant main effects or interactions between the treatment groups on these outcome measures.</p> <p>On the Homework Questionnaire, subjects in the relevant exposure, no feedback group reported fewer new activities than the other groups but the effect was not significant. Number of new homework activities correlated significantly with clinical improvement according to the SPQ (<math>r = -0.441, p &lt; .01</math>) but not the SQ or problem and target ratings.</p>	All groups showed significant improvement																																																								
Wright et al., (poster), 2001	<p><i>Mean BDI and HRSD scores in Treatment Completers, acute treatment phase data</i> (13 patients completed treatment in TCBT and CCBT groups each and 14 in waiting list control group).</p> <p><b>BDI</b></p> <table border="1" data-bbox="414 642 1352 846"> <thead> <tr> <th>Pre Tx</th> <th>4 wks</th> <th>8 wks</th> <th>significance</th> </tr> </thead> <tbody> <tr> <td>TCBT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>24.8</td> <td>16.1</td> <td>9.5</td> <td>.000</td> </tr> <tr> <td>CCBT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>30.4</td> <td>20.2</td> <td>11.4</td> <td>.000</td> </tr> <tr> <td>Waiting List</td> <td></td> <td></td> <td></td> </tr> <tr> <td>32.6</td> <td>27.1</td> <td>27.4</td> <td>.01</td> </tr> </tbody> </table> <p>No significant differences were found between TCBT and CCBT on repeated measures ANOVA. Both active treatments were superior to waiting list (TCBT vs WLC <math>p = .001</math>, CCBT vs WLC <math>p = .000</math>)</p> <p><b>HRSD</b></p> <table border="1" data-bbox="414 964 1352 1135"> <thead> <tr> <th>Pre Tx</th> <th>4 wks</th> <th>8 wks</th> <th>significance</th> </tr> </thead> <tbody> <tr> <td>TCBT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>17.5</td> <td>13.7</td> <td>9.2</td> <td>.000</td> </tr> <tr> <td>CCBT</td> <td></td> <td></td> <td></td> </tr> <tr> <td>16.8</td> <td>12.5</td> <td>9.5</td> <td>.001</td> </tr> <tr> <td>Waiting List</td> <td></td> <td></td> <td></td> </tr> <tr> <td>20.0</td> <td>18.3</td> <td>17.9</td> <td>.20 (NS)</td> </tr> </tbody> </table> <p>No significant differences were found between TCBT and CCBT on a repeated measures ANOVA. Both active treatments were superior to WL (TCBT vs WLC <math>p = .01</math>; CCBT vs WLC <math>p = .02</math>)</p>	Pre Tx	4 wks	8 wks	significance	TCBT				24.8	16.1	9.5	.000	CCBT				30.4	20.2	11.4	.000	Waiting List				32.6	27.1	27.4	.01	Pre Tx	4 wks	8 wks	significance	TCBT				17.5	13.7	9.2	.000	CCBT				16.8	12.5	9.5	.001	Waiting List				20.0	18.3	17.9	.20 (NS)	Both the TCBT and the CCBT groups showed significant improvement from baseline and the CCBT group used significantly less therapist time.
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**Table 5.** Results of reported outcomes (psychological symptoms and interpersonal and social functioning) non-RCTs

Study	Results	Conclusions																																
Carr et al., 1988	<p>At the end of treatment both groups had improved significantly on all six measures (<math>p &lt; .001</math>). Main Fear, Global Phobia, and Anxiety/depression: both groups showed similar improvement. With regard to the clinician rated scales, Phobic Problems and Phobic Targets, the therapist group had better outcomes (<math>p &lt; .05</math>). In the self rated Total Phobia score the therapist group also did better (<math>p = .05</math>).</p> <p>80% of computer group and 75% of therapist group reduced their Main Fear score by half or less of its initial value.</p> <p>At six month follow-up improvement was maintained equally in both groups.</p>	<p>Both treatments were effective but the T group did significantly better on the clinician scales</p>																																
Osgood-Hynes et al., 1998	<p><b>HAM-D Scores: Mean (SD) (two-tailed dependent sample t test)</b></p> <table border="1" data-bbox="395 497 1099 609"> <thead> <tr> <th>N</th> <th>Baseline</th> <th>Week 12</th> <th>p</th> <th>Responders</th> </tr> </thead> <tbody> <tr> <td>ITT</td> <td>18.9 ± 6.0</td> <td>11.1 ± 8.2</td> <td>.001</td> <td>20 (49%)</td> </tr> <tr> <td>Completers</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>28</td> <td>18.3 ± 4.6</td> <td>8.8 ± 7.6</td> <td>.001</td> <td>18 (64%)</td> </tr> </tbody> </table> <p><b>PGI Scores</b></p> <table border="1" data-bbox="395 642 1014 754"> <thead> <tr> <th>N</th> <th>Week 12</th> <th>Responders</th> </tr> </thead> <tbody> <tr> <td>ITT</td> <td>2.5 ± 1.3</td> <td>19 (46%)</td> </tr> <tr> <td>Completers</td> <td></td> <td></td> </tr> <tr> <td>28</td> <td>2.1 ± 1.2</td> <td>18 (64%)</td> </tr> </tbody> </table> <p>PGI responders had a score of 1 (very much improved) or 2 (much improved) by week 12.</p> <p><b>WSA Scores</b></p> <p>WSA scores improved significantly in each of the 5 domains (work, home, social leisure, private leisure, family) at 12 weeks from baseline.</p>	N	Baseline	Week 12	p	Responders	ITT	18.9 ± 6.0	11.1 ± 8.2	.001	20 (49%)	Completers					28	18.3 ± 4.6	8.8 ± 7.6	.001	18 (64%)	N	Week 12	Responders	ITT	2.5 ± 1.3	19 (46%)	Completers			28	2.1 ± 1.2	18 (64%)	<p>There was a significant improvement in patients using the COPE system although there was no comparison group. 68% of calls were made outside office hours.</p>
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Proudfoot et al., unpublished	<p>Analysis on 11 completers only. There was clinically significant improvement in BDI scores (20.0 pre-treatment to 13.1 post-treatment) (NS). Statistically significant improvement for the private leisure component of the WSA and the ASQ instruments only. All other outcomes were not statistically significant improvement.</p>	<p>This was a preliminary study with a small sample size using an accelerated method of delivery. There was an improvement in depression and attributional style and private leisure but the length of follow-up is not reported.</p>																																

Table 5. (Cont.)

Study	Results	Conclusions																																
Shaw et al., 1999	<p><b>Pilot test 1:</b> Two patients rated themselves as much improved on some measures against contrary clinical impressions. Another two rated themselves as worse yet they seemed better clinically. Patients had difficulties with the rating scales. Post treatment scores are not reported.</p> <p><i>Clinical improvement</i></p> <p>Marked improvement in 2 patients, moderate in 4, slight in 3 and non-existent in 6 patients.</p> <p><b>Pilot test 2:</b> 3 reduced their total phobia (fear questionnaire) scores, global phobia, agoraphobia and anxiety-depression. Fear and avoidance of all triggers were reduced (range 100% down to 12.5%, mean percentage reductions: 94%, 35%, 26%).</p>	<p>Completion rates for this study were low. The outcome measures were not reported in pilot test 1 due to difficulties with patient reporting and completion.</p>																																
White et al., 2000	<p><i>Mean (SD) Scores</i></p> <table border="1" data-bbox="395 694 1103 892"> <thead> <tr> <th></th> <th><b>HAD-A</b></th> <th><b>HAD-D</b></th> <th><b>BSI-GSI</b></th> <th><b>BSI-PST</b></th> </tr> </thead> <tbody> <tr> <td>Pre-therapy (<math>n = 26</math>)</td> <td>15.4 ± 2.19</td> <td>11.51 ± 3.24</td> <td>2.05 ± 0.49</td> <td>45.9 ± 10.02</td> </tr> <tr> <td>Post-therapy (<math>n = 25</math>)</td> <td>12.56 ± 2.8</td> <td>9 ± 3.7</td> <td>1.57 ± 0.47</td> <td>36.9 ± 11.5</td> </tr> <tr> <td>6 month follow-up (<math>n = 21</math>)</td> <td>9.19 ± 2.8</td> <td>6.76 ± 2.8</td> <td>1.24 ± 0.48</td> <td>31.8 ± 8.7</td> </tr> </tbody> </table> <p>Newman-Keuls tests showed significant differences on all measures between pre-therapy and follow-up and between post-therapy and follow-up (<math>p &lt; .05</math>).</p> <table border="1" data-bbox="395 958 921 1069"> <thead> <tr> <th></th> <th><b>BAI</b></th> <th><b>BDI</b></th> </tr> </thead> <tbody> <tr> <td>Session 1 (<math>n = 26</math>)</td> <td>28.2 ± 12.2</td> <td>22.3 ± 11.1</td> </tr> <tr> <td>Session 2 (<math>n = 26</math>)</td> <td>25.8 ± 11.4</td> <td>19.2 ± 10.1</td> </tr> <tr> <td>Session 3 (<math>n = 14</math>)</td> <td>29.5 ± 10.3</td> <td>22.8 ± 10</td> </tr> </tbody> </table> <p>BDI showed significant change between session 1 and 3, no significant change was found for BAI.</p>		<b>HAD-A</b>	<b>HAD-D</b>	<b>BSI-GSI</b>	<b>BSI-PST</b>	Pre-therapy ( $n = 26$ )	15.4 ± 2.19	11.51 ± 3.24	2.05 ± 0.49	45.9 ± 10.02	Post-therapy ( $n = 25$ )	12.56 ± 2.8	9 ± 3.7	1.57 ± 0.47	36.9 ± 11.5	6 month follow-up ( $n = 21$ )	9.19 ± 2.8	6.76 ± 2.8	1.24 ± 0.48	31.8 ± 8.7		<b>BAI</b>	<b>BDI</b>	Session 1 ( $n = 26$ )	28.2 ± 12.2	22.3 ± 11.1	Session 2 ( $n = 26$ )	25.8 ± 11.4	19.2 ± 10.1	Session 3 ( $n = 14$ )	29.5 ± 10.3	22.8 ± 10	<p>The process measures (BAI &amp; BDI) did not show improvement but HAD anxiety and depression, BSI-GSI and BSI-PST outcome measures did show improvement.</p>
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unpublished studies awaiting peer review. With regard to the quality of the five non-RCTs, only one (Carr et al., 1988) used a comparator.

### *Patient populations*

There was some overlap between studies with regard to patient population in that some studies included more than one patient group. Five of the 11 RCTS included patients with depression (Bowers et al., 1993; Grime, 2001; Proudfoot et al., 2003; Selmi, Klein, Greist, Sorrell, & Erdman, 1990; Wright et al., 2001). Of these, one (Bowers et al., 1993) showed TCBT to be more effective than CCBT although this was in an inpatient population. One (Grime, 2001) found CCBT to be no more effective than TAU, although this population was not clinically depressed and the primary outcome measure was absenteeism from work. Two RCTs (Selmi et al., 1990, Wright et al., 2001) of patients with depression found CCBT to be as effective as TCBT. One RCT (Proudfoot et al., 2003) found CCBT to be more effective than TAU.

Five RCTs included patients with anxiety or panic (Grime, 2001; Jones et al., unpublished; Klein & Richards, 2001; Newman et al., 1997 and Proudfoot et al., 2003). One study (Grime, 2001) found no difference between CCBT and TAU, although again in this study the population was not clinically depressed. One study (Jones et al., unpublished) found bibliotherapy to be more effective than CCBT or TAU. Two studies (Klein & Richards, 2001, Proudfoot et al., 2003) found CCBT to be more effective than TAU and one study (Newman et al., 1997) found no difference between TCBT and CCBT at follow-up.

Two RCTs included patients with phobias (Ghosh et al., 1988, Marks et al., unpublished). Both of these studies found CCBT to be as effective as TCBT and of these, one (Ghosh et al., 1988) also found bibliotherapy to be effective.

### *Therapist time*

Table 6 shows the amount of therapist time reported by the studies. A wide range of therapist time was reported by the studies with five studies (Bowers et al., 1993; Grime, 2001; Proudfoot et al., unpublished; Smith, Kirkby, Montgomery, & Daniels, 1997; White, Jones, & McGarry, 2000) giving no information at all with regard to therapist time. Five reported only the use of an interview, assessment or technical support (Jones et al., unpublished; Klein & Richards, 2001; Osgood-Hynes et al., 1998; Selmi et al., 1990; Shaw, Marks, & Toole, 1999). The four studies reporting actual therapist times (Carr et al., 1988; Marks et al., unpublished; Newman et al., 1997; Wright et al., 2001) showed a marked reduction in therapist time for the computer group. One study (Ghosh et al., 1988) reported more therapist time for the CCBT group than for the TCBT group. Finally, one study (Proudfoot et al., 2003) reported a total of 45 minutes for the computer group but no information on therapist time for the TAU group (which did include counselling and psychotherapy for some patients).

### *Comparators*

Five studies showed CCBT to be equally effective to TCBT (Ghosh et al., 1988; Marks et al., unpublished; Newman et al., 1997; Selmi et al., 1990; Wright et al., 2001). One study found TCBT to be more effective than CCBT (Bowers, 1993) although this study took place among depressed hospital inpatients. Four studies found CCBT to be more effective than TAU (Klein

**Table 6.** Therapist time

Study	CCBT group	Comparator
Bowers, 1993	Not reported	Not reported
Carr, 1988	40 minutes	11.5 hours for therapist group
Ghosh, 1988	4.7 hours	4.6 hours for therapist group and 1.5 hours for book group
Grime, 2001	Not reported	Not reported
Jones, unpublished	1 initial interview	3 short appointments at weekly intervals to check progress for book group. In current care group patients continued with GP visits as usual.
Klein & Richards, 2001	Initial interview treatment phase and monitoring of usage	Initial interview treatment phase and monitoring of usage
Marks, unpublished	Up to 20 minutes/session = maximum of 120 minutes; mean 76 ± 43 minutes	Therapist led was 283 ± 118 minutes and the relaxation group was 76 ± 22 minutes
Newman, 1997	6 hours	12 hours for therapist group
Osgood-Hynes, 1998	Assessment only	No comparator
Proudfoot, unpublished	Not reported	No comparator
Proudfoot, 2003	5 minutes at the beginning and end of each session = maximum 90 minutes	Not reported
Selmi, 1990	Not reported, "minimal contact"	Therapist group had six sessions of therapy.
Shaw, 1999	Technical support only, assessment at end	No comparator
Smith, 1997	Not reported	Not reported
White, 2001	Not reported	No comparator
Wright, 2001	4.2 hours	7.5 hours

& Richards, 2001; Proudfoot et al., 2003; Selmi et al., 1990; Wright et al., 2001) while one study found CCBT to be no more effective than TAU (Bowers et al., 1993) and one found CCBT to be no more effective than TAU at 3 and 6 months post-treatment (Grime, 2001). Two studies compared CCBT with bibliotherapy (Ghosh et al., 1988; Jones et al., unpublished). One of these found CCBT to be as effective as bibliotherapy (Ghosh et al., 1998) and one found bibliotherapy to be significantly more effective than CCBT (Jones et al., unpublished) on some outcome measures. One RCT compared three variations of the same exposure therapy computer programme (changing only the type of exposure and feedback) (Smith et al., 1997).

*Patient preference, satisfaction and acceptability*

Four of the 16 studies reported no information regarding patient preference, satisfaction and acceptability of treatment (Klein & Richards, 2001; Proudfoot et al., 2003; Smith et al., 1997; Wright et al., 2001). In the six studies (Marks et al., unpublished; Osgood-Hynes et al., 1998; Proudfoot, unpublished; Selmi et al., 1990; Shaw et al., 1999; White et al., 2000) reporting detailed information on patient preference the computer programmes were generally held in a positive light. However, four studies did report that patients in the therapist group were more satisfied (Bowers et al., 1993; Ghosh et al., 1988; Grime, 2001; Selmi et al., 1990).

*Quality of life*

No information for quality of life outcomes was reported in the 16 studies reviewed.

**Discussion**

In this review 16 studies of CCBT were identified. Of these, 11 were RCTs of variable quality. The results show that, although there is some evidence that CCBT may be as effective as TCBT and better than TAU, the evidence is by no means conclusive. There is evidence that the use of CCBT results in reduction of therapist time in comparison with TCBT. As not all studies used the same patient groups, computer programmes or outcome measures it is difficult to make direct comparisons between them or to undertake quantitative synthesis using meta-analysis.

From the results of this review, it is apparent that several methodological deficiencies are associated with these studies and that the research currently available is limited. Therefore we make three recommendations to improve the quality of future research in this area, and suggest four areas requiring further research.

As most patients with anxiety, depression and phobias are treated within the primary care setting, studies need to be conducted here and include patients with co-morbidities as they are frequently seen by General Practitioners. This will improve the applicability of research evidence to routine health service settings.

Understandably, much research on CCBT has been conducted by enthusiasts for the method or by those who have played a major role in developing the products. Although there is no reason to suggest that such research is itself of poorer quality, there is enough evidence of a systematic impact of allegiance to a therapy method on the findings of trials (Luborsky et al., 1999) to recommend that independent studies be conducted. Researchers involved in CCBT research may have conflicts of interest, particularly financial ones, and this must be considered in the design of CCBT trials. The outcomes studied in the research reviewed here were of symptomatic improvement rather than of quality of life gains, subjective well being or improved functioning. Future research should consider including these.

We suggest five key areas requiring further research. It would be helpful to establish the level of therapist involvement needed to produce optimal outcomes when using CCBT programmes. Second, the position of CCBT within stepped care programmes needs to be identified as well as its relationship to other efforts to increase access to CBT and other psychological therapies. Third, research is needed to compare CCBT to other therapies that reduce therapist time, in particular bibliotherapy. Fourth, given the evidence that a proportion of patients drop out of CCBT, qualitative studies of service users' experiences of and attitudes to CCBT would be illuminating. Finally, more research is needed to determine the cost effectiveness of CCBT,

taking into account the costs of the commercial packages as well as the cost of professional support required.

### References

- BOWERS, W., STUART, S., & MACFARLANE, R. (1993). Use of computer-administered cognitive-behavior therapy with depressed patients. *Depression, 1*, 294–299.
- CARR, A. C., GHOSH, A., & MARKS, I. M. (1988). Computer-supervised exposure treatment for phobias. *Canadian Journal of Psychiatry – Revue Canadienne de Psychiatrie, 33*, 112–117.
- DEPARTMENT OF HEALTH (1996). *A review of strategic policy on NHS psychotherapy services in England. Recommendation 1.7*. London: NHS Executive.
- DEPARTMENT OF HEALTH (2001). *Treatment choice in psychological therapies and counselling. Evidence-based clinical practice guideline*. London: DOH.
- GHOSH, A., MARKS, I. M., & CARR, A. C. (1988). Therapist contact and outcome of self-exposure treatment for phobias. A controlled study. *British Journal of Psychiatry, 152*, 234–238.
- GRIME, P. R. (2001). *An open, randomized study, to compare the effects of a computerized cognitive behavioural therapy programme (“Beating the Blues”) plus conventional care, vs. conventional care alone, on absence from work due to anxiety, depression or stress*. Dissertation submitted for Membership of the Faculty of Occupational Medicine of the Royal College of Physicians.
- JADAD, A. J., MOORE, A., CARROLL, D., JENKINSON, C., REYNOLDS, D. J. M., GAVAGHAN, D. J., & MCQUAY, H. J. (1996). Assessing the quality of reports of randomized clinical trials: Is blinding necessary? *Controlled Clinical Trials, 17*, 1–12.
- JONES, R., WHITE, J., KAMARZAMAN, Z., NAVEN, L., & MORTON, R. et al. (unpublished). Cognitive behavioural computer therapy for anxiety: Difficulties in carrying out a randomized trial and lessons learned.
- KALTENTHALER, E., SHACKLEY, P., STEVENS, K., BEVERLEY, C., PARRY, G., & CHILCOTT, J. (2002). A systematic review and economic evaluation of computerized cognitive behaviour therapy for depression and anxiety. *Health Technology Assessment, 6*, 22.
- KATON, W., VON KORFF, M., LIN, E., WALKER, E., SIMON, G., & BUSH, T. (1999). Collaborative management to achieve treatment guidelines: Impact on depression in primary care. *JAMA, 273*, 1026–1031.
- KLEIN, B., & RICHARDS, J. C. (2001). A brief internet-based treatment for panic disorder. *Behavioural and Cognitive Psychotherapy, 29*, 113–117.
- LEVINE, M., WALTER, S., LEE, H., HAINES, T., HOLBROOK, A., & MOYER, V. (1994). How to use an article about harm. *JAMA, 271*, 1615–1619.
- LUBORSKY, L., DIGUER, L., SELIGMAN, D. A., ROSENTHAL, R., KRAUS, E. D., JOHNSON, S., HALPERIN, G., BISHOP, M., BERMAN, J. S., & SCHWEIZER, E. (1999). The researcher’s own therapy allegiances: A “wild card” in comparisons of treatment efficacy. *Clinical Psychology – Science and Practice, 6*, 95–106.
- LEWIS, G., ANDERSON, L., ARAYA, R., ELGIE, R., HARRISON, G., PROUDFOOT, J., SCHMIDT, U., SHARP, D., WEIGHTMAN, A., & WILLIAMS, C. (2003). Self-help interventions for mental health problems. Report to the Department of Health R&D Programme. Summary at: [www.nimhe.org.uk/expertbriefings](http://www.nimhe.org.uk/expertbriefings).
- LOVELL, K., & RICHARDS, D. (2000). Multiple access points and levels of entry (MAPLE): Ensuring choice, accessibility and equity for CBT services. *Behavioural and Cognitive Psychotherapy, 28*, 379–391.
- MARKS, I. M., KENWRIGHT, M., MCDONOUGH, M., WHITTAKER, M., O’BRIEN, T., & MATAIZ-COLS, D. (unpublished). Randomized controlled trial of computer-guided self-help for panic/phobic disorder: Hope for cutting waiting lists?



- NEWMAN, M. G., KENARDY, J., HERMAN, S., & TAYLOR, C. B. (1997). Comparison of palmtop-computer-assisted brief cognitive-behavioral treatment to cognitive-behavioral treatment for panic disorder. *Journal of Consulting and Clinical Psychology*, *65*, 178–183.
- NATIONAL INSTITUTE OF CLINICAL EXCELLENCE (NICE) (2002). Guidance on the use of computerized cognitive behaviour therapy for anxiety and depression. *Technology Appraisal*, *51*, October. [http://www.nice.org.uk/pdf/51\\_CCBT\\_Full\\_guidance.pdf](http://www.nice.org.uk/pdf/51_CCBT_Full_guidance.pdf).
- OSGOOD-HYNES, D. J., GREIST, J. H., MARKS, I. M., BAER, L., HENEMAN, S. W., WENZEL, K. W., MANZO, P. A., PARKIN, J. R., SPIERINGS, C. J., DOTTL, S. L., & VITSE, H. M. (1998). Self-administered psychotherapy for depression using a telephone-accessed computer system plus booklets: An open US-UK study. *Journal of Clinical Psychiatry*, *59*, 358–365.
- PROUDFOOT, J., GOLDBERG, D., MANN, A., EVERITT, B., MARKS, I., & GRAY, A. J. (2003). Computerized, interactive, multimedia cognitive behavioural therapy reduces anxiety and depression in general practice: A randomized controlled trial. *Psychological Medicine*, *33*, 217–227.
- PROUDFOOT, J., SWAIN, S., WIDMER, S., WATKINS, E., & GOLDBERG, D. et al. (unpublished). The development and beta-test of a computer-therapy program for anxiety and depression: Hurdles and preliminary outcomes.
- SELMI, P. M., KLEIN, M. H., GREIST, J. H., SORRELL, S. P., & ERDMAN, H. P. (1990). Computer-administered cognitive-behavioral therapy for depression. *American Journal of Psychiatry*, *147*, 51–56.
- SHAW, S. C., MARKS, I. M., & TOOLE, S. (1999). Lessons from pilot tests of computer self-help for agora/claustraphobia and panic. *MD Computing*, *16*, 44–48.
- SMITH, K. L., KIRKBY, K. C., MONTGOMERY, I. M., & DANIELS, B. A. (1997). Computer-delivered modeling of exposure for spider phobia: Relevant versus irrelevant exposure. *Journal of Anxiety Disorders*, *11*, 489–497.
- WHITE, J., JONES, R., & MCGARRY, E. (2000). Cognitive behavioural computer therapy for the anxiety disorders: A pilot study. *Journal of Mental Health UK*, *9*, 505–516.
- WRIGHT, J. H., WRIGHT, A. S., BASCO, M. R., ALBANO, A. M., & RAFFIELD, T. (2001). *Controlled trial of computer-assisted cognitive therapy for depression. 2001*, Poster presented at the World Congress of Cognitive Therapy, Vancouver, Canada, July.