

Saving clinicians' time by delegating routine aspects of therapy to a computer: a randomized controlled trial in phobia/panic disorder

I. M. MARKS,¹ M. KENWRIGHT, M. McDONOUGH, M. WHITTAKER
AND D. MATAIX-COLS

From the Department of Psychological Medicine, Imperial College School of Medicine and Institute of Psychiatry, King's College London and South London and Maudsley Trust, London

ABSTRACT

Background. The demand for time-consuming psychotherapy of phobia/panic exceeds the supply of trained therapists. Delegating routine therapy aspects to a computer might ease this problem.

Method. Ninety-three out-patients with phobia or panic disorder were randomized in a 2 : 2 : 1 ratio to have self-exposure therapy guided either mainly by a stand-alone computer system (*FearFighter*) or entirely face-to-face by a clinician, or to have mainly computer-guided self-relaxation as a placebo. Both computer groups (*FearFighter* and relaxation) had brief back-up advice from a clinician. Primary outcome measures were self- and blind-assessor ratings of Main Problem and Goals, and Global Phobia.

Results. Drop-outs occurred significantly more often in the two self-exposure groups (43% if mainly computer-guided, 24% if entirely clinician-guided) than with self-relaxation (6%); the difference between the two self-exposure groups was not significant. Even with all drop-outs included, the mainly computer-guided exposure group and the relaxation group had 73% less clinician time per patient than did the entirely clinician-guided exposure group. The two self-exposure groups had comparable improvement and satisfaction at post-treatment and at 1-month follow-up, while relaxation was ineffective. Mean improvement on the primary outcome measures (self- and assessor-rated) was 46% computer, 49% clinician, 9% relaxation at post-treatment (week 10) and 58% computer, 53% clinician and -4% relaxation at 1-month follow-up (week 14). Mean effect sizes on the primary outcome measures were 2.9 computer, 3.5 clinician and 0.5 relaxation at post-treatment; and 3.7 computer, 3.5 clinician and 0.5 relaxation at 1-month follow-up. The assessor did not rate patients at follow-up.

Conclusions. Despite its (non-significantly) higher dropout rate, self-exposure therapy for panic/phobia cut clinician time per patient by 73% without losing efficacy when guided mainly by a computer rather than entirely by a clinician. The finding needs confirmation at a follow-up that is longer and includes a blind assessor. Self-relaxation had the highest rate of completers but was ineffective.

INTRODUCTION

In the course of their lives one in nine people have a phobic/panic disorder that is often disabling, and they use many primary and other

health care resources (Croft Jeffreys & Wilkinson, 1989; Bebbington *et al.* 2000). Sufferers usually improve lastingly with exposure therapy, yet most go untreated (Marks, 1987; Bebbington *et al.* 2000). Trained therapists are scarce and waiting-lists are long. Further hurdles are distance from clinics, inconvenience

¹ Address for correspondence: Professor Isaac Marks, 43 Dulwich Common, London SE21 7EU.

of session times, and fear of stigma from a mental health referral. Access might be eased by computer aids to therapy (Marks *et al.* 1998).

In open studies of 81 phobia/panic patients in all, computer-aided self-exposure saved two-thirds of clinician time without impairing improvement (Shaw *et al.* 1999; Kenwright *et al.* 2001; Marks *et al.* 2003). The present randomized controlled trial (RCT) for phobia/panic tested two hypotheses. The first tested whether per-patient time from a clinician could be saved without impairing efficacy in a comparison of self-exposure therapy guided mainly by a computer (*FearFighter* – F) with similar therapy guided entirely by a clinician in a face-to-face interview (C). The second hypothesis tested whether self-exposure therapy would be more effective than placebo self-relaxation (R) guided mainly by computer.

A RCT design was chosen to control for: (a) a placebo effect from using a computer with brief support from a therapist; (b) emphasis on self-treatment; (c) time spent interacting with a computer system; (d) time spent with a therapist; (e) number of sessions; (f) number of weeks of treatment; and (g) homework and diary keeping; and to have (h) masked randomization; and (i) blind assessors.

METHOD

Protocol

Out-patients were referred by health professionals to Professor Marks's Behavioural Psychotherapy Unit, Maudsley Hospital, or answered notices in GP practices or phobia self-help groups. They were screened in a 25-min semi-structured interview to confirm a phobia/panic diagnosis via a checklist of relevant DSM-IV criteria. Entry criteria were: DSM-IV (APA, 1994) agoraphobia without panic disorder, panic disorder with agoraphobia, social phobia, or simple phobia; rating of ≥ 4 on the Global Phobia scale of the Fear Questionnaire (Marks & Mathews, 1979); informed written consent; no active psychotic illness, suicidal depression or disabling cardiac or respiratory disease; not on a benzodiazepine or a diazepam-equivalent dose of > 5 mg/day; not on > 21 units (men) or > 14 units (women) of alcohol a week; had not begun or changed dose or type of antidepressant medication within the last 4 weeks.

The study protocol was approved by the Maudsley Ethics Committee. Immediately after being screened and having a complete description of the study, suitable patients signed written informed consent prior to randomization.

Randomization

This was masked. At the end of the screening interview the screening clinician obtained the patient's randomization by asking the unit administrator to open the next opaque, sealed envelope from one of three sets (one per phobia type) based on a computer-generated set of random numbers.

Suitable patients were randomized to one of three treatment groups in a 2F:2C:1R ratio (F, mainly stand-alone computer-guided self-exposure (*FearFighter*); C, entirely clinician-guided self-exposure given face-to-face; R, mainly stand-alone computer- and audiotape-guided self-relaxation without exposure). A 2:2:1 allocation ratio was used as in past studies cell sizes under 10 allowed detection of significant differences of exposure from relaxation, which yielded little improvement in phobias, whereas larger numbers were needed to compare active exposure therapies. Phobia-type (agora-, social or specific) was stratified across the three treatment conditions.

Treatment conditions

Patients had six hour-long individual treatment sessions over 10 weeks and follow-up 1 and 3 months later. The three therapists (two nurses and a psychiatrist) were experienced behaviour therapists. They standardized each treatment condition by using printed session-by-session guides. They used no therapist-accompanied exposure or relaxation. All patients were asked to complete daily homework diaries of either self-exposure (F, C) or self-relaxation (R).

F patients used a PC keyboard and mouse to go through *FearFighter's* nine self-exposure steps. Step 1 introduced *FearFighter* and self-rated questionnaires. Step 2 gave a rationale for self-exposure therapy. Step 3 explained how to recruit and work with a co-therapist. Step 4 helped clients identify the triggers for their panic and write personalized problem statements. Step 5 guided users to identify and set individualized exposure homework tasks for each

personalized trigger. Step 6 advised on coping tactics to remain in panic-evoking situations. Step 7 gave clients coping exercises to practise during exposure. Step 8 reviewed exposure homework, gave feedback and helped users extend gains by modifying existing or setting new goals. Step 9 involved troubleshooting of treatment problems that might arise.

C sessions involved similar self-exposure instruction, but guided entirely face-to-face by a clinician who explained the treatment rationale and helped patients to set problems and goals, devise an exposure hierarchy with self-exposure homework between sessions and monitor progress.

R patients were guided in self-relaxation techniques by a computer which explained the relaxation rationale, taught the practice of relaxation exercises with a biofeedback relaxation-training program (de-STRESS, 1997) and advised daily relaxation homework for 40 min daily between sessions. To facilitate homework, patients were given relaxation audiotapes.

For F and R patients, each hour-long session also included brief face-to-face help from a clinician: a mean of up to 5 min coaching and reviewing progress beforehand and up to 15 min discussing progress and giving extra treatment advice at the end. Discussion concerned exposure with F patients and relaxation with R patients.

Measures

These were valid reliable scales (Marks, 1986) used in past RCTs (Marks, 1985; Al-Kubaisy *et al.* 1992; Marks *et al.* 1993). Higher scores denoted more severity. Primary outcome measures were: assessor- and self-ratings of Main Problem and Goals (Marks, 1986), score range 0–8; Global Phobia item of the Fear Questionnaire (FQ) (Marks & Mathews, 1979), score range 0–8; time spent with the clinician. Secondary measures were Work/Social Adjustment (WSA) (Mundt *et al.* 2002), score range 0–40; and Patient Satisfaction at post-treatment on a 0–8 scale (0=very satisfied, 8=very dissatisfied). Patients rated motivation to do self-help on a 0–8 scale (0=extremely motivated, 8=not at all motivated) and estimated how many minutes a day they would be willing to spend on homework tasks.

Table 1. *Times of measures by patient, blind assessor and therapist*

	Week:		1		2		4		6		8		10		14	
	Screening		1	2	3	4	5	6								1mfu
Problem and Goals			S	S							S, B					S
Fear questionnaire		S									S					S
Clinician Global Phobia		B									B					B
Work/Social Adjustment		S, B									S, B					S
Patient motivation		S														
Patient satisfaction																S
Patient–therapist contact time				T	T	T	T	T	T	T						T
Blind rater's guess																B

1mfu, One-month follow-up; WSA, work, social and leisure adjustment; S, self-rating; B, blind-assessor rating; T, therapist rating.

Table 1 shows when ratings were done by the patient and by an experienced assessor (one of two psychiatrists or two nurse therapists) kept blind to the treatment condition, and when therapists noted duration of contact with the patient. Dropouts had follow-up ratings where possible. Patients rated satisfaction scales used routinely at the Unit, knowing that their ratings would not be revealed to their therapist. Assessors' blindness was tested by asking them at post-treatment to guess the treatment group of the patient.

Statistical analyses

Power calculations using nQuery (Elashoff, 1997) were based on independent samples *t* tests of between-groups pre- to post-treatment change in two studies (Al-Kubaisy *et al.* 1992; Kenwright *et al.* 2001). For the FQ Global Phobia scale, for a significance level of $P < 0.05$ and power of 80%, cell sizes of 25 would detect significant between-group differences. To allow for drop-outs, cell sizes were therefore set at 35 for the two active therapy groups F and C, and at 14 for the placebo R for reasons noted earlier.

All analyses were intention-to-treat by analysing subjects in the group to which they were originally randomized (Everitt, 1994). Longitudinal data were analysed for all randomized patients for whom post-baseline data were available. Where post-baseline data were unavailable, baseline data were not carried forward in the manner often done, as it is unlikely that scores remained frozen at their last observed value (Everitt, 1998).

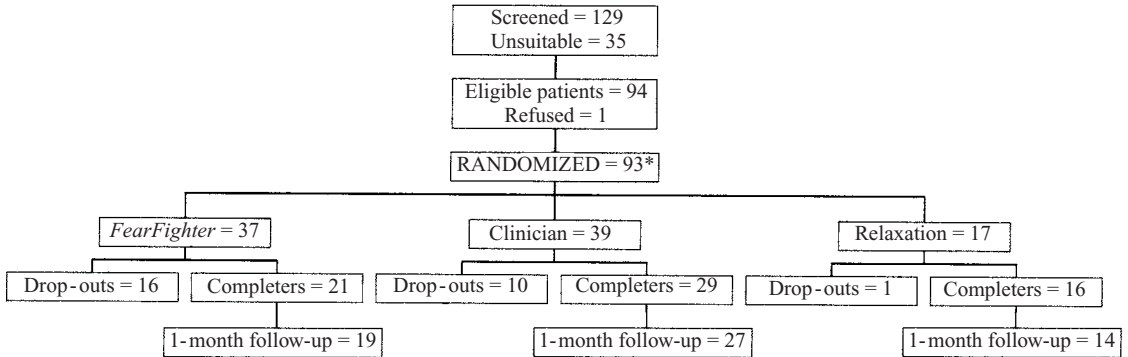


FIG. 1. Patients' progress through the trial: CONSORT diagram. *Of the patients who were randomized to *FearFighter*, two (one completer, one drop-out) were not included in the analyses because of data loss (see text). After randomization to the Clinician group one patient was withdrawn on developing severe depression. Therefore, data analyses were for 90 patients (35 *FearFighter*, 38 Clinician and 17 Relaxation).

Treatment and interaction effects were tested by mixed model MANOVAS with two between-groups factors (treatment condition and phobia type) and one within-subjects factor of two to four occasions (pre- and post-treatment, 1- and 3-month follow-up). On analyses of more than two occasions, pre-treatment scores were used as covariates. *Post hoc* contrasts were pairwise Bonferroni-corrected tests. Relevant outcome ratings were: Main Problem, Goals, FQ Global Phobia (self and assessor) and WSA Total (self and assessor).

Non-parametric tests were used when required. Cohen's kappa tested accuracy of the blind assessor's post-treatment guess of the patient's treatment group. All analyses used two-sided tests, with an omnibus significance level of $P < 0.05$ (Bonferroni-corrected to $P < 0.013$ for *post hoc* comparisons), and used the SPSS and STATISTICA statistical packages.

RESULTS

Patient flow

Fig. 1 shows patients' progress through the trial. Of 129 subjects screened, 35 were unsuitable (16 primary DSM-IV diagnosis not phobia or panic; 12, too mild; two, medical condition; two, refused; three, other reasons). Of the 94 eligible patients, one did not start due to work commitments and was not randomized. Two patients who had been randomized to F (one completer, one drop-out) could not be included in the analysis as their files disappeared when the team moved to a new site on 28.9.00, as did data from

one patient who was withdrawn on becoming severely depressed after randomization to C.

Pre-treatment features

At baseline, for the 90 patients analysed the three groups resembled samples in past studies (Al-Kubaisy *et al.* 1991; Kenwright *et al.* 2001) and resembled one another on all variables though non-significantly more F than C patients were sent by a GP rather than self-referred (see website for Appendix). Overall, 62 (69%) patients were women, mean age was 38 (S.D. = 12), mean illness duration 17 years (S.D. = 12), and mean education length 11 years (S.D. = 2); 9 (11%) patients were on stable doses of tricyclic antidepressants, five (6%) on an SRI, two (3%) on other antidepressants, and four (5%) on benzodiazepines. In the last 3 months two had seen a psychiatrist, two a psychologist, one a community psychiatric nurse, four a counsellor, and 43 a GP for their problem.

Of the 90 patients, 70 (77%) self-referred after seeing ads in general practitioner (GP) surgeries and self-help groups, 15 (17%) came via GPs, and five (6%) via other health professionals. Self- *v.* professional-referred patients did not differ significantly on any demographic or clinical variable, including motivation (all $P > 0.2$).

For the whole sample, baseline severity was moderate on FQ Total (mean = 34, S.D. = 21), FQ 1-item depression (mean = 3.1, S.D. = 2.2) and FQ dysphoria (mean = 21, S.D. = 12.4). Main DSM-IV diagnoses were: 24 panic disorder with agoraphobia (7F, 11C, 6R), three agoraphobia without panic (2F, 1C, 0R),

24 social phobia (10F, 10C, 4R), 39 specific phobia (16F, 16C, 7R). As expected, at baseline specific phobia patients had a longer problem duration (mean years=20.2, s.d.=11) than panic/agoraphobia (mean=12.0, s.d.=12) patients ($F=3.1$, $df=2,87$, $P=0.04$; *post hoc* LSD test mean difference = -7.3, 95% CI = -13.1 to -1.5) and were less severely ill than panic/agoraphobia and social phobia patients on most scales (Goals self, Global Phobia blind assessor, 1-item depression, WSA total self, WSA total blind assessor; all $P<0.02$).

Drop-outs

Despite 'hot pursuit', 25 patients gave no post-screening data (15F, 9C, 1R); three (12%) dropped out after screening, 18 (72%) after sessions 1 to 3 and 4 (16%) after sessions 4 or 5. F patients dropped out non-significantly more than C patients (43% v. 24%, Fisher's exact P (2-tailed)=0.13). R patients were significantly less likely to dropout than F or C patients (6%; Fisher's exact P (2-tailed)=0.03). Dropout numbers did not differ significantly across phobia type (18% agora-, 33% social, 31% simple phobia; $\chi^2=1.69$, $df=2$, $P=0.42$). Reasons for dropping out were similar for F, C and R: two, moved/uncontactable; four, job/study commitments; five, difficulties getting to the clinic; one, medical condition; six, other; nine, unknown.

When the 65 RCT completers were compared with the 25 drop-outs at pre-treatment they did not differ significantly on any demographic or clinical variable including motivation (data not shown).

Post-treatment outcome

Table 2 shows, for all 65 completers' self- and blind-assessor ratings, the (i) means (and s.d.s), (ii) percentage improvement from pre- to post-treatment, (iii) mean difference and 95% confidence intervals (CIs) and (iv) effect sizes.

We examined the main effects of treatment group, phobia type and time, plus the interaction of treatment group and time and other interactions. There were significant main occasion, group and group \times occasion interaction effects on the primary measures Main Problem, Goals, FQ Global Phobia (self and blind assessor), and the secondary measure WSA Total blind assessor (all $P<0.01$). On all these measures, F and C each improved significantly

($P<0.001$) and similarly ($P=NS$), and significantly more (all $P<0.02$) than R (Fig. 2).

Taking self-rated FQ Global Phobia as the main outcome measure, the mean between-group differences (after Bonferroni correction) and 95% CIs were: F v. C, -0.1 (-1.1 to 0.8); F v. R, -1.2 (-2.4 to -0.1); C v. R, -1.1 (-2.1 to -0.07).

Main phobia-type effects were significant for some measures, but there were no significant treatment-group \times phobia-type or occasion \times phobia-type interactions on any measure. As noted, specific phobics had been less severely ill than other phobia types at baseline and remained so after treatment (data not shown).

Follow-up outcome

Many patients' self-ratings posted at follow-up went astray when most of the team moved from the Maudsley to Charing Cross Hospital and staff changed.

One-month follow-up

Sixty (67%) patients were available (19F, 27C, 14R). Overall, gains were maintained or enhanced to 1-month follow-up (Fig. 2). Effect sizes rose at 1-month follow-up for F and C but remained small for R: respectively Main Problem 4.7, 3.8, 0.5; Goals 4.4, 3.8, 0.3; FQ Global Phobia self 2.2, 2.9, 0.6. Mean percentage of improvement from baseline was, for F, C and R respectively: Main Problem 57%, 53%, 10%; Goals 67%, 63%, 4%; FQ Global Phobia self 48%, 51%, 13%. On self-rated Global Phobia, the mean between-group differences at 1-month follow-up (after Bonferroni correction) and 95% CIs were: F v. C, -0.2 (-1.2 to 0.8); F v. R, -1.7 (-2.9 to -0.5); C v. R, -1.5 (-2.7 to -0.4).

Three-month follow-up

At 1-month follow-up many unimproved R patients went on to have computer-aided self-exposure, so thereafter F and C could not be compared with R. Of the 52 patients who had no other treatment after 1-month follow-up, 3-month follow-up ratings were received from only 34 (38% of the original N) (11F, 19C, 4R); these patients had not differed significantly on any measure at post-treatment or 1-month follow-up from patients whose 3-month ratings

Table 2. *Self- and blind-assessor's outcome ratings (all measures are primary, except for the WSA, which is secondary): mean and s.d. of pre- and post-treatment ratings, % improvement, 95% confidence intervals of pre-post change scores, and effect sizes for completers (N = 65)*

	Pre-treatment	Post-treatment	Pre-post difference	Improvement*, %	Effect size†
	Mean (s.d.)	Mean (s.d.)	Mean (95% CI)	Mean (s.d.)	
<i>FearFighter (N = 20)</i>					
Self-rated					
Main Problem	7.4 (0.8)	3.9 (2.0)	3.4 (2.5 to 4.3)	47.4 (25.7)	4.3
Goals	7.1 (1.1)	2.9 (1.6)	4.1 (3.2 to 4.9)	57.6 (22.5)	3.8
FQ Global Phobia	6.1 (1.3)	3.8 (2.3)	2.2 (1.2 to 3.1)	37.1 (33.7)	1.7
WSA Total	15.5 (7.7)	10 (10.5)	5.5 (2.4 to 8.6)	45.1 (45.3)	0.7
Blind assessor					
Main Problem‡	—	3.1 (1.5)	—	—	—
Goals‡	—	2.9 (1.9)	—	—	—
FQ Global Phobia	5.4 (1.1)	3.1 (1.2)	2.3 (1.7 to 2.9)	42.8 (19.2)	2.1
WSA Total	14.6 (5.9)	7.2 (5.8)	7.4 (5.4 to 9.3)	52.8 (24.9)	1.2
<i>Clinician (N = 29)</i>					
Self-rated					
Main Problem	7.3 (1.0)	3.6 (1.3)	3.6 (3.1 to 4.3)	50.1 (21.4)	3.7
Goals	7.0 (1.2)	3.1 (1.7)	3.9 (3.2 to 4.6)	55.0 (25.3)	5.7
FQ Global Phobia	6.7 (1.2)	3.3 (1.8)	3.4 (2.6 to 4.1)	49.2 (27.9)	2.8
WSA Total	17.6 (8.5)	11.8 (8.2)	5.7 (2.8 to 8.7)	30.4 (37.6)	0.7
Blind assessor					
Main Problem‡	—	3.6 (1.3)	—	—	—
Goals‡	—	3.1 (1.7)	—	—	—
FQ Global Phobia	5.7 (1.3)	3.2 (1.3)	2.4 (1.8 to 2.9)	41.7 (20.1)	1.9
WSA Total	17.5 (8.3)	10.0 (7.1)	7.4 (5.5 to 9.4)	46.7 (24.2)	0.9
<i>Relaxation (N = 16)</i>					
Self-rated					
Main Problem	7.1 (1.0)	6.4 (1.4)	0.7 (−0.05 to 1.4)	10.2 (16.4)	0.7
Goals	7.1 (1.2)	6.7 (1.6)	0.4 (0.1 to 0.7)	7.4 (9.4)	0.3
FQ Global Phobia	6.6 (1.3)	5.7 (1.9)	0.9 (−0.05 to 1.8)	13.5 (23.1)	0.7
WSA Total	15.4 (8.4)	11.9 (7.7)	3.5 (0.6 to 6.3)	16.9 (35.4)	0.4
Blind assessor					
Main Problem‡	—	5.8 (1.1)	—	—	—
Goals‡	—	6.8 (1.1)	—	—	—
FQ Global Phobia	5.6 (1.2)	5.3 (1.3)	0.3 (−0.1 to 0.8)	5.8 (17.3)	0.2
WSA Total	15.9 (7.8)	15.3 (7.1)	0.6 (−1.5 to 2.7)	−1.0 (33)	0.1

FQ, Fear Questionnaire; WSA, Work Social Adjustment Scale; F, *FearFighter*; C, Clinician; R, Relaxation; Lower scores indicate improvement.

* Formula: (pre-treatment mean – post-treatment mean)/pre-treatment mean) × 100.

† Formula: (pre-treatment mean – post-treatment mean)/pre-treatment s.d.; 0.8 upwards is usually regarded as clinically significant.

‡ Not rated at pre-treatment as blind assessor rated patients before Problems and Goals were set in sessions 1 and 2.

were not received. On repeated-measures analyses, F and C improved significantly and similarly from pre-treatment to 3-month follow-up on all measures (all $P < 0.001$).

Blindness of assessor

The blind assessor's guess at post-treatment as to each patient's treatment group was available for 50 completers. Agreement between the actual treatment condition and the assessor's guess regarding F or C was at chance level ($\kappa = 0.08$, $P = 0.58$), but was 100% accurate for R. Including R raised overall agreement to $\kappa = 0.45$ ($P < 0.001$).

Therapist contact time

C patients had 3.7 times more clinician time in all from pre- to post-treatment than did F and R patients. Including all drop-outs and completers, mean total therapist contact time per patient (in minutes) was: F = 76 (s.d. = 43), C = 283 (s.d. = 118), R = 76 (s.d. = 22) – this difference was highly significant ($F(2,86) = 69.5$, $P < 0.001$). Mean group differences and 95% CIs were: F v. C, −207 (−255 to −160); F v. R, −0.3 (−60 to 60); C v. R, 207 (149 to 266). During 1-month follow-up too F and R patients had less clinician time than did C patients, mean total therapist contact time in minutes being F = 17 (s.d. = 5.4),

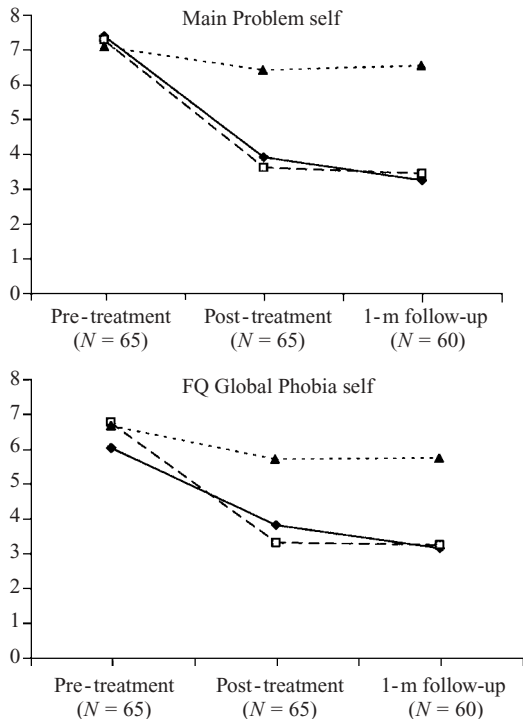


FIG. 2. Means of self-rated Main Problem and Global Phobia (FQ) from pre- to post-treatment and 1-month follow-up: Completers. (◆—◆), *FearFighter*; □--□, Clinician; ▲---▲, Relaxation.)

C=53 (s.d.=13), R=24 (s.d.=8.2) minutes ($F(2,52)=73.1$, $P<0.001$). Mean group differences and 95% CIs during 1-month follow-up were: F v. C, -36 (-44 to -28); F v. R, -7.6 (-16 to 1.2); C v. R, 28 (20 to 37).

R patients attended more treatment sessions than F patients (R mean=5.7, s.d.=0.9; F mean=4.2, s.d.=2.2; Mann-Whitney U test=186, $Z=-2.26$, $P=0.008$) and did more homework sessions than F and C patients (R mean=46, s.d.=24; F mean=20, s.d.=17; C mean=24, s.d.=19; $F(2,86)=11.02$, $P<0.001$), but total homework time did not differ among F, C and R.

The three phobia types had a similar duration of clinician contact from pre- to post-treatment ($F(2,86)=0.14$, $P=0.84$), mean total therapist contact (in minutes) being, for agora-, social and specific phobics, respectively: 172 (s.d.=128), 169 (s.d.=137) and 156 (s.d.=133). Similar small differences in therapist-contact duration remained non-significant throughout follow-up.

Patient satisfaction

On a 0 (very satisfied) to 8 (very dissatisfied) scale at post-treatment, patients' rating of treatment helpfulness did not differ significantly between groups, although F patients tended to feel more satisfied than R patients (F mean=1.1, s.d.=1.6; C mean=1.8, s.d.=2.3; R mean=2.8, s.d.=2.2; $F(2,67)=2.8$, $P=0.06$). Mean group differences and 95% CIs were: F v. C, -0.7 (-2.2 to 0.7); F v. R, -1.7 (-3.4 to 0.06); C v. R, -0.9 (-2.6 to 0.7).

DISCUSSION

Saving of clinician time without impairing efficacy

Though delegating most self-exposure guidance to a stand-alone computer in a clinic retained non-significantly fewer patients over six sessions than did the giving of such guidance entirely face-to-face, the two self-exposure groups had comparable improvement and satisfaction. The assessors' post-treatment guess about which treatment group patients had been in were no better than chance regarding mainly-computer v. entirely-clinician-guided self-exposure, so in this respect they had remained truly blind (but they did guess correctly regarding self-exposure v. self-relaxation). The clinical outcome was consistent with the study's first hypothesis that a computer aid could save clinician time without sacrificing efficacy. The time gain was 73% taking all drop-outs and completers into account.

Not all computer-aided self-exposure studies have found a high dropout rate. In a RCT where patients with obsessive-compulsive disorder (OCD) accessed computer-guided self-exposure instructions by phone from home, non-significantly fewer dropped out of computer- than clinician-guided care (Greist *et al.* 2002). *FearFighter* drop-outs tended to leave after the second or third sessions after completing its early instructional part and setting their first exposure task. Later sessions helped patients review homework, rate anxiety, get feedback, set new goals and problem-solve difficulties. Some drop-outs said they left because of technical difficulties with the system, and others because they learned how to improve with self-exposure and it was too bothersome to

attend again. It may thus be wrong to assume that no drop-outs improved (Everitt, 1994).

Cutting clinician time by delegating most self-exposure instructions to a computer allows clinicians to treat effectively almost four times more phobia/panic patients a day than they can without such a system. The clinician remains in the background for brief advice as needed (e.g. 'you could change your exposure-homework goal to ...') and supports several patients at a time while also doing other tasks over the same period. Computer-aided care is a clinician-extender, not replacer. After initial screening by phone, *FearFighter* users can now access it on the Internet at home and seek brief live advice on a helpline if they get stuck; this is undergoing a RCT.

That phobia/panic improved as much with mainly computer guidance as with entirely face-to-face guidance accords with other RCTs in phobia/panic (Ghosh *et al.* 1988), OCD (Greist *et al.* 2002) and depression (Selmi *et al.* 1990) and other studies in depression (Osgood-Hynes *et al.* 1998; Proudfoot *et al.* 2003). Because computer-guided self-help saves therapist time, routinely offering it to patients as a potentially effective first step in stepped care may speed access to care, though whether it affects outcome with any later clinician-guided care is not known.

Our design did not allow us to tease out how much *FearFighter* patients improved due to use of the system and how much due to a therapist's brief advice at each session. During computer-guided self-help for OCD, brief scheduled therapist phone contact increased compliance with exposure homework (Kenwright *et al.* unpublished).

Superiority of self-exposure over self-relaxation

The present study's results are also consistent with its second hypothesis, that phobia/panic patients would improve more when self-exposure rather than self-relaxation is guided mainly by a computer over the same length of time. Mainly computer-aided self-relaxation therapy retained the most patients of the three groups but this did them little good – they hardly improved. Relaxation is a placebo for phobia/panic when it contains no element of exposure (unlike 'applied relaxation' which does contain exposure (Marks, 1987)). Our relaxation

patients improved little despite having done more treatment sessions than F patients and more homework sessions than F and C patients, though total homework time did not differ among the three groups. Relaxation's low drop-out rate contrasts with its having tended to be rated as the least satisfying of the three treatments and that it helped the least.

Computer guidance neither lowered satisfaction nor worsened outcome if it guided self-exposure rather than self-relaxation. Improvement depended not on length of time or number of sessions spent with the clinician or at the computer but rather on what was instructed. Self-exposure instructions given mainly by computer or entirely by a clinician face-to-face improved patients similarly, and significantly, more than did self-relaxation instructions given mainly by a computer at the clinic plus audiotapes taken home. Self-exposure was equally effective for panic/agoraphobia, social or specific phobia, but cell sizes were small for this subanalysis.

Effect of self-referral?

Most patients in the present study were self-referred. Can their results be generalized to patients referred by professionals? Our self- and professional-referred patients were similar on every measure at pre-treatment, and self- v. professional referral did not affect outcome.

Our self-referrals were not the 'worried well'. Far from it. They were severely phobic with moderately severe work and social disability on assessor- and self-ratings that were closely similar to those of phobic out-patients (Kenwright *et al.* 2001). The many self-referrals reflect our having advertised in GPs' surgeries and phobia self-help groups – shame and fear of stigma from a psychiatric record often deter sufferers from consulting a GP or other professional about their phobia/panic. Using a self-help system need not incur such a record.

Limitations

There were several limitations. First, (non-significantly) more patients dropped out of mainly computer-guided than entirely clinician-guided self-exposure, though those who remained did equally well in both groups. There were no data for drop-outs beyond the start of therapy, and carrying their pre-therapy data

forward assuming that none had progressed could distort the results. Secondly, follow-up to 6 months or more post-treatment could not be done (being impractical once the team had moved) to confirm whether improvement in the face of setbacks persists as well after mainly computer-guided as after entirely therapist-guided therapy. Thirdly, a blind assessor rating was not done at follow-up. Finally, the design did not compare computer- with book-guided self-exposure, each plus brief advice from a therapist.

In conclusion, clinicians markedly cut per-patient time to treat phobia/panic without

impairing efficacy up to 1-month follow-up by giving patients access to computer-guided self-exposure plus brief live advice as needed, though confirmation with blind ratings is needed over longer follow-up.

Dr Mataix-Cols was supported by an EU Marie Curie Fellowship. We thank Dr Homa Noshirvani for doing half of the blind ratings for this study and Dr Sabine Landau for statistical advice. Professor Marks has intellectual property rights in *FearFighter*.

Appendix. Pre-treatment demographic and clinical characteristics of the 3 treatment groups (no significant differences between them). The pre-treatment ratings on outcome measures appear in Table 2 and Figure 2.

Variables	<i>FearFighter</i> (<i>N</i> = 35)		Clinician (<i>N</i> = 38)		Relaxation (<i>N</i> = 17)	
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)
Gender						
Male	11	(31)	10	(26)	7	(41)
Female	24	(69)	28	(74)	10	(59)
Ethnicity, Caucasian	25	(86)	28	(76)	17	(100)
Primary diagnosis						
Agoraphobia	9	(26)	12	(32)	6	(35)
Specific phobia	16	(46)	16	(42)	7	(41)
Social phobia	10	(28)	10	(26)	4	(24)
Secondary diagnosis						
Agoraphobia	0	(0)	2	(6)	0	(0)
Specific phobia	1	(3)	0	(0)	0	(0)
Social phobia	0	(0)	3	(9)	0	(0)
Chronic fatigue	0	(0)	1	(3)	0	(0)
Source of referral						
Self-referred	24	(68)	33	(87)	13	(76)
GP	9	(26)	3	(8)	3	(18)
Mental health professional	2	(6)	2	(5)	1	(6)
Medications						
SSRI	2	(7)	3	(8)	0	(0)
TCA	3	(10)	6	(16)	0	(0)
OA	0	(0)	1	(2)	1	(6)
Benzodiazepines	1	(3)	3	(8)	0	(0)
	Mean (<i>s.d.</i>)		Mean (<i>s.d.</i>)		Mean (<i>s.d.</i>)	
Age (years)	38.2 (11.7)		37.9 (12.2)		38.5 (14.9)	
Years of education	11.3 (1.5)		11.3 (1.7)		11.0 (1.2)	
Problem duration (yrs)	15.9 (10.1)		16.7 (12.3)		20.6 (14.4)	

SSRI = serotonin reuptake inhibitors, TCA = tricyclic antidepressants, OA = other antidepressants.

REFERENCES

- Al-Kubaisy, T., Marks, I. M., Logsdail, S., Marks, M. P., Lovell, K., Sungur, M. & Araya, R. (1992). Role of exposure homework in phobia reduction: a controlled study. *Behavior Therapy* **23**, 599–622.
- American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders, 4th edn*. American Psychiatric Press: Washington, DC.
- Bebbington, P. E., Brugha, T. S., Meltzer, H., Jenkins, R., Ceresa, C., Farrell, M. & Lewis, G. (2000). Neurotic disorders and the receipt of psychiatric treatment. *Psychological Medicine* **30**, 1369–1376.
- Croft Jeffreys, C. & Wilkinson, G. (1989). Estimated costs of neurotic disorder in UK general practice. *Psychological Medicine* **19**, 549–558.
- de-STRESS (1997). Ultramind Group plc, 2 Lindsley Street, London EC1A 9HP.
- Elashoff, J. D. (1997). *nQuery Advisor Version 2 User's Guide*. Statistical Solutions: Ireland.
- Everitt, B. S. (1994). *Statistical Methods for Medical Investigations, 2nd edn*. Edward Arnold: London.
- Everitt, B. S. (1998). Analysis of longitudinal data. Beyond MANOVA. *British Journal of Psychiatry* **172**, 7–10.
- Ghosh, A., Marks, I. M. & Carr, A. (1988). Therapist contact and outcome of self-exposure treatment for phobias. *British Journal of Psychiatry* **152**, 234–238.
- Greist, J. H., Marks, I. M., Baer, L., Kobak, K. A., Wenzel, K. W., Hirsch, M. J., Mantle, J. M. & Clary, C. M. (2002). Behaviour therapy for obsessive compulsive disorder guided by a computer or by a clinician compared with relaxation as a control. *Journal of Clinical Psychiatry* **63**, 138–145.
- Kenwright, M., Liness, S. & Marks, I. M. (2001). Reducing demands on clinicians by offering computer-aided self-help for phobia/panic: a feasibility study. *British Journal of Psychiatry* **179**, 456–459.
- Marks, I. M. (1985). *Psychiatric Nurse Therapists in Primary Care*. Royal College of Nursing: London.
- Marks, I. M. (1986). *Behavioural Psychotherapy: Maudsley Pocket Book of Clinical Management*. John Wright: Bristol.
- Marks, I. M. (1987). *Fears, Phobias and Rituals*. Oxford University Press: New York.
- Marks, I. M. & Mathews, A. M. (1979). Brief standard self-rating for phobic patients. *Behaviour Research and Therapy* **23**, 563–569.
- Marks, I. M., Swinson, R. P., Basoglu, M., Kuch, K., Noshirvani, H., O'Sullivan, G., Lelliot, P. T., Kirl, M., McNamee, G., Sengun, S. & Wickwire, K. (1993). Alprazolam and exposure alone and combined in panic disorder with agoraphobia: controlled study in London and Toronto. *British Journal of Psychiatry* **162**, 776–787.
- Marks, I. M., Shaw, S. & Parkin, R. (1998). Computer-aided treatments of mental health problems. *Clinical Psychology: Science and Practice* **5**, 151–170.
- Marks, I. M., Mataix-Cols, D., Kenwright, K., Cameron, R., Hirsch, S. & Gega, L. (2003). Pragmatic evaluation of computer-aided self help for anxiety and depression. *British Journal of Psychiatry* **183**, 57–65.
- Mundt, J. C., Marks, I. M., Greist, J. H. & Shear, K. (2002). The work and social adjustment scale: a simple accurate measure of impairment in functioning. *British Journal of Psychiatry* **180**, 461–464.
- 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* **58**, 358–365.
- Proudfoot, J., Goldberg, D., Mann, A., Everitt, B., Marks, I. M. & Gray, J. (2003). Computerized, interactive, multimedia CBT reduces anxiety and depression in general practice: a randomized controlled trial. *Psychological Medicine* **33**, 217–227.
- 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 agoraphobia and panic. *MD Computing* **16**, 44–48.

Supplementary information accompanies this paper on the Journal's website (<http://journals.cambridge.org>).