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Single-case experimental studies of a self-help manual for traumatic stress in earthquake survivors

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ABSTRACT

Studies showed that earthquake-related posttraumatic stress disorder could be reduced by a single session of therapist instructions for self-exposure to fear cues. Eight single-case experimental studies examined whether such instructions were as effective when delivered through a self-help manual after an initial assessment. After two baseline assessments conducted at the participants homes, the manual was delivered to the participants, who were then assessed at week 10 (post-treatment) and at 1-, 3-, and 6-month post-treatment. After minimal improvement during the baseline, treatment achieved marked improvement in seven survivors, leading to effect sizes comparable to those obtained by therapist-delivered treatment. Self-help appears to be a promising approach in cost-effective survivor care.

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1. Introduction

Major earthquakes traumatise millions of people, causing a mental health problem that often overwhelms the resources of the affected countries. The enormous task of delivering urgent treatment to such large survivor populations requires interventions that can be delivered with minimal or no therapist involvement. Although there is evidence to show that exposure-based self-help treatments are

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effective in anxiety disorders (Newman, Erickson, Przeworski, & Dzus, 2003) their usefulness in post-traumatic stress disorder (PTSD) has not yet been adequately explored. A recent study (Ehlers et al., 2003) found that a self-help manual based on cognitive-behavioural treatment (CBT) was not useful in survivors of motor vehicle accidents.

Since the 1999 earthquakes in Turkey, we developed a mental health care model based on largely self-help behavioural treatments that involved minimal therapist involvement. The treatment involved mainly instructions for self-exposure to distressing or fear-evoking trauma cues presented with a rationale to enhance sense of control over fear and no systematic cognitive restructuring. In four trials this intervention was demonstrated to achieve marked improvement in over 80% of the cases, whether delivered in four weekly sessions (Başoğlu, Livanou, Şalcıoğlu, & Kalender, 2003) or in a single session involving self-exposure instructions alone (Başoğlu, Şalcıoğlu, Livanou, Kalender, & Acar, 2005), exposure to simulated tremors in an earthquake simulator without self-exposure instructions (Başoğlu, Livanou, & Şalcıoğlu, 2003), or a combination of the latter two interventions (Başoğlu, Şalcıoğlu, & Livanou, 2007). These studies also showed that reducing therapist involvement did not affect treatment compliance. Over 90% of the survivors complied with self-exposure instructions given in a single session and reduced behavioural avoidance early in treatment was associated with subsequent improvement in all PTSD symptoms (Şalcıoğlu, Başoğlu, & Livanou, 2007a). This implied that reducing therapist involvement even further by delivering self-exposure instructions through other media, such as a self-help manual, might be possible without undermining treatment effectiveness.

Developing a self-help tool for behavioural treatment is a challenging task, because of the structured and directive nature of the intervention. Such a task requires a highly structured self-help manual. We developed such a tool that closely parallels the 10-session behavioural treatment (Başoğlu, Livanou, Şalcıoğlu, & Kalender, 2003) used in the earlier stages of our outreach care delivery programme in the disaster region. In the present article we report a series of eight multiple baseline single-case experimental studies that tested the effectiveness of the manual when delivered after an initial therapist contact. A randomised controlled study was not feasible, so we opted for experimental case studies. We hypothesised that the rates of improvement among the survivors who read the manual will be comparable to those achieved by therapist-delivered treatment in our previous studies.

2. Method

2.1. Participants

Following the 1999 earthquakes in Turkey we established an outreach treatment delivery programme, which involved consecutive house visits in the disaster region to identify survivors in need of care using a self-rated diagnostic screening instrument (Traumatic Stress Symptom Checklist – TSSC; Başoğlu et al., 2001). Participants ($n = 15$) for the present study were consecutively recruited from among the survivors living in two permanent housing sites for homeless survivors in the epicenter region. Survivors with probable PTSD (TSSC score >25) were further assessed to determine their eligibility for the study. Inclusion criteria were diagnosis of PTSD, literacy, age 16–65 years, and ability to attend follow-up assessments. Exclusion criteria were predominating depression or grief, psychotic illness, use of benzodiazepines, use of antidepressants for less than 2 months at assessment, and previous CBT for earthquake-related PTSD. Survivors with predominating grief problems were excluded because treatment of such problems required additional behavioural interventions, which were not covered by the self-help manual. The study was conducted between July 2003 and October 2004.

Fig. 1 shows the flow of participants into the study. Consecutive screening in the community identified 109 cases with PTSD. Of these cases, 48 were eligible for study (excluding 8 refusers). The majority of ineligible cases were excluded because they were deemed not suitable for self-help treatment. Predominating depression required drug treatment and cases with prolonged grief had to be treated by a therapist. Survivors with certain physical conditions (e.g. cardiovascular problems, pregnancy) were excluded because we did not want to prescribe exposure treatment to these survivors outside our control. Those with history of Conversion Disorder with seizures were excluded because possible 'seizures' as a result of heightened anxiety during exposure might have been misinterpreted as worsening in the survivors' condition.

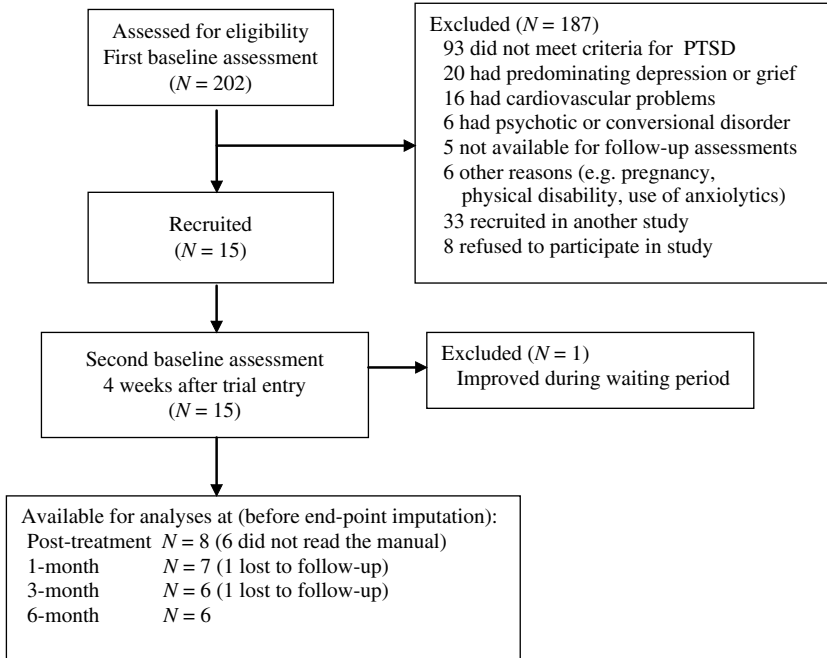


Fig. 1. Flow of participants through each stage of the study.

Thirty-three of these cases were recruited in a concurrent randomised controlled study (RCT; Başoğlu et al., 2007). Because both studies relied on the same source of referrals, potential participants were first assessed for eligibility for the RCT and, if found ineligible, then considered for the present study. Consequently, 12 cases ineligible for the RCT (7 refusers of treatment in an earthquake simulator and 5 with hypertension) were recruited in the present study. Three survivors had been recruited in the present study consecutively before the commencement of the RCT. The cases recruited in the present study did not differ from the 61 ineligible cases (including the 8 refusers) or the cases recruited in the RCT on any pre-treatment characteristic.

2.2. Study design

To control for the possible effects of therapist contact and assessment, two baseline assessments were conducted in 4 weeks of waiting period. The manual was delivered after the second baseline assessment. Post-treatment assessment was conducted at week 10. Subsequent follow-ups were at 1-, 3- and 6-month post-treatment. The first baseline assessment lasted 2 h, the second 1 h, and each follow-up assessment about 40 min.

In delivering the manual to the participants we made an effort to minimise therapist contact to simulate as much as possible the circumstances in which the manual was likely to be used in post-disaster work. Following major earthquakes survivors are often unable to attend treatment for more than once, because of increased demographic mobility and day-to-day survival problems. Accordingly, therapist contact during the 10 weeks of treatment period was limited to one occasion, mainly for assessment and delivery of the manual. The participants were told that the manual provided the same treatment they would get from a therapist and advised to read it and follow the instructions closely. No information was given about the treatment to avoid discussions about its rationale. This was also designed to test whether the manual effectively delivered the treatment rationale and prompted compliance with self-exposure instructions. The participants were also informed that subsequent contacts would be for assessment only.

2.3. Measures

The assessor-rated measures included a Semi-Structured Interview for Survivors of Earthquake (Şalcıoğlu, 2004), the standardised Turkish version of the CAPS (Aker et al., 1999), Work and Social Adjustment Scale (WSA), and a Global Improvement Scale – Assessor (GIS-A; 0 = *No improvement*, 1 = *Minimal – less than 20%*, 2 = *Moderate – 20%–60%*, 3 = *Much – 60%–80%*, 4 = *Very much – more than 80%*; Başoğlu et al., 2007). The self-rated measures included the TSSC (Başoğlu et al., 2001), Fear and Avoidance Questionnaire (FAQ; 35 items measuring avoidance of situations that evoke earthquake-related fears, 0 = *no avoidance*, 3 = *extreme avoidance*; Başoğlu, Livanou, & Şalcıoğlu, 2003; Başoğlu, Livanou, Şalcıoğlu, & Kalender, 2003; Başoğlu et al., 2005, 2007), and Global Improvement Scale – Self (GIS-S; the self-rated version of the GIS-A; Başoğlu et al., 2007). Both the TSSC and FAQ had satisfactory sensitivity to clinical change in our previous trials.

The assessments were conducted by the second author (EŞ) and two other psychologists, all of whom had extensive experience in assessment from previous trials. They had been standardised in their ratings, with a concordance rate of 90% (Başoğlu et al., 2005). Written informed consent was obtained after the procedures were fully explained. The study was approved by the Research Ethics Committee of the Institute of Psychiatry, King's College London.

2.4. Self-help manual

The manual consisted of 51 pages and 6 sections providing information on (1) PTSD and depression symptoms, (2) self-assessment using the TSSC, (3) principles of treatment and suitability for treatment, (4) self-assessment of fear and avoidance behaviours using the FAQ and instructions on how to set treatment targets, (5) conducting self-exposure sessions, blocking cognitive or behavioural avoidance or distraction strategies, coping with anxiety, panic or flashbacks, monitoring fear cues, and dealing with problems encountered during the first week of treatment, and (6) evaluating progress in treatment targets, selecting new targets for treatment, and dealing with problems encountered during the subsequent 9 weeks of treatment. The manual provided emphatic instructions to contact the project headquarters in case of problems during treatment, such as suicidal ideas, uncontrollable rage, behaviour harmful to self or others, dissociative fugues, and frequent and unmanageable panics or flashbacks.

The treatment rationale was designed to encourage survivors to fight against fear. Fear was presented as an adversary and avoidance of feared situations as 'surrender' to fear. The need for a choice between surrender and fight was emphasised (e.g. "beat your fear or live in defeat!") Such discourse was meant to instil courage and self-confidence in survivors, enhance their sense of control over fear, and also to increase their motivation for self-exposure.

The manual was first piloted in a group of 22 survivors with PTSD. At 3-month phone follow-up, over 80% of the survivors reported having found the manual easily understandable and the treatment credible. No survivor reported any adverse effects during self-treatment. The manual was then distributed to more than 1000 survivors in the disaster region as part of our routine care delivery. Although these survivors were not followed up, no survivor contacted the project headquarters to report any problems.

3. Results

3.1. Sample characteristics

All 15 participants were women. This was mainly due to the fact that men were less likely to be at home during work hours when house visits were made. The mean age was 40 (SD = 11) and 14 (93%) participants were married. Eight participants (53%) had primary school, two (13%) secondary school, five (33%) high school, and none had university education. Eight (53%) had past history of psychiatric illness and six (40%) had previous trauma experience, mainly road traffic accidents. The extent of damage to home was moderate to severe (uninhabitable) in five (33%) and reduced to rubble in two (13%).

One survivor (7%) was trapped under rubble, two (13%) suffered physical injury, and six (40%) lost at least a second-degree relative or a friend. The mean time since the earthquake was 4.5 years ($SD = 0.3$).

Of the 15 participants assessed at second baseline, one showed improvement during the waiting period and was excluded from the study. The manual was thus delivered to 14 participants after the second baseline. At week 10, six (43%) reported not having read it ('*did not have time*'). All eight survivors who read the manual initiated self-exposure. Those who did not read the manual did not differ from the others in age, education, baseline clinical ratings, and change in scores between the two baselines (two-tailed *t*-tests). Because we were interested in examining the effectiveness of the manual when it was read by the survivors, the participants who did not read it were excluded from the study.

3.2. Treatment outcome

Data were first analyzed on a case-by-case basis to examine patterns of response to treatment and rates of improvement in eight participants who utilised the manual. The cases were then aggregated for statistical analyses. Only the latter results were reported in detail, because both types of analyses yielded similar results. The results of case-by-case analysis of data (available on request) are briefly summarised below.

3.2.1. Case-by-case analysis

At first baseline assessment the CAPS scores ranged from 50 to 78. According to the CAPS score ranges proposed by Weathers, Keane, and Davidson (2001) for interpreting severity of PTSD, three survivors had moderately severe (score range 40–59) and five had severe PTSD (score range 60–79). Some ratings showed a reduction during the waiting period but in seven cases this did not amount to more than slight improvement according to both GIS-S and GIS-A. One survivor rated herself as much improved (moderately improved according to the assessor). At the second baseline assessment, one participant had mild, three moderate, three severe, and one had extremely severe PTSD.

In seven cases a typical improvement pattern was noted after the introduction of the manual. Marked improvement in all measures was noted at post-treatment, with much of the improvement occurring largely during the first 10 weeks of treatment and stabilizing thereafter. Percentage of improvement in CAPS at the last assessment ranged from 67% to 100%. At this point all seven cases were much/very much improved according to the assessor rating (six according to self-ratings). Although one of these participants rated herself as moderately improved, she showed 70% improvement in CAPS and 80% in WSA. The eighth participant (CAPS score 60) conducted some exposure but showed only a modest reduction in her fear and PTSD symptoms. Although she rated herself as moderately improved at 6-month follow-up (rated as no change by the assessor), this was clearly a case of treatment failure.

3.2.2. Aggregated analyses

We used both parametric (repeated-measure ANOVA) and non-parametric (Wilcoxon-signed rank test) tests to examine the significance of within-group change in scores at each assessment point. Effect sizes were calculated using Cohen's *d* (Cohen, 1992), which was corrected using Hedges adjustment for small sample size (Hedges & Olkin, 1985). End point imputation was conducted in two cases that were lost to follow-up, carrying forward their last available assessment scores (post-treatment in one case and 1-month follow-up in the other).

The results are shown in Table 1. During the waiting period the percentage of change in the scores ranged from 0% to 16%. The change in the TSSC was significant but not substantial (13%). Improvement in CAPS, on the other hand, was not significant. In contrast, a substantial reduction was noted in all ratings from the second baseline to post-treatment, ranging from 63% to 73%. Treatment effects were significant on all measures in both parametric and non-parametric tests, with large effect sizes at post-treatment and follow-up. At the last assessment, 70% reduction was noted in earthquake-related fears and PTSD symptoms, with 90% improvement in work and social disability. Using the criterion (Jacobson & Truax, 1991) of 2 SD or more improvement since baseline, seven (88%) cases showed improvement in PTSD, as measured by the CAPS. At the same assessment seven (88%) cases achieved good end-state functioning, defined as a CAPS total score of 19 or less, indicating absence of PTSD (Weathers et al., 2001).

Table 1

Treatment outcome in aggregated sample ($N = 8$): Mean scores at all assessments, change from baseline, percentage change and effect sizes

Measures and assessment points	M	SD	F^a	Z^b	% Change	Effect size ^c
Clinician-Administered PTSD Scale (0–136)						
Baseline-1	61.6	11.3				
Baseline-2	55.5	16.6	4.1	–1.68	10	0.4
Post-treatment	20.5	14.4	36.1***	–2.52*	63	2.0
One-month follow-up	20.4	17.3	25.8***	–2.52*	63	1.8
Three-month follow-up	18.0	15.3	37.8***	–2.52*	68	2.1
Six-month follow-up	16.5	20.1	21.8**	–2.38*	70	1.8
Traumatic Stress Symptom Checklist (0–69)						
Baseline-1	40.1	12.2				
Baseline-2	35.0	12.2	7.3*	–2.24*	13	0.4
Post-treatment	10.6	9.5	22.7**	–2.52*	70	1.9
One-month follow-up	13.4	10.9	16.4**	–2.38*	62	1.7
Three-month follow-up	12.3	11.9	12.0*	–2.31*	65	1.7
Six-month follow-up	10.5	8.6	21.3**	–2.37*	70	2.0
Fear and Avoidance Questionnaire (0–105)						
Baseline-1	50.4	14.4				
Baseline-2	50.8	16.0	0.0	–0.35	0	0.0
Post-treatment	16.1	15.7	21.4**	–2.52*	68	1.9
One-month follow-up	14.3	12.3	35.7***	–2.52*	72	2.3
Three-month follow-up	15.8	19.0	16.4**	–2.38*	69	1.7
Six-month follow-up	13.5	12.2	37.3***	–2.52*	73	2.3
Work and Social Adjustment (0–32)^d						
Baseline-1	17.3	5.2				
Baseline-2	14.6	6.5	1.1	–0.95	16	0.4
Post-treatment	4.0	4.1	25.9***	–2.37*	73	1.7
One-month follow-up	3.1	4.5	21.0**	–2.37*	79	1.8
Three-month follow-up	5.1	7.8	7.1*	–2.12*	65	1.1
Six-month follow-up	1.4	2.7	30.6***	–2.52*	90	2.3

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

^a Within subjects contrast at Baseline 2 tests change from Baseline 1. All other contrasts test change from Baseline 2. All df 's = 1, 7.

^b Wilcoxon-Signed Rank test at Baseline 2 tests change from Baseline 1. All other rank tests test change from Baseline 2.

^c Cohen's d (for change during waiting period) = $M_{\text{baseline-1}} - M_{\text{baseline-2}} / \sqrt{(SD^2_{\text{baseline-1}} + SD^2_{\text{baseline-2}}) / 2}$. Cohen's d (for improvement after treatment) = $M_{\text{baseline-2}} - M_{\text{post-treatment or follow-up}} / \sqrt{(SD^2_{\text{baseline-2}} + SD^2_{\text{post-treatment or follow-up}}) / 2}$. Cohen's d was corrected using Hedges adjustment for small sample size $[1 - 3 / (4(N - 2) - 1)] \times d$.

^d Work impairment item omitted because all participants were housewives. Total score thus based on four items.

4. Discussion

Although our results are based on only eight cases, several strengths of the study that support the internal and external validity of the findings are worth noting. The design involved a waiting period to control for the effects of therapist contact, assessment, and time. The improvement in participants who conducted self-exposure is unlikely to reflect 'spontaneous' recovery, given the chronic nature of PTSD in earthquake survivors (Şalcioğlu, Başoğlu, & Livanou, 2007b) and minimal (10%) improvement in PTSD during the waiting period. Similar improvement rates were noted in the control groups of our previous randomised controlled studies (Başoğlu et al., 2005, 2007). Furthermore, the effect size on PTSD was comparable to those obtained with therapist-delivered treatments in our previous studies (Başoğlu, Livanou, & Şalcioğlu, 2003; Başoğlu, Livanou, Şalcioğlu, & Kalender, 2003; Başoğlu et al., 2005, 2007) and larger than the mean effect size of 1.57 reported in a meta-analysis of studies of exposure treatment in PTSD (Bradley, Greene, Russ, Dutra, & Westen, 2005). Finally, the study involved repeated assessments, which showed that the findings were stable over time.

Several points need to be considered in evaluating the generalisability of our results. The participants were drawn from the same survivor population using similar selection procedures as in a concurrent randomised controlled study. There was no evidence of a selection bias (e.g. inclusion of less severely ill cases) that might have worked in favour of the treatment. Given that the CAPS scores ranged from 33 to 85 (mild to extremely severe PTSD) at the second baseline assessment, the manual appeared to be effective across a fairly wide range of illness severity. Nevertheless, the usefulness of the manual in cases complicated by various comorbid illnesses remains to be explored further. It is worth noting, however, that the manual was not originally designed for the most severely ill cases, which constitute a relatively small proportion of survivors. It was rather intended as a cost-effective care delivery method for the majority of survivors, while sparing costly therapist time for nonresponders to self-help. Second, the fact that our case studies involved only women is unlikely to have biased the results, given that no gender differences were noted in compliance with self-exposure instructions and improvement rates in our previous studies (Başoğlu, Livanou, Şalcıoğlu, & Kalender, 2003; Başoğlu et al., 2005). Third, the case studies revealed a typical response pattern that could be replicated across individuals. This could be regarded as supporting the generalisability of the results, given that the generality of findings in single-case studies is addressed through replication on a case-by-case basis (Hilliard, 1993). Fourth, the study was conducted in a naturalistic community setting with non-treatment seeking survivors, so our results apply (within the confines of the selection criteria) to the survivor population for which the manual was originally intended. It is also important to note that the relatively high exclusion rate of 49% in our study is largely due to the fact that most of the ineligible cases were not deemed suitable for self-help exposure treatment. This does not bias our study group in any way, given that the manual was designed for use in survivors suitable for self-help treatment in the first place. Finally, the fact that six survivors were omitted from the study for not reading the manual is unlikely to have biased the results, because they did not differ from the others in any pre-treatment characteristic. Because they were not informed about the nature of the treatment when they were given the manual and never checked the content of the manual afterwards to find out what the treatment involved (confirmed by retrospective inquiry at week 10 assessment), they are also unlikely to be select cases resistant to the idea of exposure treatment. Not reading the manual is likely to reflect lack of reading habits in people with lower socio-educational status and perhaps other random factors.

The usefulness of a self-help manual needs to be evaluated according to two criteria: its '*effectiveness rate*' (proportion of improved users among those who read and comply with the manual) and its '*benefit rate*' (proportion of users who utilise the manual and improve among those who receive the manual). Effectiveness rate is an indication of whether the treatment involves therapeutic elements and how successfully the manual delivers these elements to compliant cases, whereas benefit rate reflects not only the manual's effectiveness but also the probability of it being read and utilised by the targeted survivor population when delivered to them. Although the aim of the present study was to examine the effectiveness of the manual, the latter criterion is also important, particularly in post-disaster work. Employing these criteria, the manual had a high effectiveness rate ($7/8 = 88\%$), comparable to the improvement rates of over 80% obtained in our previous studies of therapist-delivered treatment. On the other hand, its benefit rate was 50% ($7/14$). If corroborated by further research in larger samples, this finding suggests that one in two survivors could be helped by simply delivering the manual after an initial assessment. This rate is reasonably satisfactory, considering that non-compliance rates (e.g. refusal of treatment and drop-out) reach 50% among patients treated with psychotherapy or drugs and 30% among patients with anxiety disorders receiving therapist-delivered exposure treatment in outpatient settings (Marks, 2002). Some form of monitoring after the manual is delivered to the survivors might be helpful in improving the chances of the manual being read and utilised by survivors. For reasons noted earlier, our study design did not involve any therapist contact or monitoring during the treatment phase.

Given that we have not encountered any complications of treatment at any stage of the development of the manual, self-help appears to be a safe method in care delivery to survivors. Our naturalistic observations suggest that self-exposure strategies play an important role in natural recovery from earthquake trauma; many survivors discover the usefulness of exposure strategies and utilise them without any guidance from a therapist (Başoğlu et al., 2007; Şalcıoğlu et al., 2007b).

Our findings may have some implications for studies of self-help tools. In their review of the relevant literature, Newman et al. (2003) noted that most self-help approaches involve varying amounts of therapist contact (e.g. explaining treatment and its rationale, providing encouragement, monitoring, phone contacts, answering questions, etc) and studies of 'self-administered therapy' (e.g. involving therapist contact for assessment at most) are quite rare. Our self-help approach falls under the latter category. The effectiveness of the manual could be attributed to its trauma-specific and highly structured content that closely parallels therapist-delivered treatment (making one feel as if one is getting treatment from an 'invisible' therapist, as a participant noted). Such features are known to enhance the effectiveness of self-help tools (Hellstrom & Öst, 1995; Newman et al., 2003). In addition, the manual involved minimal cognitive interventions, mainly aimed at enhancing treatment compliance. The results of all our studies, including the present one, show that systematic cognitive restructuring is not essential for recovery. The manual's minimal cognitive focus also made it easier to understand for survivors of lower socio-educational status.

In conclusion, our findings, viewed together with those from our previous studies, suggest that self-help approaches have promise as a cost-effective method of treatment delivery to earthquake survivors. Further research needs to examine the usefulness of the manual when it is distributed to survivors with no therapist contact. Its usefulness might be limited in some survivors because of lack of reading habits, illiteracy, or motivation. Such cases could be helped by a single treatment session delivered by a therapist. Furthermore, audio or video versions of the manual could be developed to facilitate treatment delivery to people with reading difficulties. Finally, self-exposure as an effective coping strategy might also be suitable for mass dissemination through other media, such as the Internet, radio, and TV. The prospects are indeed promising and further research on this issue is well warranted.

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