

# Postal self-exposure treatment of recurrent nightmares

Randomised controlled trial

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**Background** Many nightmare sufferers do not consult a health care professional. Though behaviour and cognitive therapy can help, they have not been tested as a self-treatment method at home using a manual.

**Method** One hundred and seventy adults with primary nightmares were randomised to four weeks' self-exposure or self-relaxation at home using manuals posted to them, or to a waiting-list as a control group for four weeks. Individuals recorded nightmare frequency and intensity in four-week diaries.

**Results** At one- and six-month follow-up, the self-rated nightmare frequency fell more significantly in exposure subjects than relaxation or waiting-list subjects. The self-exposure group had the most drop-outs but remained superior in an over-cautious intent-to-treat analysis. The individuals' partners confirmed the superiority of self-exposure to self-relaxation at one- and six-month follow-up.

**Conclusions** Recurrent nightmare sufferers improved more with self-exposure manuals than with self-relaxation manuals or by being on a waiting-list. Self-exposure may be needed for longer than four weeks in order to reduce nightmare intensity as well as frequency. Despite a high drop-out rate, some sufferers of other conditions may benefit from self-treatment manuals.

Though nightmares are very common, nightmare sufferers rarely seek medical advice. This is often due to embarrassment or fear they might not be taken seriously, or concern that the person will be prescribed sleeping tablets or that treatment is unavailable (further details available from the author upon request). Case reports (Marks, 1978; Cutting, 1979; Burgess *et al*, 1994) and five randomised controlled trials (RCTs) found behaviour and/or cognitive therapy effective in reducing the frequency of nightmares. Four of the RCTs used mainly exposure methods (Cellucci & Lawrence, 1978; Miller & Dipilato, 1983; Kellner *et al*, 1992; Neidhart *et al*, 1992); a fifth used only a cognitive method (Krakow *et al*, 1995). None of these RCTs tested whether sufferers can treat their nightmares at home by using a self-treatment manual sent by post. Also untested is whether exposure works better than a similar amount of relaxation, and whether self-exposure is better than no treatment at all.

## METHODS

### Subjects

Respondents to media advertisements were sent a questionnaire to see whether they met trial criteria including DSM-III-R criteria (American Psychiatric Association, 1987) for recurrent nightmares: age at least 18 years; nightmares for at least one year occurring at last once a week over the past six months; vivid frightening dreams with up to five themes that could be recalled on waking; score  $\geq 5/11$  on distress and sleep disturbance from nightmares; signed consent to enter a correspondence-based self-treatment trial. Exclusion criteria were: severe organic or psychiatric illness; night terrors; narcolepsy; sleep paralysis; asthma; medication likely to cause nightmares; and drinking more than two (women) or three (men) units of alcohol per day.

### Study design

At Week 0, 206 people who had returned a questionnaire showing their suitability for the trial, were randomised to one of three conditions: (a) self-exposure treatment at home; (b) self-relaxation treatment at home; or (c) a waiting-list control. People on the waiting-list were told their situation at Week 0, and the others were told on receipt of their manual at the start of the treatment period in Week five.

At Week 0 all the people were sent a four-week nightmare diary in which to record the frequency and intensity (0-8) of their nightmares, to be completed each day over Weeks 1-4 and returned at the end of Week 4, and also other items to be rated and returned together with the diary at the end of Week 4. On receipt of completed diaries the individuals were sent a fresh diary to be returned at the end of Weeks 8 and 12. Self-exposure and self-relaxation subjects completed their self-treatment individually in Weeks 5-8 and were followed-up to Week 12.

The people randomised to self-exposure or to self-relaxation were asked to follow the manual's instructions for 0.5-1 hour daily and to record length of self-treatment sessions and anxiety/relaxation at the start of, during, and at the end of each session. Exposure subjects were asked to write down their nightmares immediately on waking, and to relive these in their imagination. Relaxation subjects were asked to carry out muscle relaxation (Jacobsen, 1929) for 0.5-1 hour daily.

People randomised to the waiting-list were posted nightmare diaries for Weeks 0-4, 5-8 and 9-12 and other measures for the ends of Weeks 4, 8 and 12. After Week 12 they were randomised to self-exposure or to self-relaxation.

The individuals were given a therapist's phone number and a weekly time they could call during the treatment weeks (5-8), but hardly ever took up this offer.

### Measures

The individuals were asked to record nightmares on the previous night and their intensity (0=none, 8=extreme) together with eight other items selected for their reliability, validity and sensitivity to change in anxiety disorders (Marks & Matthews, 1979; Marks, 1986) including the fear questionnaire (Marks & Matthews, 1979); the Beck Depression Inventory (21-item) (Beck *et al*, 1961); problem and target

ratings (on 0–8 scales) (Marks, 1986); and work, home management, social leisure, private leisure ratings (on 0–8 scales) (Marks, 1986).

If possible, partners were asked at one- and six-month follow-up to rate the person on 0–8 scales for sleep (0=worse, 8=improved) and well-being (0=worse, 8=improved).

## Statistical methods

Nightmare frequency and nightmare intensity were calculated. Percentage difference of scores from Weeks 4 to 12 and from Weeks 4 to 32 was calculated for each subject for nightmare frequency and intensity and for problem, target, fear questionnaire and Beck depression scores. These percentages had an approximately normal distribution and their means were analysed by group using ANOVA for Weeks 4–12 and Weeks 4–32 in order to use all available data. Change in means over time for each group for work, home management, private leisure and social leisure at pre-treatment, one- and six-month follow-up were analysed by paired *t*-tests.

The many dropouts (as expected) were compared with completers on demographic and baseline clinical measures. An intention-to-treat analysis was carried out for all individuals who completed pre-treatment measures at the end of Week 4. For this ANOVA, where data were missing at follow-up, they were calculated from the pre-treatment value on the assumption that no change had occurred (though 20 of the 67 drop-outs said they did not return measures because they had improved and no longer wanted to bother corresponding).

## RESULTS

### Subject flow

There were 1633 people who responded to the advertisement and were sent a questionnaire about suitability for the trial. The majority (901) completed the questionnaire; of these 695 did not meet entry criteria and 206 did.

The 206 suitable subjects were randomised to: self-exposure (83), relaxation (61), and waiting-list (62). Randomisation was skewed in the ratio 2:1:1, respectively. However, half-way through the trial, it became apparent that the exposure group contained the most drop-outs. Thirty-six people did not complete the baseline nightmare diary or measures at Week 4 and were

excluded as non-starters, leaving 170 people (69 exposure, 55 relaxation, 46 control) who continued treatment phase for Weeks 5–8. Diaries were returned at Week 8 (post-treatment) by 103 (28, 33, 42, respectively) people, at Week 12 (one-month follow-up) 99 diaries (28, 30, 41) were returned, and at Week 32 (six-month follow-up) by 46 (23 exposure, 23 relaxation) subjects.

### Subject characteristics

At randomisation at Week 0, the mean ages of subjects were 44 (s.d. 17), 46 (s.d. 19) and 42 (s.d. 15) years in the exposure, relaxation and waiting-list groups, respectively. The percentages of women were 83 in the exposure group, 85 in the relaxation group, and 70 on the waiting-list. Percentages who were married or living with a partner were 58 in the exposure group, 60 in the relaxation group and 64 on the waiting-list. Duration of problems with nightmares was 10–20 years in all three groups. Groups did not differ significantly on any of these variables. Baseline scores for mood (Beck) and work adjustment were not significantly lower for people on the waiting list than those in the exposure or relaxation groups.

### Completers v. drop-outs

Treatment-phase (Weeks 5–8) diaries and assessments were not returned by 67 people (39%); 41 (61%) in the exposure group, 22 (33%) in the relaxation group, 4 (6%) on the waiting list. More drop-outs occurred within the exposure group than in the relaxation group ( $\chi^2=4.6$ , 1 d.f.,  $P=0.03$ ). Week 12 information was not returned by a further three relaxation group and one waiting-list subjects. Total numbers not completing Week 12 were thus 71 (42%); 41 (61%), 25 (45%), 5 (11%) respectively.

Compared to treatment completers, drop-outs by Week 8 from the exposure and relaxation groups were more often single ( $P=0.005$ ), and people in the relaxation group had had fewer nightmares at baseline ( $P=0.02$ ). In other respects drop-outs and completers were similar.

Each of the 67 people who dropped out of treatment was asked why they dropped out. The 79% who replied gave reasons such as: nightmares had reduced or ceased (13 exposure, 7 relaxation subjects), technical problems or lack of time in doing treatment (9 exposure, 7 relaxation subjects), occurrence of illness (7 exposure, 4 relaxation subjects).

## Change in measures by condition over time

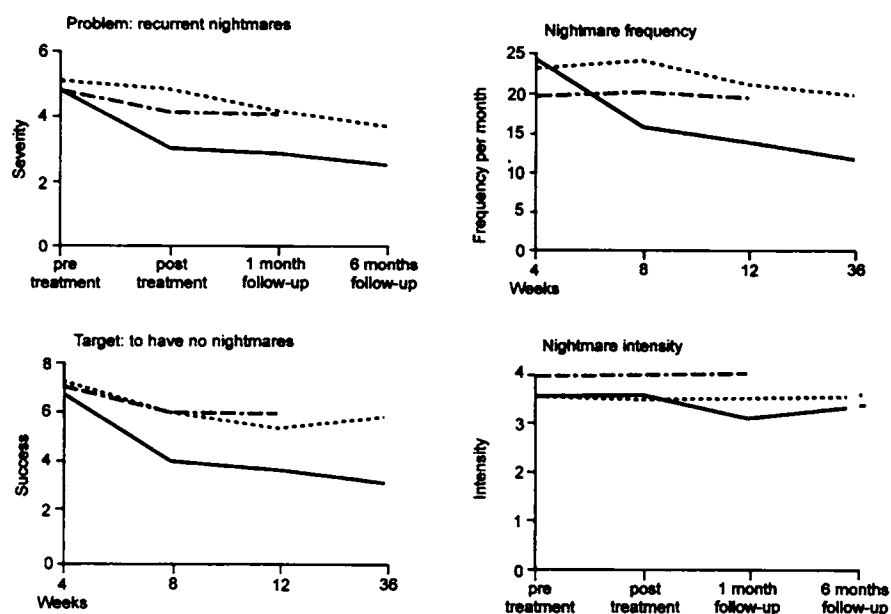
### Completer analysis

Figure 1 and Table 1 show the measures from baseline (Week 4) to six-month follow-up (Week 32). For parametric analysis the data were normalised by converting them to percentage differences. By Week 12 the number of nightmares per month fell by 43% for the exposure group, 9% for the relaxation group, and 7% for those on the waiting list (exposure *v.* relaxation,  $F=13.1$ ,  $P=0.0005$ ; exposure *v.* waiting-list,  $F=17.9$ ,  $P=0.0001$ ). By Week 32 nightmare frequency had fallen by 58% for the exposure group but only 18% in the relaxation group. Compared to relaxation, the exposure group also improved significantly more on nightmare target and total phobia (fear questionnaire). Compared to people on the waiting list, those in the exposure group also improved significantly more on nightmare problem and target ratings, fear questionnaire and Beck depression rating. The relaxation group did not improve significantly more than the waiting-list group on any measure.

Work, home management and social and private leisure measures appear in Table 2. On paired *t*-tests the exposure group improved significantly from Weeks 4 to 12 and 4 to 32 on all four measures. The relaxation group did not improve significantly on any measure. The waiting-list group improved significantly on home management for Weeks 4–12. At six-month follow-up the above measures again improved significantly compared to pre-treatment measures for the exposure group but not for the relaxation group.

### Partner-rated measures

Partners of 38 people who had completed treatment were available and were sent questionnaires. Partners were asked to rate the individuals' sleep and well-being at one- and six-month follow-up. Twenty-nine (15 exposure, 14 relaxation) people replied at one-month follow-up and 26 (14 exposure, 12 relaxation) at six-month follow-up. Partners rated subjects' sleep as having improved significantly more (Table 3) after exposure than relaxation treatment at both one- and six-month follow-up (respectively  $F=5.27$ ,  $P<0.029$ ;  $F=4.2$ ,  $P<0.05$ ). Partners also tended to rate subjects' well-being as being greater after



exposure than relaxation at six-month follow-up ( $F=3.34, P<0.07$ ).

*Intention-to-treat analysis*

Data for people who did not complete treatment in Weeks 5–8 or subsequent follow-up (non-completers) were projected as though they had not improved. This procedure is over-cautious, given that 20 of the 67 drop-outs from the treatment phase said they did not return measures as they had improved and did not want the bother of further contact. Data from completers were combined with the projected data for drop-outs and for non-completers in order to carry out intention-to-treat analyses by ANOVA for Weeks 4–12 and for Weeks 4–32.

As with the completer analysis, for Weeks 4–12 (to one-month follow-up) the number of nightmares fell significantly more after exposure treatment than relaxation ( $F=7.4, P<0.007$ ) or waiting ( $F=6.6, P<0.012$ ). For Weeks 4–12 the exposure

**Fig. 1** Means, by group, of nightmare frequency and intensity and problem and target ratings at pre-treatment, post-treatment, one-month and six-month follow-up. —, exposure group; - - - -, relaxation group; - · - · -, waiting list.

**Table 1** Treatment completers: means for measures at Weeks 4 (pre-treatment), 8 (end of treatment) 12 (one-month follow-up) and 32 (six-month follow-up); E=exposure group, R=relaxation group, W=waiting list group. Group comparison is of mean percentage differences, Weeks 4–12 and 4–32

	Group	n	Week 4 mean (s.d.)	Week 8 mean (s.d.)	Week 12 mean (s.d.)	n	Week 32 mean (s.d.)	ANOVA					
								E v. R		E v. W		R v. W	
								F	P	F	P	F	P
Number of nightmares in month	E	28	19.9 (10.8)	13.1 (9.0)	11.3 (7.7)	20	8.3 (8.6)	13.1 <sup>1</sup>	0.0005	17.9	0.0001	0.1	0.76
	R	30	23.3 (16.2)	21.7 (13.7)	21.2 (15.9)	22	19.0 (18.3)	6.2 <sup>2</sup>	0.017				
	W	41	19.7 (13.6)	19.3 (12.6)	18.4 (11.9)								
Intensity (0–8)	E	28	3.6 (1.2)	3.5 (1.6)	3.6 (1.2)	20	3.3 (2.1)	0.27 <sup>1</sup>	0.61	0.36	0.55	0.0	0.99
	R	30	3.7 (1.3)	3.5 (1.7)	3.7 (1.3)	22	3.4 (1.5)	0.0 <sup>2</sup>	0.99				
	W	41	4.1 (1.6)	4.0 (1.2)	4.1 (1.6)								
Problem (0–8)	E	28	4.7 (1.7)	3.0 (1.1)	2.6 (1.5)	20	2.2 (1.4)	3.86 <sup>1</sup>	0.54	4.53	0.04	0.17	0.68
	R	30	5.0 (1.4)	4.7 (1.9)	4.2 (1.9)	22	3.5 (1.8)	2.8 <sup>2</sup>	0.1				
	W	41	4.1 (1.6)	4.1 (1.8)	4.0 (1.6)								
Target (0–8)	E	28	6.6 (1.5)	4.0 (2.1)	3.6 (2.1)	20	2.9 (2.4)	6.8 <sup>1</sup>	0.01	11.1	0.001	2.04	0.16
	R	29	7.2 (1.0)	5.9 (2.1)	5.5 (2.5)	22	5.4 (2.5)	9.4 <sup>2</sup>	0.004				
	W	41	7.1 (1.6)	6.5 (2.2)	5.9 (2.0)								
Beck Depression Inventory (0–63)	E	28	20.3 (12.1)	13.2 (7.6)	12.6 (9.2)	20	11.7 (10.4)	3.1 <sup>1</sup>	0.08	9.8	0.003	3.18	0.08
	R	30	19.4 (10.1)	17.4 (11.8)	16.3 (12.3)	22	17.9 (11.3)	2.4 <sup>2</sup>	0.12				
	W	41	13.8 (7.8)	12.2 (8.6)	13.4 (9.4)								
Fear questionnaire: total phobia (0= 120)	E	28	38.2 (21.9)	30.7 (15.7)	27.0 (17.9)	20	26.5 (18.1)	3.87 <sup>1</sup>	0.05	13.6	0.0005	0.9	0.34
	R	30	37.1 (19.6)	37.1 (21.1)	35.6 (23.5)	22	34.4 (24.1)	2.4 <sup>2</sup>	0.12				
	W	41	31.7 (17.6)	30.2 (15.1)	32.3 (17.4)								

1. Percentage difference Weeks 4–12.  
2. Percentage difference Weeks 4–32.

**Table 2** Means of measures at Weeks 4, 12 and 32. Paired sample t-tests are performed by group for Weeks 4 and 12 and Weeks 4 and 32

		n	Week 4 mean (s.d.)	Week 12 mean (s.d.)	n	Paired sample t-test		
						Week 32 mean (s.d.3)	Pre-1-month t (P)	Pre-6-month t (P)
Work	E	27	3.8 (3.4)	2.3 (3.0)	23	1.5 (2.5)	2.86 (0.008)	3.69 (0.001)
	R	26	4.4 (3.6)	3.2 (3.2)	23	4.1 (3.5)	1.9 (0.069)	1.09 (0.288)
	W	39	2.5 (1.9)	2.2 (1.9)		0.9 (0.376)		
Home management	E	27	2.1 (2.0)	1.1 (1.2)	23	0.9 (1.0)	2.49 (0.019)	2.32 (0.030)
	R	26	1.8 (1.5)	1.6 (1.6)	23	2.0 (1.0)	0.49 (0.631)	0.00 (1.000)
	W	39	2.0 (1.6)	1.5 (1.6)			2.11 (0.042)	
Private leisure	E	27	2.5 (1.9)	1.1 (1.3)	23	0.9 (1.1)	3.24 (0.003)	3.74 (0.001)
	R	26	2.0 (1.7)	2.0 (2.4)	23	2.3 (1.9)	-0.12 (0.903)	-1.00 (0.328)
	W	39	1.8 (1.6)	1.8 (1.6)			0.10 (0.922)	
Social leisure	E	27	2.3 (2.0)	1.3 (1.6)	23	1.2 (1.1)	2.62 (0.015)	2.21 (0.038)
	R	26	2.4 (2.5)	1.7 (2.0)	23	1.7 (2.1)	1.94 (0.064)	1.57 (0.130)
	W	39	2.1 (1.9)	1.9 (1.8)			0.77 (0.444)	

E, exposure group; R, relaxation group; W, waiting-list group.

group also improved more than the waiting-list group on the fear questionnaire (total phobia) ( $F=7.4$ ,  $P<0.007$ ) and Beck depression ( $F=3.9$ ,  $P<0.049$ ). Between-group differences were not significant for Weeks 4–32. Relaxation was no better than waiting on any measure at one- or six-month follow-up.

## DISCUSSION

### Self-exposure was superior to self-relaxation and waiting

Self-help (rehearsal relief) instructed by a posted self-exposure manual without therapist contact improved chronic recurrent nightmares more than instructions for relaxation using a posted self-relaxation manual, and more than being on a waiting list. Monthly nightmare frequency fell by 43% after a month of self-exposure treatment and by 58% by six-month follow-up, but changed little with self-relaxation or being on a waiting list. The effect was significant for treatment completers and also for intention-to-treat analyses given that 20 out of 67 people who did not return treatment-phase measures said they had improved. Gains continued to one- and six-month follow-up. At those points partners confirmed that the individuals' sleep was better after self-exposure than after self-relaxation.

Many people had been very distressed by the trouble they had falling asleep after a

nightmare, for fear of having a bad dream. Insomnia produced fatigue, irritability, lower concentration and energy. People scored fairly high on the 21-item Beck Depression Inventory (mean 18, 95% CI for all subjects 15.3–20.9, similar to that in people with chronic generalised anxiety (Durham & Turvey, 1987)), and on the 0–40 anxiety/depression sub-scale of the fear questionnaire (mean 17.5, 95% CI 14.7–20.1). Anxiety and depression scores fell after self-treatment, significantly more after exposure than after relaxation, suggesting that the nightmares had formerly been producing anxiety and depression, and that reducing nightmares can relieve depressed mood. In addition, work, home management and social and private leisure had improved significantly by one- and six-month follow-up almost solely in the exposure group. This suggested that

improvement in nightmares also improved general well-being.

Waiting-list subjects had slightly less depression and better work adjustment at baseline than other subjects. This strengthens the finding that self-exposure was superior to being on a waiting list, as anxiety disorders usually improve even more with exposure therapy when mood and work adjustment are normal.

Although nightmare frequency and other symptoms improved markedly after self-exposure treatment, nightmare intensity did not decrease. This might reflect the fact that four weeks of treatment is too short, given that some anxiety reduction usually appeared in the records of the self-exposure subjects. To reduce nightmare intensity, future trials might have to encourage subjects to try self-exposure treatment for longer, perhaps over eight weeks.

**Table 3** Partners' rating of subject's sleep and general well-being at one- and six-month follow-up

	Group	One-month follow-up					Six-month follow-up				
		n	Mean	s.d.	F	P	n	Mean	s.d.	F	P
Sleep	Exposure	15	5.87	1.06	5.27	0.029	14	6	1.3	4.2	0.05
	Relaxation	14	4.92	1.14			12	4.8	1.5		
Well-being	Exposure	15	5.26	1.2	0.09	0.76	14	5.5	1.4	3.34	0.07
	Relaxation	14	5.14	0.94			12	4.41	1.62		

The self-help manuals appeared easy to follow as individuals improved markedly with exposure and only two people (one exposure, one relaxation subject) ever contacted the therapist during the treatment phase. A similar, very low rate of telephoning the therapist was noted by Krakow *et al* (1995).

### Therapeutic components

The superiority of exposure treatment cannot be attributed either to the recording of nightmares (because all groups completed diaries) or to self-treatment homework (because the self-relaxation group completed homework too). Unlike Marks (1978), we did not ask people to add a triumphant end to nightmares when they rehearsed them, because this would have added a confounding cognitive factor. Whether such cognitive factors could enhance compliance and outcome is worth testing. In the trial by Krakow *et al* (1995), cognitive therapy with minimal exposure was effective.

### High drop-out rate with treatment by post

The reply rate to posted questionnaires tends to be low. It was only 39% at three-month follow-up among 103 chronic anxiety sufferers who had been sent self-help material (Donnan *et al*, 1990). Our 45% reply rate was similar (732/1633). Only 59% of 412 people who had taken iodine for hyperthyroidism posted back a questionnaire that had been posted to them by Hoffman *et al*, (1981).

The fact that more single than married people dropped-out from exposure and from relaxation suggests that a partner helps motivation to complete systematic self-care (the same holds for taking medication). Few people dropped-out of our waiting list. Our high drop-out rate from postal treatment suggests that an offer of such care may not help all the many anxiety-disorder sufferers found in community surveys who said they were untreated.

Does our high treatment drop-out rate make postal exposure financially ineffective? We do not think so because exposure was effective even in the intention-to-treat analysis and the exposure booklet is simple and cheap to post and monitor. However, a formal cost-effectiveness trial is desirable.

### CLINICAL IMPLICATIONS

- Nightmare frequency, mood and work/social adjustment improved the most (at six-month follow-up) after sufferers were posted self-exposure treatment manuals. Self-exposure was better than relaxation or being on a waiting-list.
- Nightmares changed little after self-relaxation treatment or being on a waiting list.
- Self-exposure therapy by post may be of value to nightmare and other anxiety sufferers who do not seek help from a health care professional.

### LIMITATIONS

- Unlike nightmare frequency, nightmare intensity was not greatly reduced after only four weeks of self-exposure, and may need a longer self-exposure phase to improve.
- Many people dropped-out of postal self-treatment, especially self-exposure.
- Postal self-treatment may be less effective in individuals who have no partner.

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### Implications for treatment

We believe that self-exposure treatment is lastingly effective and that it is lastingly better than alternative treatments. We also think that it can be successfully carried out by post, despite the high drop-out rate recorded here. Self-treatment by correspondence and post may be worth trying in phobic, obsessive-compulsive and post-traumatic stress disorders, which are problems that also improve with behaviour and cognitive therapy.

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