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Long-term treatment effects of imagery rehearsal therapy for nightmares in a population with diverse mental disorders

Annette M. van Schagen[1], Jaap Lancee[2], Victor I. Spoormaker[3], & Jan van den Bout[4]

[1]GGz Centraal Innova, The Netherlands
[2]Department of Clinical Psychology, University of Amsterdam, The Netherlands
[3]Max Planck Institute of Psychiatry, Munich, Germany
[4]Department of Clinical and Health Psychology, Utrecht University, The Netherlands

Summary. Nightmares are a common problem with debilitating consequences. Meta-analyses have revealed that imagery rehearsal therapy (IRT), in which the storyline of the recurring nightmare is changed, is the treatment of choice for nightmares. In a randomized clinical trial, we recently demonstrated that IRT was also effective in a population of patients with diverse mental disorders. In this trial, IRT showed moderate additional benefits over treatment as usual on nightmare distress, general psychopathology, and posttraumatic stress symptoms. In the current paper we report on the six- and nine month follow-up measurements of the IRT group of this trial. In the six- and nine-month follow-up the moderate improvements observed at post-treatment were sustained for all measures. This means that IRT has long-lasting effects, also in a sample with severe co-morbid psychopathology. IRT could be considered at an early stage in addition to the usual mental health treatment.

Keywords: Nightmares, imagery rehearsal therapy, comorbidity, mental disorders, follow-up

1. Introduction

The prevalence of nightmares is high with about 2-5% in the general population suffering from one or more nightmares a week (Sandman et al., 2013) and up to 30% in populations with diverse mental disorders (Swart, van Schagen, Lancee, & van den Bout, 2013). Nightmares are associated with various forms of psychological distress both in the general population (Lancee & Schrijnemaekers, 2013), as well as in a population of patients with diverse mental disorders: patients with frequent nightmares have more severe psychopathological symptoms than patients without nightmares (submitted manuscript).

Nightmares can be treated effectively with imagery rehearsal therapy (IRT; Augedal, Hansen, Kronhaug, Harvey, & Pallesen, 2013). With IRT, the script of the recurring nightmare is changed into a new dream with a different ending. Subsequently this new dream story is rehearsed by imagining it several times during the day. IRT has been extensively studied in general populations and in patients with posttraumatic stress disorder (PTSD). Several meta-analyses concluded that IRT is the treatment of choice for nightmares (e.g. Augedal et al., 2013).

Recently we have demonstrated the efficacy of IRT in a population with diverse mental disorders (van Schagen, Lancee, de Groot, Spoormaker, & van den Bout, 2015). In this randomized controlled trial we observed that IRT added to the treatment as usual rendered moderate effects on nightmare frequency, nightmare distress and psychopathology measures. These effects were sustained at the three-month follow-up consistent with previous research on samples with PTSD or traumatic experiences (Davis & Wright, 2007) or patients with major depression or PTSD and nightmares (Thünker & Pietrowsky, 2012). However, little is known about the long-term effects of IRT in a psychiatric population. In this paper we report on the six- and nine- month follow-up data of this trial with regard to the IRT condition only.

Corresponding address:
Annette M. van Schagen, Foundation Centrum '45, Rijnzichtweg 35, 2342 AX Oegstgeest, The Netherlands.
Email: A.van.Schagen@centrum45.nl

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2. Method

2.1. Participants and Procedure

The study participants were patients with diverse mental disorders that received treatment at a secondary mental healthcare institute, GGz Centraal, at three locations in the Netherlands. In line with the declaration of Helsinki (2013) the study was approved by the Medical Research Ethics Committee of Isala Clinics, Zwolle, the Netherlands and was registered at Clinical Trials (ID: NCT00291031). Between January 2006 and July 2010 participants were recruited. Treating practitioners referred their patients to the study if they reported to have a minimum of three nightmares a month. After the procedure had been explained fully written informed consent was obtained from all participants.

After the baseline assessment, 90 participants were randomly assigned to the IRT condition or the treatment as usual condition (TAU). The mean age was 36.0 years (SD =

10.6). There were 18 men (20.0%) and 72 women (80.0%). The primary diagnoses according to DSM-IV-TR (APA, 2000) were personality disorders (45.3%), mood disorders (17.4%), anxiety disorders (including PTSD) (17.4%) and other disorders (19.9%). Most participants (75.6%) had more than one DSM-IV-TR diagnosis. After six months, the participants in the TAU condition also received IRT. The intervention consisted of six individual sessions at intervals of two weeks of manualized IRT added to the treatment as usual. The IRT treatment manual was written by the first author (AvS) and third author (VS). See for a description of the manual (van Schagen et al., 2015).

Post-treatment assessments took place after the completion of the IRT (three months after the baseline) and at follow-up three months later. Participants recorded their nightmares in daily nightmare logs from the baseline to the post-treatment. They completed another four weeks of the daily nightmare log before every follow-up assessment. Only for the IRT condition, there were two additional follow-up assessments, one six months after post-treatment, and one nine months after post-treatment. In the current paper we report on these six- and nine-month follow-up data. The drop-out rate for the nine-month follow up was 58.1%.

2.2. Measures

Participants recorded their nightmares and sleep quality in daily nightmare logs (Lancee, Spoormaker, & van den Bout, 2010). The Dutch version of the Nightmare Frequency Questionnaire (NFQ) (Krakow et al., 2002) was used to assess the nightmare frequency retrospectively. Nightmare distress was measured using the Dutch version of the Nightmare Distress Questionnaire (NDQ) (Belicki, 1992). The effects of nightmares on daily life were measured with the Dutch version of the Nightmare Effects Survey (NES) (Krakow et al., 2000).

The Dutch version of the SCL-90 was administered to assess general psychopathology (Arrindell & Ettema, 2003). The 'Self-Rating Inventory for Posttraumatic Stress Disorder' (ZIL), a Dutch self-report inventory regarding the specific symptoms of post-traumatic stress disorder, assessed the severity of PTSD symptoms in the last four weeks (Hovens, Bramsen, & van der Ploeg, 2002). Item 7 ('I had bad dreams') was removed from the analysis, leaving us with the items to assess PTSD symptoms other than nightmares.

2.3. Data analysis

Multilevel regression analyses were performed to test for within-group effects. This intention-to-treat analysis allows participants with only one measurement to be included in the analysis (Hox, 2002). A one-way between groups analysis of variance was conducted to explore possible differences between the completers (n = 25) and non-completers (n=18). At baseline, there was a trend that non-completers had lower scores on both the NDQ and the NES compared to the completers ($p = 0.10$). Therefore we added the baseline scores of the NDQ and the NES as covariates in the multilevel regression analyses. Furthermore, the nightmare frequency variable was log-transformed because of the skewness of its distribution. Throughout the study a significance level of $p < 0.05$ (two-tailed) was used. Cohen's d effect sizes on the observed data were calculated with: (Mpre1 – Mpost1) / pooled. In addition, to correct for possible dropout influences of the NES and NDQ variables, the missing follow-up values were imputed using multiple imputation (Sterne et al., 2009). We used a predictive mean matching procedure and imputed ten separate datasets. Those data with corresponding Cohen's d are reported in an online supplement (Supplementary Table S1). Regarding the daily nightmare logs, we calculated mean weekly scores only if five or more days in one week were filled out. Because there were too many data missing on the daily nightmare logs we decided not to impute these missing data.

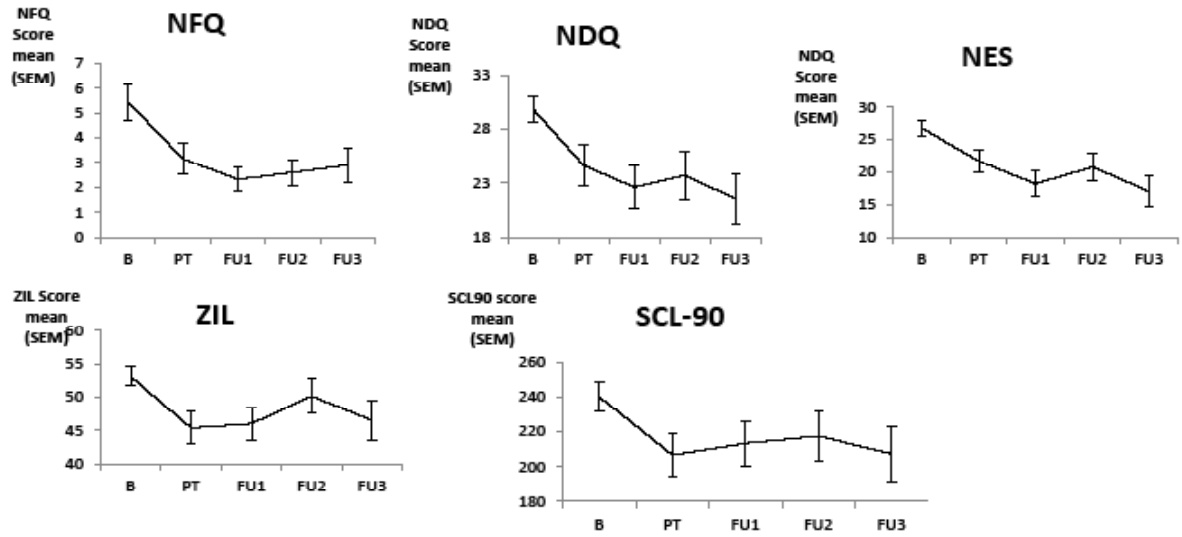
3. Results

The treatment effects observed at post-treatment and three-

Table 1. Observed pre- post-treatment means with corresponding Cohen's d effect sizes on all measures

	Baseline N = 43		Post-treatment N = 31			Follow-up 1 N = 28			Follow-up 2 N = 27			Follow-up 3 N = 25		
	Mean	(SD)	Mean	(SD)	d	Mean	(SD)	d	Mean	(SD)	d	Mean	(SD)	d
NFQa	5.45	(4.78)	3.16	(3.41)	0.55***	2.33	(2.68)	0.81***	2.61	(2.74)	0.73***	2.91	(3.49)	0.61***
NFQb	3.59	(1.99)	2.31	(1.85)	0.67***	2.01	(2.01)	0.79***	2.10	(1.71)	0.80***	2.39	(2.50)	0.53***
NDQ	29.84	(7.88)	24.65	(10.31)	0.57***	22.61	(10.48)	0.78***	23.70	(11.59)	0.62***	21.54	(11.62)	0.84***
NES	26.84	(9.15)	21.74	(11.50)	0.49***	18.21	(12.02)	0.81***	20.82	(12.42)	0.55***	17.04	(13.76)	0.84***
ZIL	53.16	(9.42)	45.42	(13.41)	0.67**	46.04	(13.23)	0.62**	50.19	(13.51)	0.26*	46.56	(15.16)	0.52**
SCL-90	240.16	(57.19)	206.68	(67.32)	0.54*	213.36	(67.22)	0.43*	217.52	(72.73)	0.35*	207.40	(79.12)	0.47**
DNLa	4.84	(3.16)	3.11	(3.12)	0.55***	3.26	(3.12)	0.50***	2.98	(3.22)	0.58***	2.80	(4.25)	0.54***
DNLb	3.57	(2.08)	2.48	(2.28)	0.50***	2.56	(2.24)	0.47***	2.32	(2.14)	0.59***	2.02	(2.19)	0.73***
DNLc	4.98	(1.41)	5.47	(1.48)	-0.34***	5.38	(1.71)	-0.26***	5.63	(1.60)	-0.43***	5.81	(1.48)	-0.57***

Note: * p < .05. ** p < .01. *** p < .001 (two-tailed); d = Cohen's d; Post-treatment = 3 months after Baseline; Follow-up 1 = 3 months after post-treatment; Follow-up 2 = 6 months after post-treatment; Follow-up 3 = 9 months after post-treatment; NFQa = Nightmare Frequency Questionnaire, nightmares per week; NFQb = Nightmare Frequency Questionnaire, nights with nightmares per week; NDQ = Nightmare Distress Questionnaire; NES = Nightmare Effects Survey; ZIL = PTSD symptoms; SCL-90 = Symptom Checklist Total Score; DNLa = Daily nightmare log, nightmares per week; DNLb = Daily nightmare log, nights with nightmares per week; DNLc = Daily nightmare log, sleep quality (rated on a scale 0–10, with 0 = lowest sleep quality to 10 = highest sleep quality).



Note. B = baseline assessment; PT = post-treatment assessment; FU1 = follow-up assessment 1; FU2 = follow-up assessment 2; FU3 = follow-up assessment 3; NFQ = Nightmare Frequency Questionnaire; NDQ = Nightmare Distress Questionnaire; NES = Nightmare Effects Survey; ZIL = PTSD Symptoms; SCL90 = Symptom Checklist.

Figure 1. Changes in observed mean scores and standard errors of means on all assessments.

month follow-up were sustained at the six- and nine-month follow-up assessments. Compared to baseline, significant moderate time effects ($p < .05$) were found for nightmares per week (6 months: b = -1.86; SE = 0.31; 9 months: -1.94; SE = 0.32), nights with nightmares (6 months: b = -3.99; SE = 0.61; 9 months: -3.85; SE = 0.62), nightmare distress (6 months: b = -6.73; SE = 1.37; 9 months: -9.75; SE = 1.43), nightmare effects (6 months: b = -19.51; SE = 3.35; 9 months: -24.09; SE = 3.41), psychopathology symptoms (6 months: b = -38.90; SE = 19.62; 9 months: -52.97; SE = 19.94), and PTSD symptoms (6 months: b = -7.46; SE = 4.18; 9 months: -11.78; SE = 4.25); Table 1, Figure 1). Please see supplementary table S1 for the corresponding imputed means. In general, there were only negligible differences in Cohen's d effect sizes based on the imputed dataset compared with the Cohen's ds from the observed data. In supplementary table S2 all the multi-level regression coefficients can be found.

4. Discussion

In this study we reported on the long-term treatment effects of IRT in addition to treatment as usual in a population with moderate to severe mental disorders. We observed that the moderate effect of IRT was sustained over a period of nine months for nightmare frequency, nightmare distress and effects, PTSD complaints and general psychopathology symptoms. These findings are consistent with earlier reports on long-term treatments effects in the general population (Lancee, Spoormaker, & van den Bout, 2011) and in patients with PTSD complaints (Davis & Wright, 2007). The current data extend these findings beyond the general populations or specific patient groups into a more diverse patient population with moderate to severe mental disorders.

Before discussing the implications of these findings we first want to mention a couple of limitations. A major limitation of the current study is that, due to ethical reasons, we did not have a control group at the six- and nine-month follow-up. At the three-month follow-up the additional benefit of IRT over treatment as usual alone, remained intact (van Schagen et al., 2015); therefore we think that the influence of time-effects is probably low. However, since we do not have these six- and nine-month follow-up control data, the results should be interpreted with caution. Additionally, we had several missing data. We tried to control for these with multilevel regression and multiple imputation but these remain estimations and should be treated as such.

These limitations notwithstanding we propose that the results are still clinically relevant since we observed an enduring moderate treatment effect in a complex patient population with severe and heterogeneous psychopathology. Therefore these findings are a useful addition to the literature because this study is more ecologically valid than the earlier studies with more specific populations e.g. (Davis & Wright, 2007).

We have shown that populations with severe co-morbid psychopathology also benefit from symptom-based treatments like IRT in the short and long-term. We propose that IRT should be considered at an early stage of treatment in addition to the regular mental health treatment since nightmares are debilitating and the associated sleep disruptions may be a maintaining factor for other mental problems, and IRT had a positive effect on comorbid psychopathology symptoms as well.

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