Weighted blankets for insomnia in affective disorder and ADHD – a clinical follow up study

Authors:

Bodil Ekholm, Bachelor of Science in Occupational Therapy, Bachelor of Medical Science with a major in Occupational Therapy.[1]

Mats Adler, MD, PhD.[1,2*]

1. The Affective Disorder outpatient clinic at Psychiatry Southwest, Karolinska University Hospital Huddinge, SE-14186 Stockholm Sweden.

2. Institution for Clinical Neuroscience, Karolinska Institutet, Tomtebodavägen 18A, SE-171 76 Stockholm, Sweden.

*) Corresponding author.
Psychiatric clinic Southwest, M58
Karolinska University Hospital Huddinge
SE118 49 Stockholm
Sweden
Tel. +46858589125
+46707717977
mats.adler@sll.se

Abstract

Introduction: Weighted blankets are used for the treatment of insomnia in patients with affective disorders and ADHD, despite the lack of scientific support. This study aimed to evaluate the clinical use of weighted blankets for insomnia in patients with affective disorder and ADHD.

Methods: 199 psychiatric patients with affective and ADHD diagnoses and co-occurring insomnia were included consecutively and treated with weighted blankets as a part of a clinical routine. They were evaluated before and after four weeks use of the blanket concerning time to sleep onset and ten sleep-related symptoms, using a self-rating scale, and after one year by a telephone interview.

Results: The use of weighted blankets reduced the median time to fall asleep from 70 to 30 minutes ($p<0.001$) and led to a significant improvement of ten other sleep-related symptoms at the follow up after four weeks. After one year the positive effects on sleep were still maintained.

Conclusions: The favourable results the results of this open clinical study should be interpreted with caution. Studies with a controlled design are warranted.

Key words: insomnia, affective disorder, ADHD, weighted blankets, occupational therapy

Introduction

Insomnia is common in modern society. Using a definition based on DSM-IV criteria, approximately one-third of the population suffers from insomnia (Ohayon, 2002). Insomnia refers to night-time sleep symptoms as difficulties in initiating sleep, maintaining sleep or having a non-refreshing sleep, giving daytime consequences as fatigue, attention deficits and mood instability (Pillai, Roth, & Drake, 2015). The day-time consequences of insomnia often interfere with occupational functioning, making sleep an important focus for occupational therapists.

Insomnia is highly prevalent among patients with psychiatric disorders. Studies have shown that up to 70% of bipolar patients suffer from insomnia, increasing the risk of relapse into affective episodes and suicide (Harvey, Schmidt, Scarna, Semler, & Goodwin, 2005; Harvey et al., 2015). Among patients with ADHD, the prevalence of insomnia have been estimated to 60-80 %, enhancing the burden of cognitive dysfunction, fatigue, and emotional symptoms (Yoon, Jain, & Shapiro, 2012).

Treatment with weighted blankets is an increasingly recommended intervention used by occupational therapists for relaxation, insomnia, and other sleeping problems (Hvolby & Bilenberg, 2011; Mullen, Champagne, Krishnamurty, Dickson, & Gao, 2008). The mechanisms of action for weighted

blankets is not established, but it is hypothesized that they provide calming sensory input, reducing levels of physiological arousal (Ayres, 1972; Gringras et al., 2014). The scientific evidence for the clinical effect of weighted blankets on insomnia and other sleeping problems is, however, limited. A few studies are made in children with developmental disorders and healthy adults (Gringras et al., 2014; Hvolby & Bilenberg, 2011; Mullen et al., 2008). However, studies of the clinical effect of insomnia in adults with psychiatric disorders are to our knowledge non-existing (SBU, 2013). A few small scientific studies have been published, evaluating the safety of weighted blankets, indicating that weighted blankets for adults are a safe method (Champagne, Mullen, Dickson, & Krishnamurty, 2015; Mullen et al., 2008). Treatment with weighted blankets are a part of the clinical routine at the Affective disorder clinic for patients with insomnia and is considered as a safe treatment.

Patients suitable for treatment with weighed blanket are remitted by physicians to occupational therapists for testing the appropriate weight and type of blanket. Due to the lack of scientific support for the use of weighted blankets on this indication, a research project was initiated, with a clinical follow-up study as the first step.

The study aimed to evaluate the effect of weighted blankets prescribed on clinical grounds for insomnia in adult patients with affective disorder or ADHD.

Methods

Participants and Material

Patients with a clinical diagnosis an affective disorder or ADHD and co-occurring insomnia referred on clinical grounds to the occupational therapist at the Affective Disorder outpatient clinic at Psychiatry Southwest, Karolinska University Hospital Huddinge for sleeping problems were included in the study. A total of 218 patients were approved for participation. Their average age was 41 years. Patients clinical diagnoses were bipolar disorder type 1 (n=140), bipolar disorder type 2 (n=4) bipolar disorder NOS (n=11), ADHD (n=53) and other affective disorders (n=10). 42 of the patients with bipolar disorder were also diagnosed with a co-morbid ADHD. The average duration of the different disorders was 17.8 years. The study protocol has been given ethical approval by the Regional Ethical Review Board in Stockholm (registration number 2014/136-31/1).

Patients could choose between different blankets; chain blankets (6 or 8 kg) or two ball blankets (6.5 or 7 kg). Most of the patients used medication, for example Lithium, for their underlying disorder, and also medications for the treatment of insomnia. The patients and their doctor were told not to change doses during the study or stop or start using a new medication. 19 patients

dropped out of the study. Thus, 199 patients (125 Bipolar I, 49 ADHD and 25 with other affective disorders) were eligible for final analysis.

Patients sleep symptoms were evaluated at appointments before the intervention and after four weeks of use of the blanket by a self-rating scale ("day and night diaries", developed by Assistive technology Stockholm for the evaluation of weighted blankets). In the rating scale, patients estimated the time it took for them to fall asleep (in minutes). They also rated ten other sleep-related symptoms on VAS-scales 65 mm in length, where 1 meant severe problems and 65 no problems (table 1). Five items concerned nighttime symptoms: awakenings, relaxed sleep, calm sleep, pain, and anxiety. The rating scale also contained five similar VAS-scales for day-time symptoms: alertness, concentration, worrying/relaxed, pain and anxiety. A few patients indicated the time for falling asleep between two values and selected multiple values on the same scale. In these cases, the mean of the values indicated was used. Patients giving no indication on the scale, who stated verbally that they had no problems with the symptom, was set to 65 on the particular subscale. This particular rating scale was mandatory for the prescription of weighted blankets in the region, and not chosen by the authors. After one year, patients were interview by telephone concerning the same variables as in the previous ratings. The occupational therapist asked them to estimate the time needed for

them to fall asleep and to choose a number between 1 and 65 using the variables in the rating scale. The patients were not reminded of previous ratings. Two patients were lost to follow up. All patients included in one-year follow-up still used weighted blankets.

Data analysis

Since all the data were estimations or ratings of symptoms, we could not assume parametric properties of the data and data were not normally distributed. We, therefore, used the non-parametric Friedman ANOVA & Kendalls´ concordance test for significance of change.

We used the Kruskal-Wallis ANOVA and Median Test to investigate if there were any significant differences in the ratings before and after four weeks of use of the blanket between patients with bipolar disorder without co-morbid ADHD, patients with ADHD without co-morbid bipolar disorder and patients with combined bipolar disorder and ADHD.

We also calculated response rates between the ratings before and after 4 weeks use of the weighted blankets. 30 minutes reduction of sleep onset and 20 mm improvement on VAS-scales were defined as lower limits of response. In the analysis of response we only included patients indicating problems in the

ratings before use of the blankets, defined as a reduction of at least 20 mm on the VAS-scale.

All statistical tests were performed in the program Statistica 13.

Results

139 chain blankets and 79 ball blankets were prescribed. The use of weighted blankets reduced the median time to fall asleep from 70 to 30 minutes after four weeks use of the blankets and VAS-ratings for sleep-related symptoms improved between 7 and 47 mm and the effects were still maintained at one year (table 2). All improvements were significant ($p<0.001$). The results of the ratings are displayed in box-plots (figure 1).

Response rates were on average 69.6% (range 59.8-82.6%), with the highest rates for relaxed sleep and lowest for night-time pain (fig 2).

We found no significant differences in any of the outcome variables between patients with bipolar disorder without ADHD, patients with ADHD without bipolar disorder, and patients with combined bipolar and ADHD disorders (all $p>0.1$). There were no side-effects.

Conclusion

This study is to our knowledge the first study evaluating the effect of weighted blankets on insomnia and other sleep-related problems in adults with

psychiatric disorders. The effect of the intervention with the weighted blanket for patients with bipolar disorder or ADHD and co-occurring insomnia showed encouraging results with significant decreases in time to sleep onset and several other sleep-related symptoms.

As a clinical follow-up study without a control group, the study has several limitations. We can not be sure if the observed effect is due to the weighted blanket or if it is due to something else, such as an unspecific effect of care. Diagnoses were clinical and not confirmed by a structured interview. Patients used concomitant medication. The rating scale, mandatory for the use of weighted blankets in the region, have not been validated. The follow-up interview at one year was made by telephone, using an interview format for the same items that were self-rated at the start and four weeks. Merits of the study are the sample size and the high ecological validity of the sample. The large proportion of patients who still used the weighted blanket after one year supports the usefulness of the intervention.

In spite of the promising results of this study, controlled studies are necessary if weighted blankets are to be considered as an evidence-based intervention for insomnia in patients with affective disorder and ADHD.

Key Points

- Treatment with weighted blankets improved time to sleep onset and other sleep-related symptoms in patients with ADHD and affective disorders and co-occurring insomnia.
- Due to methodological limitations of this study, the results should be confirmed in controlled studies.

Declaration of Authorship

Both authors have contributed to the design, acquisition, analysis and interpretation of the work. They have both revised the manuscript and approved to the final version of the manuscript.

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Conflict of interest statement

The authors declare no conflicts of interest and have no financial interests in the production or sale of weighted blankets.

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Table 1. Items in the rating scale

Items for nighttime symptoms	1.Sleep onset	The patient´s estimated time to fall asleep (minutes)
	2. Awakenings	Patient-rated value of maintaining sleep
	3. Relaxed sleep	Patient-rated value of being able to sleep relaxed
	4. Calm sleep	Patient-rated value of being able to sleep peacefully
	5. Pain	Patient-rated value of pain at night
	6. Anxiety	Patient-rated value of anxiety at night
Items for daytime symptoms	7. Alertness	Patient-rated value of alertness vs tiredness
	8. Concentration	Patient-rated value of being able to concentrate
	9. Worrying/relaxed	Patient-rated value of worrying vs being relaxed
	10. Pain	Patient-rated value of pain
	11. Anxiety	Patient-rated value of anxiety

Table 1. Items for night- and daytime symptoms.

	Diag-nosis	Mean			Median		
		Pre	Post	One year	Pre	Post	One year
Sleep onset (minutes)	**All**	97.6	31.4	26.2	70	30	20
	BP I	96.3	30.4	22.7	90	30	20
	ADHD	90.0	29.0	23.1	60	20	15
Awakenings (VAS)	**All**	20.6	50.2	52.8	14	53	60
	BP I	19.7	49.6	52.3	13	53	60

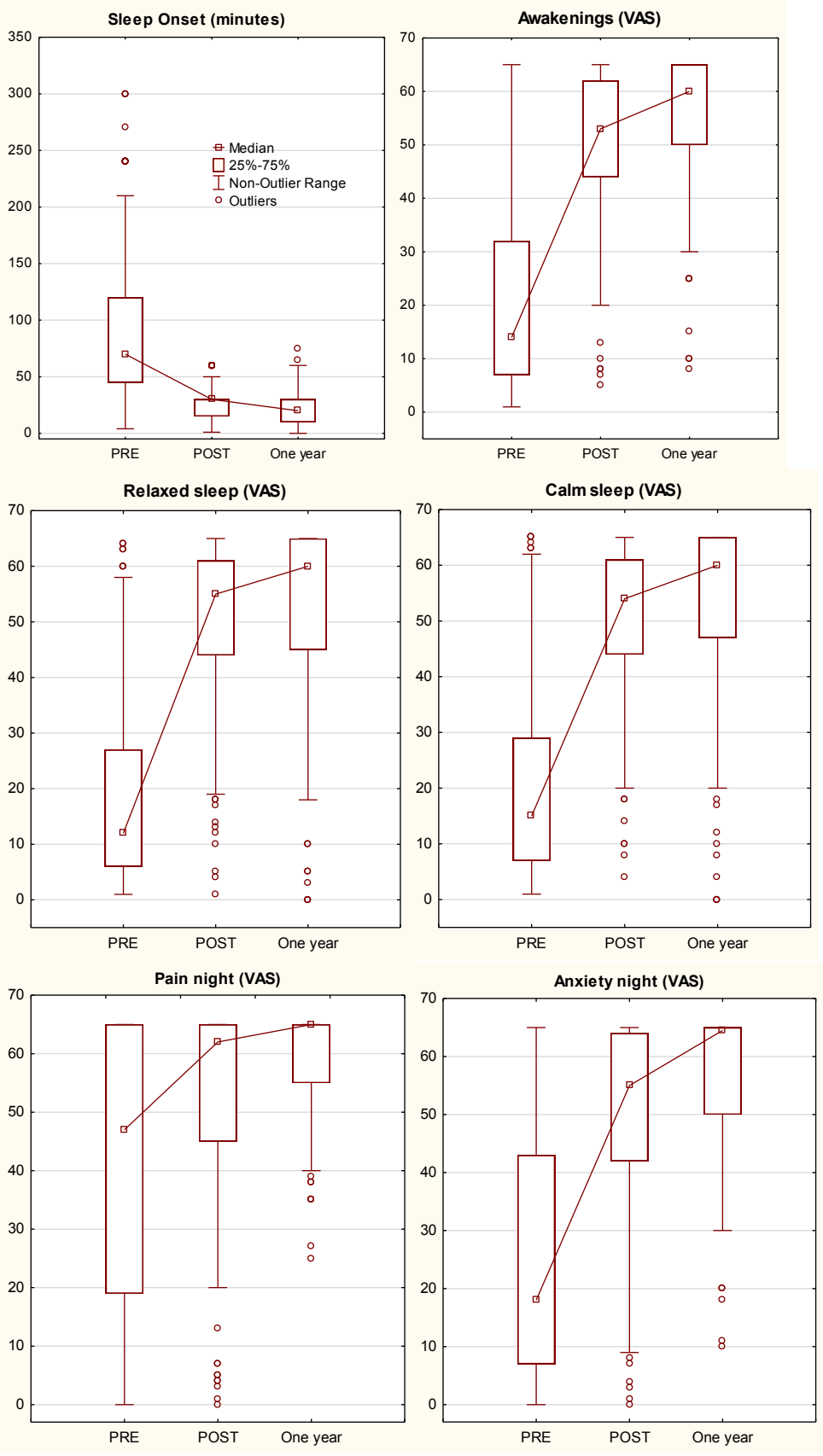
Table 2.

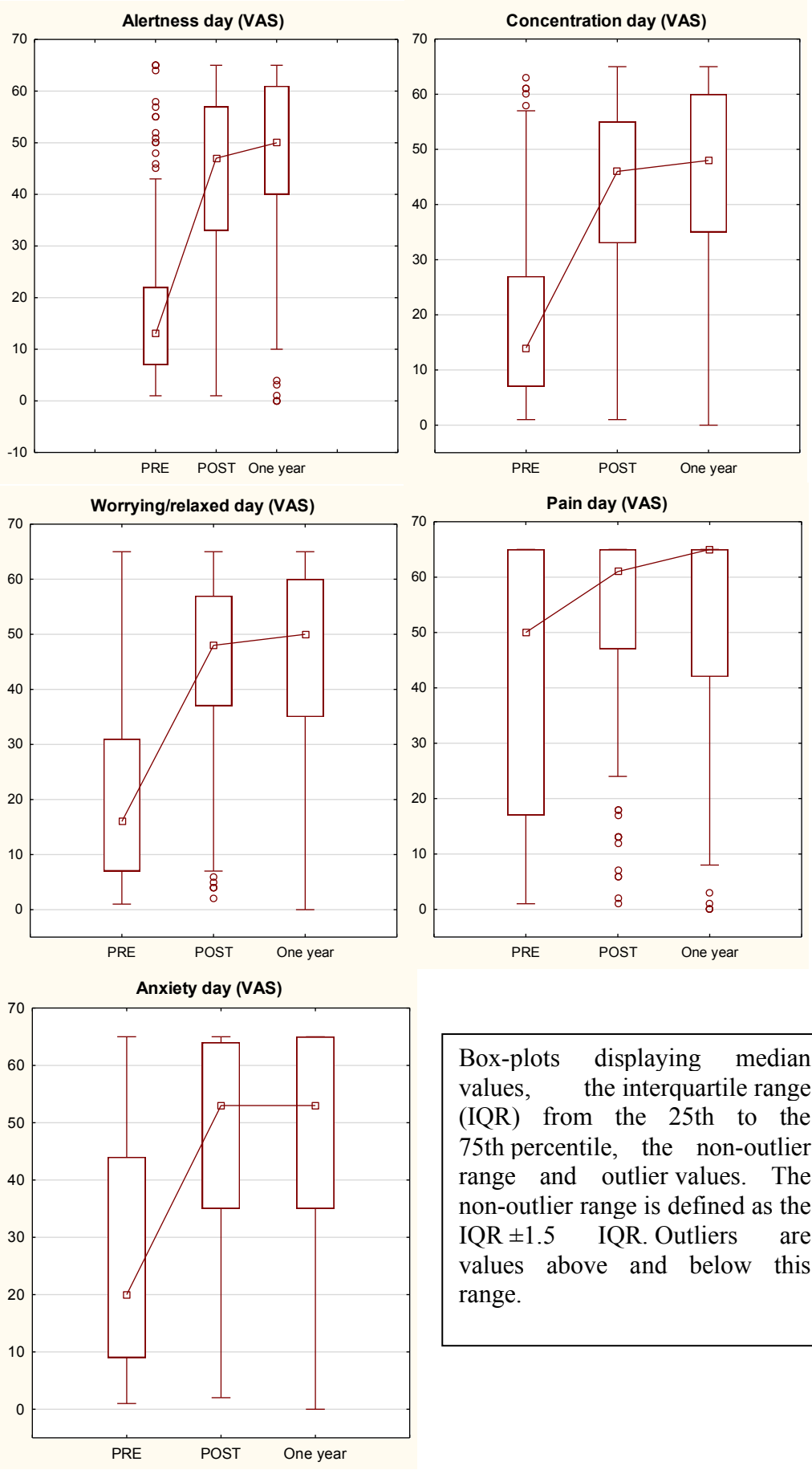
Results.

	ADHD	21.5	52.4	57.1	13	57	62
Relaxed sleep (VAS)	**All**	17.6	50.2	52.6	12	55	60
	BP I	17.8	49.9	52.0	13	55	60
	ADHD	15.4	52.1	56.4	9	56	64
Calm sleep (VAS)	**All**	20.4	50.3	53.1	15	54	60
	BP I	19.5	49.3	53.6	15	54	60
	ADHD	22.7	53.4	56.3	13	55	64
Pain – night (VAS)	**All**	40.9	53.0	56.2	47	62	65
	BPI	40.8	52.0	55.6	47	60	65
	ADHD	42.3	54.8	60.3	48	63	65
Anxiety – night (VAS)	**All**	25.7	50.2	54.4	18	55	64.5
	BP I	24.0	49.8	54.8	17	54	60
	ADHD	27.1	51.7	59.1	17	59	65
Alertness – day (VAS)	**All**	18.5	43.8	46.6	13	47	50
	BPI	19.5	43.2	47.5	13	47	55
	ADHD	16.7	44.9	49.8	12	48	50
Concentra-tion – day (VAS)	**All**	18.5	42.8	44.4	14	46	48
	BP I	18.4	43.1	47.3	13	46	50
	ADHD	18.2	42.7	45.9	14	45	48
Worrying/ relaxed – day (VAS)	**All**	19.7	45.1	45.5	16	48	50
	BP I	19.0	45.1	46.4	14	48	50
	ADHD	21.4	46.5	49.6	18	49	54
Pain – day (VAS)	**All**	42.0	53.7	52.0	50	61	65
	BP I	41.7	53.5	52.9	50	60	65
	ADHD	44.3	53.9	56.7	55	62	65
Anxiety – day (VAS)	**All**	27.3	48.0	47.0	20	53	53
	BP I	25.3	47.6	45.1	19	53	52
	ADHD	32.8	51.1	55.2	25	55	65

Table 2: Mean and median of ratings before, after four weeks and after one year of use of weighted blankets, showing significant improvements of all sleep-related values ($p<0.001$). N = 199 (all), 125 (bipolar disorder type 1 = BP I) and 49 (ADHD). For the one year follow up N=197.

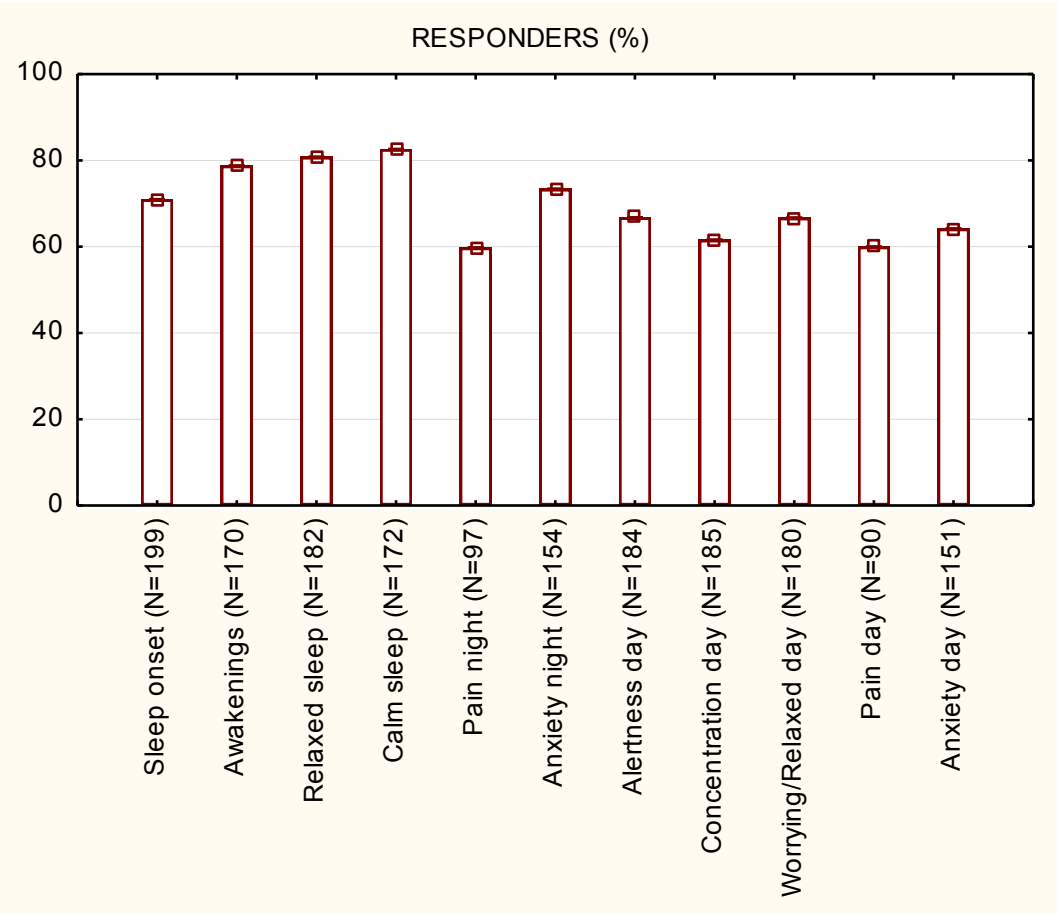
Figure 1. Box-plots of time to sleep-onset and sleep-related items.





Box-plots displaying median values, the interquartile range (IQR) from the 25th to the 75th percentile, the non-outlier range and outlier values. The non-outlier range is defined as the IQR ±1.5 IQR. Outliers are values above and below this range.

Figure 2. Response rate.



Response rates between the ratings before and after four weeks use of the weighted blankets. For the analysis of response rate, 30 minutes reduction of sleep onset and 20 mm improvement on VAS-scales were defined as lower limits of response. The analysis of response on the VAS-scales only included patients indicating problems in the rating before use of the weighted blankets, defined as a reduction of at least 20 mm on the VAS-scale. N indicates the number of patients fulfilling this criterion for inclusion.