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TREATMENT OF INSOMNIA BY MEANS OF INTERNET BASED-MULTICOMPONENT CBT

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INTRODUCTION

Chronic insomnia is a very common sleep complaint affecting between 10 and 20% of the adult population. Insomnia can have a large impact on daily life and on society in general: fatigue, impaired daytime performance, increased use of medication, absenteeism from work and traffic accidents are only some of the effects[1].
Cognitive Behavioral Therapy (CBT) has been recognized as an effective treatment of chronic insomnia[2,3] and it causes a durable long-term improvement of the patient's sleep. A web-based system was developed for the evaluation, diagnosis and treatment of insomnia patients with an internet based version of CBT. Approximately *50000* individuals visited the internet site www.somnio.nl during the last four years. *19935* individuals (13052 females, 6883 males), were aware of their sleep problems and completed a short self test for the first assessment of sleep. *5594* (3696 females, 1891 males) of these individuals felt that their sleep problem was serious enough to complete a detailed sleep interview.
This paper reports on the effects of the online CBT on the subjective sleep variables and on the attitudes and beliefs for a subgroup of verified insomnia patients.

METHODS

A group of 111 chronic insomnia patients (79 males, 32 females, age > 18 years) completed a questionnaire to assess faulty beliefs and negative attitudes consisting of 21 items (DBAQ-F), adapted from Morin[4]). Responses were collected on a 5-point scale ranging between *fully agree* to *fully disagree*. The chi-square non-parametric test was performed to test the hypothesis that all subjects will respond with negative attitudes and beliefs.
From this group 50 patients completed at least 6 of the 8 CBT treatment sessions (15 males, 35 females). The treatment plan consisted of 8 sessions and provided various components of CBT: sleep restriction, stimulus control, cognitive therapy and sleep hygiene. For each session, the patients had to keep a diary of their sleep wake schedule and their subjective perception of sleep. After each week this information was analyzed and a personalized treatment plan was proposed. Patients were also encouraged to send their personal comments and questions that were handled confidentially by a CBT therapist.
The effectiveness of the online CBT was assessed by self-reported sleep quality and feeling in the morning on a Visual Digital Scale, nap duration during the day, sleep latency, number of awakenings and minutes awake during sleep. This was tested by means of the non-parametric Mann-Whitney U test.

RESULTS

Beliefs and attitudes

The results are shown in Table 1. In 7 statements there were significantly more agreements with the expected response ($p<0.001$). In 4 statements there was no difference in the distribution of responses over the 5 response classes. Strikingly, on 10 statements the subjects responded in a direction opposite to the expectations ($p<0.001$).

Table 1. Distribution of responses on the DBAQ-F

STATEMENT	*% Highly Agree*	*% Agree*	*% Neutral*	*% Disagree*	*% Highly Disagree*	*p-values*
AGREE						
Nervous breakdown if no sleep	34.2	12.6	14.4	18.9	19.8	0.003[b]
Stay long in bed to get more sleep	33.3	19.8	13.5	15.3	18	0.009[b]
Better take pill for better functioning	33.3	7.2	14.4	18.9	26.1	0.000[a]
Should sleep as good as partner	39.6	8.1	28.8	10.8	12.6	0.000[a]
Night cap is good solution	55.9	15.3	14.4	7.2	7.2	0.000[a]
Sleep getting worse, no one to help	34.2	18.9	26.1	9.9	10.8	0.000[a]
Medication is real solution	51.4	14.4	22.5	3.6	8.1	0.000[a]
DISAGREE						
Believe 8 hours sleep is needed	13.5	7.2	12.6	35.1	31.5	0.000[a]
Lost control over sleep	14.4	3.6	9.9	22.5	49.5	0.000[a]
Causing serious health problem	9	0.9	17.1	23.4	49.5	0.000[a]
Irritated/down due to poor sleep	10.8	5.4	18.9	36	28.8	0.000[a]
Can't control thoughts	17.1	11.7	9.9	26.1	35.1	0.000[a]
Never predict sleep	10.8	13.5	10.8	19.8	45	0.000[a]
No energy left	7.2	3.6	18	31.5	39.6	0.000[a]
Ruins my life, can’t do what I want	14.4	8.1	17.1	21.6	38.7	0.000[a]
Can't lead satisfactory life	12.6	7.2	9.9	31.5	38.7	0.000[a]
Cannot function without good sleep	9	14.4	20.7	32.4	23.4	0.001[a]
NEUTRAL						
Need to catch up sleep loss by nap	21.6	16.2	18	17.1	27	0.359
I try hard to go to sleep	23.4	13.5	17.1	18.9	27	0.181
Can’t handle negative consequences	14.4	15.3	16.2	25.2	28.8	0.048
Avoid obligations after poor sleep	27	15.3	10.8	24.3	22.5	0.040

[a]Significant at 0.001. [b]Significant at 0.01

Subjects agreed with statements concerning the positive effect of hypnotics and alcohol as sleeping aids ($p<0.001$). Staying in bed longer after a poor night of sleep was considered to be good, although 8 hrs sleep was not a ‘must’ ($p<0.001$). The subjects did show concern that their sleep was getting worse and that it would cause a nervous breakdown ($p<0.001$, $p<0.01$ respectively). Contrary to the expectation, they did not agree with statements that were more concerned with possible detrimental effects of their insomnia on daytime functioning, and with negative effects of the insomnia on their future ($p<0.001$). The responses on the

statement the positive effect of taking naps were equally divided over 'Agree' and 'Disagree' categories.

Self reported effect of online-treatment CBT

Overall, online CBT treatment improved the self-rated sleep variables ($p<0.025$ Mann-Whitney U test), except for the duration of daytime naps. Sleep latency showed a trend towards a shorter sleep latency by the end of the CBT-treatment ($p<0.07$).

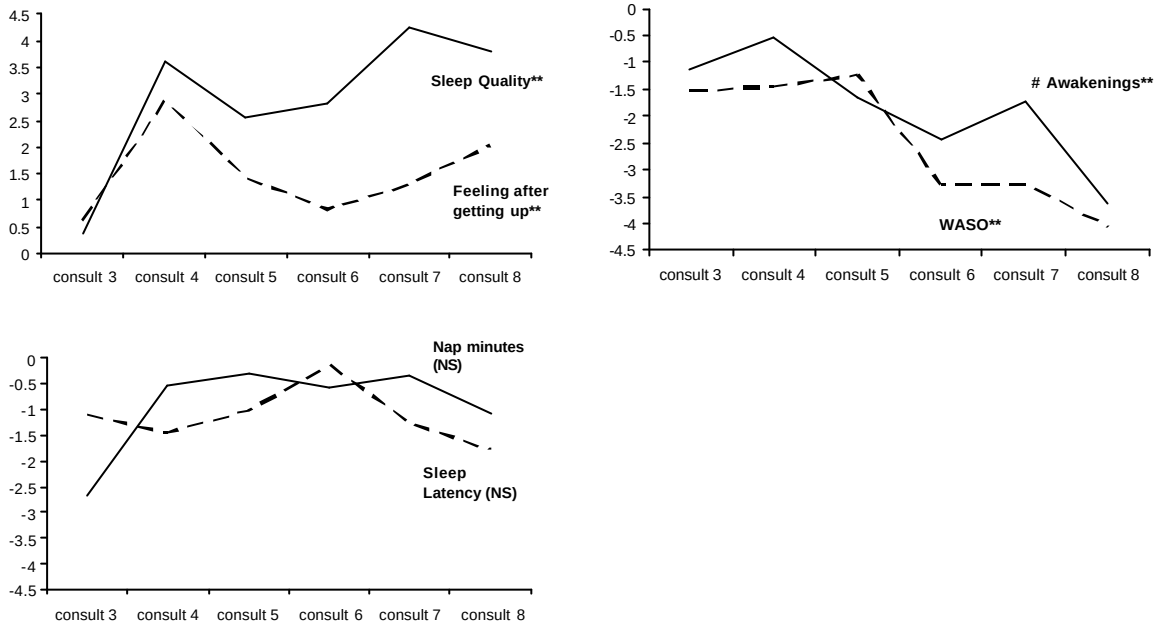

Figure 1. Impovement of sleep parameters compared to the first consult (in z-scores). * = $p<0.05$, **=$p<0.001$

The changes in bed times from the first to the last consult showed that the getup times decreased sharply from the 1st to the 2nd consult, under the influence of the sleep restriction module. As the wake-up times gradually shifted towards a later time, the wake-up times and the getup times approached each other over time. The bedtimes did not change very much over the consults, nor did the timings of lights off.

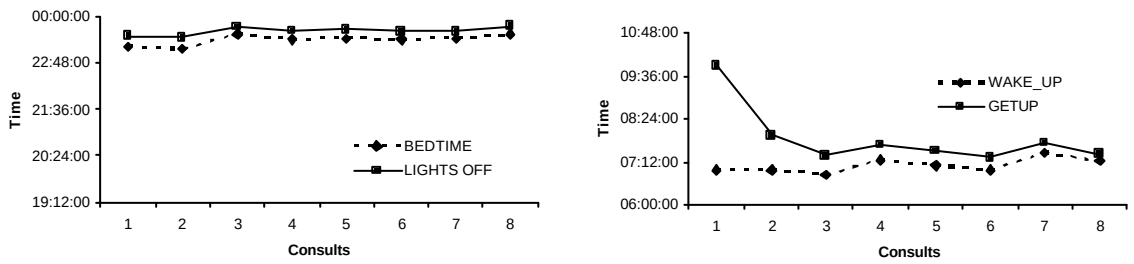

Figure 2. Changes in sleep timings from the first to the last consult.

DISCUSSION

An interesting result was that, although many patients said that they wanted to be able to get rid of their sleep medication, still sleep medication was considered to be the only solution to their sleep problem. Also taking a night cap as sleeping aid was considered to be a useful alternative. The result that the responses to some of the statements were contrary to the expectation could be due to the fact that these patients were actively seeking help for their sleeping problem, so that they might have had a positive approach to some of the issues raised in the questionnaire. Some of the questions are most probably applicable for severe insomnia with other psychological morbidities. Further shortening of DBAQ (F) can be more useful for the general insomniac population.

The improvements on the subjective sleep variables were comparable to values found in the literature[5,6]. Patients who improved showed a tendency to stop earlier with the treatment. As there was no solicitation or proactive evaluation to keep the patient under treatment and the patients had to pay for each session, economic factors may have played a role.

The sharp decline in getup times can be expected from the fact that the sleep restriction module was introduced from the second session onwards. As the patients slowly adjusted to this regimen and the final waking times slowly improved it was to be expected that the 2 timings would approach each other.
In conclusion, the internet based method of CBT treatment of insomnia patients is effective and easy to deliver. The knowledge based approach provides an ideal combination of a standard procedure and completely individualized to the situation of the subject.

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