Summary

Insomnia is characterized by difficulties in initiating or maintaining sleep, poor sleep quality, or a combination of these symptoms. Tiredness and problems with mood, concentration and memory are the most common daytime complaints associated with insomnia. The consequences of untreated chronic insomnia may be severe (e.g., more psychiatric complaints, severe traffic and work accidents, and higher absenteeism). One-third of the adult Dutch population suffers from insomnia now and then and no less than 10% experiences chronic insomnia. The severity of the insomnia varies from mild to severe. This gradation is also seen in treatment, which varies from relatively simple to complex. Therefore, treatment should be given on multiple levels ranging from education to the public to prevent chronic sleep complaints to individual treatment. This thesis aims at the diagnosis, treatment and education of insomnia.

Diagnosis

Self-monitoring of subjective sleep as is done with the sleep log has become an essential instrument in the diagnosis of insomnia. Polysomnography (PSG), which measures sleep objectively in the various sleep stages, is a specialized and expensive instrument that is indicated only when a sleep-related breathing disorder or periodic limb movement disorder is suspected, initial diagnosis is uncertain, treatment fails, or arousals occur with violent behavior. Actigraphy was developed as an alternative to measure sleep objectively for several days or weeks in an easy and inexpensive way. The actigraph is a small portable device that is worn on the wrist. It senses physical motion and generates an internal signal each time it is moved (accelerated). An algorithm is used to estimate the amount of sleep and wake from these movements. The first goal was to study the usefulness of actigraphy for clinical practice in insomnia. Actigraphy may give information that supplements that of the sleep log. Although the algorithms to score sleep and wake based on motions measured by actigraphy are still being improved, the role of actigraphy in the clinical evaluation of sleep in insomnia is limited. This way of automatic scoring is problematic in two kinds of patients: those who are awake but motorically very quiet, for whom actigraphy will overestimate sleep and underestimate wake; and those who are asleep but motorically very restless, for whom actigraphy will underestimate the amount of sleep and overestimate the duration of wake. Both situations are likely in insomnia.

Cognitive behavioral therapy (CBT)

For many physicians, hypnotics are still the first choice of treatment in chronic insomnia. In the last decade, non-pharmacological treatment strategies and specific cognitive behavior therapy (CBT) have been established as substitutes for pharmacological treatment in insomnia. The most important ingredients of this treatment are self-registration of sleep by way of sleep logs, sleep education, sleep hygiene guidelines, stimulus control, sleep restriction, relaxation exercises, cognitive restructuring and discontinuation from hypnotics. Treatment is short, with an average of six sessions excluding follow-up. The second goal was to study the effect of CBT on sleep and quality of life in a clinical setting. Most literature studies
recruit their patients through media adds. Since 1994, the Centre for Sleep and Wake Disorders (CSW) Kempenhaeghe has offered individual, short-term CBT for patients who are referred by their G.P. or specialist. In the first study the effect of treatment in 86 patients was evaluated. Already after four weeks of treatment, a significant improvement of subjective sleep was seen in the sleep logs. Sleep-onset latency decreased from 79 to 45 minutes, the amount of wake after sleep onset decreased from 137 to 74 minutes, and sleep efficiency (the percentage of total sleep time divided by total time in bed) increased from 56 to 71%. Furthermore, the time in bed decreased significantly and the length of core sleep increased. At least 74 of the 86 patients reported improvement of sleep and experienced more control over their sleep problem.

**The effect of CBT in primary insomnia**

In the next study, the hypothesis that CBT also leads to better daytime functioning was investigated. The effect of CBT was studied in primary insomnia so that there would be no interference from factors such as hypnotic use or a primary medical or psychiatric complaints. This study concerned 32 patients with primary chronic insomnia (patients without a primary medical or psychiatric cause of their insomnia). In the sleep log completed by the patients after therapy, a large decrease was seen in sleep-onset latency (from 70 to 31 minutes) and a high increase in sleep efficiency (from 53% to 73%). The rather high decrease in wake after sleep onset (from 72 to 43 minutes) did not quite reach significance, likely because of the high standard deviations. At follow-up, besides sleep onset latency and sleep efficiency, also total sleep time had significantly improved. Objective sleep, as measured with ambulatory polysomnography, showed a significant decrease in sleep-onset latency (baseline 22 minutes, post-treatment 11 minutes) and the amount of nightly awakenings (from 9.7 to 5.3 times). Although the amount of wake after sleep onset decreased from 53 to 24 minutes, this change was not significant, again likely due to the high standard deviations. At follow-up no significant improvements were seen. It should be noted that baseline values in polysomnography already were quite normal (sleep-onset latency 23 minutes, sleep efficiency 83% and wake after sleep onset 53 minutes). The objective data were rather different from the subjective estimations of sleep as measured in the sleep log. This is a well-known phenomenon and is precisely the reason why subjective sleep is the starting point for treatment. In the questionnaires, significant improvements were seen in quality of life, both post-treatment and at follow-up. This gives the expression that patients were feeling better, had more social interactions, better alertness/intellectual functioning and more recreational activities. Furthermore, patients had more realistic expectations, experienced more control over the sleep problem, were more realistic about the consequences of insomnia and had improved sleep habits. The conclusion from this study is that short-term CBT improves subjective and objective sleep as well as daytime functioning.

**Is group treatment also effective?**

In the next study, the effect of group treatment was investigated. Data from 40 chronic insomniacs (primary and secondary) divided in groups of five to seven patients was analyzed and compared with data from 18 individually-treated primary
insomniacs. The subjective sleep efficiency post-treatment improved significantly: from 62% to 77% (group) and from 62% to 80% (individual). At follow-up these improvements were no longer significant: 74% (group) and 76% (individual). The other sleep parameters improved, but not significantly. Again, standard deviations were rather high; this reflects the high inter-individual changes. Quality of life improved significantly both post-treatment and at follow-up for both group and individual treatment. The changes were more pronounced for group treatment. Significant improvements in psychological well being were seen only in the post-treatment results from patients treated in groups. Improvements in subjective sleep and attitudes and beliefs about sleep were comparable between group and individual treatment. The changes between both treatments may be explainable based on the difference in patient population (in group treatment, there was no exclusion for use of hypnotics or a high score in Symptom Check List (SCL-90)), the larger number of patients (n) in group treatment through which significant differences are seen more easily, or the format of the group. At the evaluation of group treatment, the behavioral component (stimulus control and sleep restriction), cognitive restructuring, and “meeting fellow insomnia patients” were reported as the three components that contributed most to effective treatment. The conclusion from this study is that group treatment is just as effective as individual treatment and that it is suited for both primary and secondary insomnia, as long as the primary pathology does not interfere with group treatment. Group treatment has the extra advantage of allowing participants to meet fellow patients.

Public education
Although always short, CBT is relatively expensive due to the personal therapist–client contact. This is an important disadvantage when it concerns public education. There is a need to develop effective interventions for insomnia that are readily accessible and not too expensive. The third goal was to seek ways to spread CBT to the large group of patients who suffer from insomnia. We chose to investigate both a telephone help line and the treatment of chronic insomnia by general practitioners. In April 1998, The ‘Sleep Line’ was introduced in The Netherlands. People could dial a telephone number for information and tips about sleep. The initiative came from the Dutch Society for Sleep–Wake Research (Nederlandse Vereniging voor Slaap Waak Onderzoek, NSWO) and was organized by the Dutch branch of the pharmaceutical company Sanofi-Synthélabo. The purpose of the Sleep Line was primarily to inform the general public about sleep disorders and secondly to help people with sleep problems. Information about sleep hygiene was given on a pre-recorded message. Together with the NIPO (a professional and independent Dutch Institute for Market Research) we studied the use of the Sleep Line. Randomly structured interviews by telephone were held among 302 of the 10,000 people who called the line in the first nine months of its existence. The average caller of the Sleep Line was middle-aged and highly educated. Sleep onset was the main complaint. Almost all subjects had experienced complaints a few nights per week or more, with a mean duration of five years. Callers listened mostly to general information about sleep and to treatments not involving hypnotic drugs. About one-quarter of the callers experienced subjective improvements in their sleep after calling the line once or twice. This means that from the 10,000 people who called the line, the subjectively

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experienced sleep quality of approximately 2500 people may have improved. It is suggested that these positive results could be explained by the information about sleep and sleep hygiene advice given to the callers. We therefore conclude that minimal intervention using the Sleep Line is a useful supplement to more time-consuming and expensive forms of sleep therapy.

**Education of general practitioners**

Although the prevalence of chronic insomnia is high, not many patients visit their general practitioner (GP) for sleep complaints. Furthermore, CBT is relatively unknown to G.P.s. That is unfortunate, because early diagnosis and behavioral treatment of sleep behavior may prevent chronic sleep complaints, which in its turn may reduce chronic use of hypnotic drugs. A survey among 62 G.P.s showed that 44 of them (71%) did not use the standards ‘Sleeplessness and Hypnotics’ from the Dutch College of General Practitioners (NHG). Obviously, it is difficult to apply the guidelines from the NHG-standards. This was the reason we started a training program for G.P.s about sleep physiology, sleep pathology and the application of the sleep log and sleep hygiene guidelines. The duration of the training program was 1.5 hours and was given within the pharmacological therapeutic consultation (PTC). Just before, directly after, and at three months follow-up, written questionnaires were given (or, at follow-up, sent) to the G.P.s. The questionnaires from five PTC groups (40 G.P.s in total) were analyzed. Just before the education program, the G.P.s gave information about the use of sleep medication, sleep physiology and expectations about sleep. The sleep hygiene guidelines that they gave were to relax before bedtime and to avoid caffeine. Directly after the training, more G.P.s intended to give information about sleep physiology (especially core and optional sleep). Furthermore, they intended to give more specific sleep hygiene guidelines and behavioral advice based on the sleep log. Three months after the training, the behavioral guidelines seemed to be applied most. All G.P.s who participated in the training program intended to use the sleep log after the training. Three months after training, results showed that 13 out of the 22 G.P.s (59%) who sent back the questionnaire (58% sent back the questionnaire) did use the sleep log. It gave them insight into the sleeping behavior of their patients and could be a way to postpone the use of hypnotic drugs. Although the NHG standards ‘Sleeplessness and Hypnotics’ give a clear survey of the management in the diagnosis and treatment of insomnia, it seems that education about sleep and sleep hygiene guidelines to G.P.s is a valuable supplement.
Conclusion
Insomnia is primarily diagnosed clinically with a detailed medical, psychiatric, and sleep history together with the patient's self-registration of sleep by way of a sleep log for minimum of one week. The severity of the insomnia varies from mild to severe. This gradation is also seen in treatment, which varies from relatively simple to complex. Therefore, treatment should be given on multiple levels. To prevent chronic sleep complaints, information about sleep and sleep hygiene guidelines should be easily accessible to the public. The Sleep Line is a good example of this. Furthermore, the television (TELEAC course 'You can learn to sleep better') and also internet are important media. Sleep courses as given by the Association of Home Care are a valuable supplement. In primary care, most physicians (G.P.s, psychologists and psychiatrists) are insufficiently educated in the (patho)physiology of sleep and the CBT of chronic insomnia. Centres for Sleep and Wake disorders should apply themselves to therapy-resistant insomnia, patients in whom an organic sleep disorder is suspected, and on training physicians in primary care about sleep.