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**Cognitive-Behavioural Treatment of Insomnia
Secondary to Chronic Pain**

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**A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfilment of the requirements for the degree of**

Doctor of Philosophy

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Abstract

Fifty subjects with insomnia secondary to chronic pain were assigned randomly to either a cognitive-behavioural therapy ($n = 25$) or a minimal contact symptom-monitoring/waiting-list control group ($n = 25$). The therapy consisted of a multicomponent seven-week group intervention aimed at promoting good sleep habits, teaching relaxation skills, and changing negative thoughts about sleep. Subjects in the control group monitored their sleep using a sleep diary for seven weeks; they also received weekly supportive phone calls from a therapist. Treated subjects were significantly more improved than control subjects on measures of sleep onset latency, wake time after sleep onset, sleep efficiency, sleep quality, and nocturnal activity levels (obtained from ambulatory monitors). A small, but significant, decrease in pain levels was also found in the treated subjects, but depression and medication use remained unchanged. At a 3 month follow-up, treated subjects showed good maintenance of most therapeutic gains. These results provide the first evidence from a randomized controlled trial that cognitive-behavioural therapy is an effective treatment for insomnia that is secondary to chronically painful medical conditions.

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Table of Contents

Abstract	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	v
List of Figures	vi
List of Appendices	vii
Introduction	1
Method	28
Results	55
Discussion	65
References	79
Footnotes	94

List of Tables

<u>Table</u>	<u>Page</u>
1. Demographic Characteristics of the Sample	95
2. Medical Diagnoses of Subjects	96
3. Results of Subject Recruitment Protocol	98
4. Primary Outcome Measures: Means and Standard Deviations	99
5. Secondary Outcome Measures: Means and Standard Deviations	100
6. Medication Usage	101
7. Moderating Variables: Means and Standard Deviations	102
8. Correlations Between Changes in Moderating Variables and Changes in Primary Outcome Measures in Patients Receiving CBT	103
9. Effect Size Indices for Pretreatment to Posttreatment Change	104
10. Clinical Significance of Results According to Various Criteria	105

List of Figures

<u>Figure</u>	<u>Page</u>
1. Cognitive-Behavioural Model of Insomnia	106
2. Hypothetical Model of Insomnia Secondary to Chronic Pain	107
3. Representative Actigraph Recording from a Chronic Pain Patient.	108
4. Timetable of Assessment and Intervention Procedures.	109

List of Appendices

<u>Appendix</u>	<u>Page</u>
A Coping with Chronic Pain Sleep Problems patient manual	110
B Coping with Chronic Pain Sleep Problems therapist guide	175
C Manuscript of pilot study results	209
D Cover letter for patients	224
E Exclusion criteria	226
F Consent form	228
G Personal Information Form.....	230
H Primary Care Evaluation of Mental Disorders.....	233
I Structured Interview For Sleep Disorders for DSM-III-R.....	242
J Daily Sleep Diary.....	248
K Pittsburgh Sleep Quality Index.....	250
L Instructions for wearing actigraph.....	253
M Manuscript of concordance study.....	255
N Multidimensional Pain Inventory	266
O Sleep Self-Efficacy Scale.....	268
P Sleep and Pain Knowledge Quiz.....	270
Q Pre-Sleep Arousal Scale	273
R Adherence Checklist	275
S Client Satisfaction Questionnaire.....	277

Cognitive-Behavioural Treatment of Insomnia Secondary to Chronic Pain

Introduction

Chronic Pain: Definition, Epidemiology, and Treatment

Chronic pain has been defined as pain that persists for at least six months despite medical intervention (International Association for the Study of Pain, 1995). In Canada, the incidence of chronic pain has risen dramatically in the last 10 years. Recent estimates place the prevalence at 3.9 million adults, or 17% of the adult population, who experience some degree of chronic pain or discomfort. Chronic pain is seen disproportionately among women and the elderly (Millar, 1996). Back pain and arthritis/rheumatism are the leading conditions associated with chronic pain, affecting 15% and 13%, respectively, of the adult population. Other conditions that can precipitate the development of chronic pain include migraine headaches, diabetes, musculoskeletal dysfunction, acute trauma, and cancer. For many benign chronic pain conditions such as back pain, however, a definitive etiological explanation has not been found (White & Gordon, 1982; Kerns, 1996), and there is no clear relationship between pain and physical pathology (Boden, Davis, Dina, Patronis, & Wiesel, 1990).

The clinical correlates of chronic pain have been well-researched and they have been the subject of several comprehensive reviews (see Hanson & Gerber, 1990; Turk & Melzack, 1992; Wall & Melzack, 1989). These reviews indicate that there is considerable variability in how chronic pain affects a person, but for many the impact of living with constant pain extends beyond physical health, leading to emotional distress, strained social relationships, and functional disability. For example, 35% of people with chronic pain report restrictions in activities of daily living (Millar, 1996). Many individuals are forced to take time off work, which can result in financial strain. As many as one quarter of injured workers remain absent from work for extended periods (La Rocca, 1987). In addition, chronic pain sufferers report a high utilization of health-care services. People with moderate to severe chronic pain average between 10 and 13 physician contacts annually, compared to an average of four contacts for

individuals without chronic pain (Millar, 1996). The cumulative cost of chronic pain in terms of compensation claims, health care costs, and lost work time, is estimated in the hundreds of millions of dollars in Canada alone.

The treatment of chronic pain has posed a challenge to the field of medicine. Although not a specific disease *per se*, chronic pain can present as a constellation of symptoms that span physical, psychological, and social dimensions of health. In the absence of a definitive cure, treatment approaches have tended to focus on providing temporary relief from the many emergent symptoms. Analgesic medication, for example, may be taken to alleviate pain for indefinite periods of time. In addition, many people are prescribed antidepressants or anxiolytics to alleviate the emotional distress that can result from prolonged disability and the loss of work and social roles. Unfortunately, the weight of evidence suggests that these treatments are not long-term solutions. In fact, most pharmacological treatments lose their effectiveness over time with the development of tolerance, requiring higher dosages to achieve the same effects. Moreover, this practice can lead to serious health complications from cumulative side-effects (Aronoff & Evans, 1992).

A variety of nonpharmacological treatments, including physiological (acupuncture, exercise, physiotherapy, transcutaneous electrical neurostimulation) and psychological services (relaxation, behavioural modification, psychotherapy), have been investigated as treatments for chronic pain, and have been found to have varying degrees of success (see Cohen & Campbell, 1996, and Scheer, Watanabe, & Radack, 1997, for reviews). In the last 15 years, multidisciplinary pain management clinics have emerged as the treatment of choice for severe forms of chronic pain in which the patient's functioning and well-being have been compromised significantly (Turk, & Meichenbaum, 1989; Turk, Meichenbaum, & Genest, 1983). Comprehensive pain management programs strive to improve patient functional capacity, alleviate emotional distress, and aid in the return to work and resumption of social roles. Patients receive concurrent treatment from a variety of therapeutic specialities (e.g.,

occupational therapy, physiotherapy, psychology) aimed at helping them to achieve optimal functioning. Recent reviews and meta-analyses report positive outcomes for comprehensive pain management programs, mostly in terms of improved physical conditioning, lowered emotional distress, and reduced medication use (Flor, Fydrich, & Turk, 1992; Scheer et al. 1997).

Scope of the Insomnia Problem

In the general population, occasional sleep difficulties are reported by 30% to 40% of adults, with about 10% to 15% of individuals complaining of chronic insomnia (i.e., symptoms lasting more than six months; Ford & Kamerow, 1989; Mellinger, Balter, & Uhlenhuth, 1985). According to 1991 data, 24% of Canadian adults reported having problems sleeping on a regular basis (Tait, 1992). Chronic sleep disturbances tend to be more common in women and older adults (Tait, 1992). There is also a higher rate of insomnia among people with low incomes, and people with medical or psychiatric disorders (Morin, Culbert, & Schwartz, 1994; Wooten, 1989). Prolonged sleep disruption can itself lead to psychological distress, impairments in daytime physical and cognitive functioning, absenteeism and decreased work productivity, and higher risk for work-related accidents (Kripke, Simons, Garfinkel, & Hammond, 1979; Mitler et al., 1988; Morin, 1993). In addition, chronic insomnia can increase vulnerability to depression and other mental-health difficulties (Ford & Kamerow, 1989; Mellinger, Balter, & Uhlenhuth, 1985). It can also lead to greater preoccupation with somatic concerns and a higher utilization of health-care resources (Kales et al., 1984; Morin & Gramling, 1989).

For many people, disturbed sleep can be a symptom of an underlying medical or psychiatric condition. Insomnia can also present as a distinct clinical syndrome in itself, as in the case of primary insomnia. The main features of primary insomnia are persistent sleep difficulties with associated distress and daytime impairment (American Psychiatric Association [APA], 1994; American Sleep Disorders Association [ASDA], 1990). Insomnia is most often

classified on the basis of the portion of night that is the most disturbed. When the predominant complaint is one of initiating sleep, the label Sleep Onset Insomnia is used, which is usually defined as taking thirty minutes or longer to fall asleep most nights (Lacks & Morin, 1992). Frequent or extended nocturnal awakenings, or premature awakening in the morning with less than 6.5 hours total sleep, constitutes Sleep Maintenance Insomnia. In clinical settings, most insomnia patients experience a combination of sleep onset and sleep maintenance difficulties (Morin, 1993).

The ASDA recognizes several diagnostic subtypes of primary insomnia (ASDA, 1990). By far the most prevalent and extensively studied is psychophysiological, or “learned” insomnia. Considerable research has been devoted to documenting the many psychological and physiological correlates of psychophysiological insomnia (Lacks & Morin, 1992). Because the presentation and severity of symptoms can vary widely across patients, the etiology of psychophysiological insomnia is thought to be multifactorial, with a prominent psychosomatic component. For example, stress, and poor sleep behaviours, such as habitual napping, are assumed to exacerbate an existing insomnia complaint and perpetuate the chronicity of the problem.

Secondary insomnia is defined as persistent sleep difficulties that are judged to be etiologically related to a known medical or psychiatric condition. Insomnia is listed in the diagnostic criteria for no less than 14 psychiatric disorders described in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994). In addition, a variety of medical illnesses can cause sleep disturbances, including chronic pulmonary disease, back pain, arthritis, cancer, headaches and renal disease (Morin, 1993; Wooten, 1989). Many chronic illnesses can precipitate sleep difficulties severe enough to warrant independent clinical attention and treatment. In primary care settings, cases of secondary insomnia account for the largest percentage of patients with sleep disturbances, and actually exceed the number of cases of psychophysiological insomnia (Lacks & Morin, 1992).

Chronic Pain and Insomnia

The co-morbidity of chronic pain and insomnia is well established. In fact, pain is thought to be one of the leading causes of sleep problems among people with chronic illnesses (Millar, 1996). Recent population data indicate that approximately 11% of Canadian adults report sleep disturbances that are pain-related (Tait, 1992). The rates are much higher among patients seeking treatment in speciality pain clinics, where they range from 42% to 90% (Atkinson, Ancoli-Israel, Slater, Garfin, & Gillin, 1988; Becker et al., 1997; Currie, Wilson, & Gauthier, 1995; Pilowsky, Crettenden, & Townley, 1985; Wittig, Zorick, Blumer, Heilbronn, & Roth, 1982). With some chronic pain syndromes, such as fibromyalgia, the attendant sleep disturbance can take on primary significance in the course of the disorder (Moldofsky, 1986). For most persons with chronic pain, however, fragmented sleep is a secondary, albeit highly distressing, aspect of their chronic pain condition that can increase the salience of their disability and emotional distress (Follick, Smith, & Ahern, 1985). Furthermore, prolonged sleep disruption may compound patients' risk of other long-term consequences such as exacerbated pain levels, fatigue, physical impairment, and vulnerability to psychological disorders.

The sleep problems of chronic pain patients have been investigated using different methods, including retrospective sleep questionnaires (Atkinson et al., 1988; Currie, Wilson, & Gauthier, 1995; Pilowsky et al., 1985; Wittig et al., 1982), prospective self-monitoring via sleep diaries (Affleck, Urrows, Tennen, Higgins, & Abeles, 1996; Haythornthwaite, Hegel, & Kerns, 1991; Morin, Kowatch, & Wade, 1989), and, in a handful of studies, with the use of objective sleep measures (Blumer, Zorich, Heilbronn, & Roth, 1982; Currie, 1993; Lavie et al., 1992; Staedt et al., 1993; Wittig et al., 1982). The data gathered from these various sources indicate that people with chronic pain disorders generally experience the same constellation of sleep symptoms as patients with psychophysiological insomnia (ASDA, 1990). These include difficulties falling asleep, frequent nocturnal awakenings, poor sleep quality, and impaired

daytime functioning. Samples of patients drawn from multidisciplinary pain centres tend to report the most severe sleep problems. Most patients, for example, experience both sleep onset and sleep maintenance insomnia. In a survey of 131 patients with chronic low back pain, Currie et al. (1995) found that patients reported taking an average of one hour to fall asleep, and they experienced an average of 2.5 awakenings each night. Comparable results were reported in studies by Atkinson et al. (1988), Pilowsky et al. (1985), and Wittig et al. (1982). Although formal diagnostic criteria for sleep disorders were not applied in these studies, the results suggest that the majority of chronic pain patients seen in speciality clinics would in fact meet DSM-IV criteria for insomnia disorder.

Etiological Explanations of Insomnia Secondary to Chronic Pain

1. Pain causes insomnia. Although the phenomenology of insomnia in people with chronic pain has been documented extensively, the actual causes of their disturbed sleep are not well understood. The simplest explanation is that patients have difficulty sleeping because of the presence of constant, discomforting pain. The hypothesis that pain is the singular cause of insomnia suggests that a course of treatment targeted at the alleviation of pain would provide a straightforward solution to their problems with sleep. Unfortunately, the complete elimination of pain is not a realistic treatment goal for the majority of chronic pain patients. Nevertheless, patient self-reports indicate a clear link between their pain and sleep disruption. For example, most patients attribute their poor sleep directly to pain or physical discomfort. They report that pain impairs their ability to initiate sleep by serving as a source of distraction. They also report that pain wakes them up after falling asleep, and that their sleep is light and unrefreshing (Currie & Wilson, *under review*; Morin et al., 1989).

On the other hand, the empirical evidence examining the correlation between pain intensity and insomnia severity has produced mixed results. In some studies, for example, ratings of pain intensity have shown a modest correlation with the severity of sleep disturbances (Atkinson et al., 1988; Haythornthwaite et al., 1991; Millar, 1996; Moffitt,

Kalucy, Baum, & Cooke, 1991; Wilson, Watson, & Currie, 1998). Both Moffitt et al. (1991) and Wilson et al. (1998) found that pain was correlated most highly with long sleep onset latencies, although in both of these studies pain accounted for less than 20% of the actual variance in this sleep measure. One recent study investigated the influence of poor sleep quality on daily pain levels. Affleck et al (1996) found that poor sleep predicted a more painful day in women with fibromyalgia, which in turn predicted poor sleep the following night. Affleck et al. (1996) speculated that after a bad night of sleep, patients may be fatigued and experience decreased concentration, causing them to make poor use of coping strategies to control or distract them from their pain. In addition, poor sleep could lead to increased depression and anxiety, which has been shown to increase the salience of pain and other physical symptoms (Geisser, Gaskin, Robinson, & Greene, 1993).

Other studies have not demonstrated any relationship between pain severity and insomnia (Beszterczey, & Lipowski, 1977; Kaye, Kaye, & Madow, 1983; Pilowsky et al., 1985). The lack of consistent findings may be due to the subjective nature of both pain and insomnia. A recurring finding in the insomnia literature is that subjective reports of poor sleep show low concordance with objective sleep measures (Borkovec, 1982; Carskadon, Dement, Mitler, Guilleminault, Zarcone, & Spiegel, 1976; Wilson et al., 1998). Similarly, patients' self-reported pain does not always correspond to objective measures of pathology or physical functioning (Turk & Melzack, 1992).

An alternative explanation is that the mere presence of constant pain, regardless of its intensity, quality, or duration, is sufficient to disturb one's sleep. However, this hypothesis is inconsistent with the findings that not all people with chronic pain report sleep disturbances (Becker et al., 1997; Pilowsky et al., 1985), and that the severity of disturbed sleep among patients with chronic pain can vary considerably. Therefore, most researchers have concluded that pain alone cannot account for the variability in insomnia severity displayed across chronic pain patients, and that there may be other factors contributing to the etiology of insomnia

secondary to chronic pain (Atkinson, et al., 1988; Haythornthwaite et al., 1991; Morin et al., 1989).

2. Objectively-recorded sleep anomalies. Attempts to find a physiological basis for sleep disturbances in chronic pain patients have yielded few conclusive findings. The small number of studies using polysomnography, the “gold standard” of sleep assessment, confirm that most patients demonstrate disturbances in sleep architecture that are also characteristic of primary insomnia, including a delayed sleep onset, wakefulness during the sleep period, disruption of the sleep stage cycle, and reduced slow-wave sleep (Atkinson et al., 1988; Lavie et al., 1992; Wittig et al. 1982). Other sleep anomalies have also been detected, although not in all patients. For example, Blumer et al. (1982) found reduced latencies for rapid eye movement (REM) sleep in some patients, a phenomenon thought to be a biological marker for depression. Restless leg movements were recorded in some patients in the studies by Wittig et al. (1982) and Atkinson et al. (1988). Lavie et al. (1992) used ambulatory monitoring units (wrist actigraphs), a cost-effective alternative to polysomnography, to compare the sleep of patients with chronic low back pain, patients with rheumatoid arthritis, and healthy controls. The actigraphs recorded significantly more sleep fragmentation and body movement during the sleep period in the arthritis patients compared with controls, while those with back pain occupied an intermediate position. Currie, Cooper, Hoffmann, and Henderson (1994) also found that patients with chronic pain showed more actigraph-recorded sleep disturbances than age-matched healthy, sedentary control subjects.

The detection of ‘alpha-delta’ sleep in patients with longstanding musculoskeletal pain was thought at one time to be a significant breakthrough in the search for a biological basis of their disturbed sleep. Moldofsky first observed the intrusion of alpha waves into the non-REM (mostly delta) sleep of patients with fibromyalgia syndrome, a chronic pain condition characterized by diffuse muscle pain and a pattern of fragmented or nonrestorative sleep (Moldofsky, Scarisbrick, England, & Smythe, 1975). A subsequent study showed that healthy

subjects began complaining of musculoskeletal pain symptoms when the alpha-delta disturbance was simulated by selective deprivation of stage 4 sleep (Moldofsky, & Scarisbrick, 1976). Based on these findings, the alpha-delta anomaly was thought to represent a specific arousal disorder within the sleep of fibromyalgia patients, which offered a possible physiological mechanism to explain their subjective reports of disturbed sleep. However, subsequent research has shown that the alpha-delta sleep anomaly does not appear to be specific to fibromyalgia or other chronic pain syndromes (Lavigne, Velly-Miguel, & Montplaisir, 1990). For example, it has since been observed in patients with arthritis, insomnia, chronic fatigue syndrome, and dysthymia, as well as in some healthy subjects (Pivik & Harman, 1995; Scheuler, Stinsoff, & Kubicki, 1983). Even prior to the work of Moldofsky, the anomaly had been documented in the sleep of psychiatric patients (Hauri & Hawkins, 1973). Perhaps most importantly, not all people with chronic pain or fibromyalgia show alpha-delta sleep. Together, these findings call into question the hypothesis that alpha-delta activity is representative of an arousal disorder, or a pain-specific biological marker for nonrestorative sleep (Pivik & Harman, 1995). In fact, there is no conclusive evidence to date that chronic pain is associated with any specific EEG sleep anomaly other than the polysomnographic features typically associated with insomnia.

3. Emotional distress. There has been speculation that anxiety and depression may contribute to poor sleep in people with chronic pain (Atkinson et al., 1988; Blumer et al., 1982; Pilowsky et al., 1985; Wade, Morin, Schwartz & Walton, 1989). Affective distress is common in this group, and depressed mood is known to be associated with sleep continuity disturbances, poor sleep quality, and sleep stage anomalies (e.g., reduced latency to the first REM period; diminished slow-wave sleep; Walsh, & Sugerma, 1989). Haythornthwaite et al. (1991) concluded that affective distress was more closely associated to insomnia in chronic pain patients than was pain intensity. The high comorbidity of depression and chronic pain raises the possibility that disturbed sleep in this population is primarily the result of depression.

The strongest evidence against this hypothesis comes from a recent study by Wilson et al. (1998), in which chronic pain patients who were not clinically depressed or anxious (according to structured interview assessment) were nevertheless found to have significant sleep disturbances.

4. Activity levels. The reduced level of fitness and low daytime activity levels exhibited by many chronic pain patients may be contributing factors to their reports of poor sleep quality (Lavigne et al., 1990; Linton, 1989; Moldofsky, 1990). In the general population, activity levels tend to be associated with the amount of deep sleep, providing support for the hypothesis that sleep serves a restorative function for the body (Carskadon & Dement, 1989; Shapiro, 1982). Hence, patients with chronic pain may have fragmented sleep because they are insufficiently active during the day to attain a deep, restoring sleep at night. However, this hypothesis would also predict that sedentary individuals in general should have poor sleep, which has not been a consistent finding in the literature (Horne, 1981). Although people with sedentary lifestyles do tend to have lighter sleep than very active individuals, they typically do not report more clinically significant sleep problems (Horne, 1981).

5. Behavioural factors. Behavioural factors play a large mediating role in both primary and secondary insomnia conditions (Morin, 1993; Lacks, & Morin, 1992). In the case of chronic pain, Morin et al. (1989) have speculated about the specific influence of pain behaviours on maintaining patients' sleep problems. According to these authors, "pain patients tend to organize their daily activities around their bed or bedroom (e.g., eat, read, and watch television while in bed/bedroom). They may also maintain irregular sleep/wake schedules and spend excessive amounts of time lying down attempting to relax, rest, nap, or simply find a comfortable body position" (Morin et al., 1989, p. 296). These behaviours may be misguided attempts to cope with sleep loss or fatigue; however the end result may be the entrenchment of an increasingly ingrained sleep problem. For example, spending excessive time in bed may fragment sleep throughout the night, when patients would be better served by

a sustained period of consolidated sleep. Furthermore, the continued use of the bed for activities other than sleep may strengthen its role as a conditional stimulus for wakefulness, rather than sleep. Finally, the use of medication, including hypnotics and other sleep-promoting drugs, may have the paradoxical effect of sustaining and even worsening sleep disturbances in patients with chronic pain. In addition, reliance on medications may perpetuate a behavioural cycle of drug dependence and undermine patients' perceptions of self-control over their sleep behaviour (Fleming, 1993).

In light of the ambiguity of the relationship among these various causal factors, Currie (1993) sought to examine the relative contributions of activity level and depressed mood in predicting poor sleep in patients undergoing multidisciplinary treatment for chronic pain. A group of patients was studied under circumstances in which these problems would be expected to improve--in this case, after their participation in an intensive pain management program. Wrist actigraphs (ambulatory monitoring units) provided objective data on sleeping behaviour and daytime activity levels over a continuous period of three days and nights. The sleep and activity levels of the patients were also compared to those of a group of age-matched sedentary healthy control subjects.

Currie (1993) found that individuals with chronic pain exhibited a highly fragmented sleep pattern that differed significantly from that of controls on all subjective and objective sleep measures. The patients also demonstrated daytime activity levels that were significantly lower than those of controls. Furthermore, daytime activity levels were correlated negatively with objective measures of mid-sleep arousals and wakefulness after sleep onset.

Another important, although perplexing, finding of this study was that the sleep of chronic pain patients did not change significantly following their participation in a comprehensive pain management program, whereas their levels of depression and physical fitness did improve. This finding suggests that insomnia secondary to chronic pain constitutes a distinct clinical problem rather than an artifact of depression or a sedentary lifestyle.

Furthermore, Currie (1993) demonstrated that pain management programs do not necessarily improve the sleeping behaviour of patients with chronic pain. A similar investigation by Staedt et al. (1993) also found that patients did not show significant changes in conventional parameters of sleep continuity (e.g., sleep efficiency and the frequency of nocturnal arousals) following participation in a comprehensive pain management program. Taken together, these studies indicate either that insomnia in chronic pain patients is essentially resistant to treatment, or that more intensive interventions specifically targeting sleep problems are required.

Cognitive-Behavioural Model of Insomnia

Chronic insomnia is no longer viewed as stemming from a single biological, environmental, or psychological cause. Rather, current theories propose that insomnia is a multifactorial, biopsychosocial phenomenon. Morin (1993) put forth the cognitive-behavioural model as an integrated conceptual framework for describing the multifaceted phenomenology of psychophysiological insomnia. This model, depicted in Figure 1, proposes that disturbed sleep is the product of a complex interaction among physiological, cognitive, affective and behavioural factors (Morin, 1993; Lacks, & Morin, 1992). Morin hypothesizes that, for most patients, chronic insomnia develops after a period of acute insomnia precipitated by a stressful life event. In support of this, research indicates that approximately three quarters of chronic insomniacs recall that their sleep problems began during the same period as one or more stressful life experiences (Gagné, Bastien, & Morin, 1997; Healy et al., 1981).

Some studies also point to one or more predisposing factors that increase an individual's susceptibility to chronic insomnia. For example, compared to good sleepers, insomniacs are prone to be more physiologically aroused during the day as well as at night (Kales & Kales, 1984). Hence, arousal sensitivity may predispose one to the development of insomnia. There may also be familial risk factors. A large percentage of insomniacs--75% in one study--report a positive family history of chronic sleep problems (Bastien, Gagné, &

Morin, 1997; Coren & Searleman, 1985). Whether this is the result of a genetic predisposition or of environmental factors, such as parental modelling of poor sleep habits, has yet to be determined.

Just as the cognitive-behavioural model has proven beneficial in describing primary insomnia, the available evidence suggests that the model could also provide a useful framework for understanding the problem of insomnia secondary to chronic pain. For example, it is apparent that pain, depression, behavioural, and activity-related factors may all be related to poor sleep in patients with chronic pain, but no single factor is sufficient to explain their sleep disturbances. Rather, the available evidence points to a complex interaction of these factors in the perpetuation of insomnia secondary to chronic pain. Within this hypothesized model, the onset of chronic pain, which for most patients is a highly salient and stressful life event, serves as the major precipitant for the initial development of an episode of acute insomnia. It is plausible that a chronic sleep problem could then evolve from the continuation of physical pain and discomfort, in conjunction with other factors such the presence of ongoing stressors, the development of poor sleep habits in the attempt to cope with nightly sleep loss, and the continued reliance on medication. As with psychophysiological insomnia, the relative contribution of these factors may vary from individual to individual. This would explain the range of individual differences that are observed in the severity of insomnia in chronic pain patients, and account for the fact that some patients do not report any sleep problems at all. A graphic representation of this hypothetical model is presented in Figure 2.

Management of Sleep Disturbances in Chronic Pain

The current treatment approach for medical patients with co-morbid insomnia consists primarily of pharmacotherapy (Aronoff, Wagner, & Spangler, 1986; King & Strain, 1990; Mellinger et al., 1985). Benzodiazepine hypnotics are widely used in the treatment of acute insomnia (National Institutes of Health, 1984), although tricyclic antidepressants have become

more popular as sleep aids--especially for chronic pain patients (Aronoff et al., 1986; Lavigne et al., 1991). While short-term pharmacotherapy for insomnia is accepted, the long-term use of any sleep medication is generally discouraged because of the potential for iatrogenic effects that can result in a continuing sleep problem (Dement, 1982; Lacks, 1987; National Institutes of Health, 1984). For example, protracted use of benzodiazepines and other sleep-promoting agents can result in the development of dependence and tolerance to the drug, as well as persistent carry-over effects such as morning headache, nausea, daytime sedation, and cognitive and psychomotor impairment. Many of the residual and iatrogenic effects of hypnotics are attributable to their effects on sleep architecture. Most medications, including non-hypnotics, alter the normal sleep cycle by increasing the amount of time spent in the lighter sleep stages at the expense of reduced slow-wave or REM sleep, which are considered to be the most restorative and necessary for attaining good sleep quality (Nicholson, Bradley, & Pasco, 1989). Thus, patients may feel that their sleep, although sufficient in duration, is not deep and refreshing. Rebound insomnia and other withdrawal symptoms can occur with sudden discontinuation of sleeping medications (Morin, 1993), which may induce a cycle of drug dependence and escalating use. Finally, some patients with chronic pain can actually experience an exacerbation of their pain with benzodiazepine use (Aronoff et al., 1986).

Despite the health risks, many chronic pain patients regularly take medication for sleep. In fact, people with severe chronic pain are seven times as likely to be taking sleeping pills as people without chronic pain (Millar, 1996). Samples of patients from pain clinics also point toward the frequent use of sedatives and tricyclic antidepressants (Hendler, Cimini, Ma, & Long, 1980; Jamison, Anderson, Peeters-Asdourian, & Ferrante, 1994; King & Strain, 1990). Nevertheless, most patients who take sleeping medications still experience disturbed sleep (Millar, 1996). For example, King and Strain (1990) studied a heterogenous sample of chronic pain patients and found that users and non-users of benzodiazepines reported the same degree of sleep impairment. Thus, in addition to persistent side-effects, the negative impact

on sleep architecture, and health risks, sedative medications do not appear to be especially efficacious in treating insomnia secondary to chronic pain.

Nonpharmacological Interventions for Insomnia

Alternatives to pharmacotherapy for treating insomnia have been available for many years. A substantial empirical database consisting of numerous controlled trials is now available, which attests to the efficacy of psychologically based treatments for insomnia. This body of literature has been the subject of several recent reviews, as well as two independent meta-analyses (Lacks, & Morin, 1992; Morin, Culbert, & Schwartz, 1994; Murtagh & Greenwood, 1995; NIH Technology Assessment Panel, 1996). In general, the evidence is strong that psychological approaches offer a safe and effective treatment for chronic insomnia. The most recent meta-analysis (Murtagh & Greenwood, 1995), involving 66 outcome studies and over 1500 participants, found that improvements in time to fall asleep, sleep efficiency (the ratio of time asleep to time spent in bed), wake time after sleep onset, and subjective sleep quality following treatment were on the order of large effect sizes using standard conventions (Cohen, 1988). Moreover, these improvements are well maintained at follow-up intervals ranging from three to twelve months (Murtagh & Greenwood, 1995). Typically, changes in the number of nocturnal awakenings and total sleep time are less robust, but in some studies they have still improved significantly following treatment with demonstrated maintenance of such gains over time (Morin et al., 1994; Murtagh & Greenwood, 1995).

Prior research also suggests that pharmacotherapy may actually be inferior to nonpharmacological treatment approaches in the management of chronic, as opposed to acute, insomnia. Although pharmacotherapy tends to produce quicker results, studies indicate that clinical benefits are better maintained over time with behaviour therapy (McClusky, Milby, Switzer, Williams, & Wooten, 1991; Morin, 1993). Nevertheless, nonpharmacological interventions for insomnia are still underutilised by health care professionals (Lacks & Morin, 1992), despite the fact that they are generally preferred over drug therapy by patients (Morin,

Gaulier, Barry, & Kowatch, 1992).

The main nonpharmacological interventions for insomnia include stimulus control, sleep restriction, relaxation, cognitive-behaviour therapy, and sleep hygiene education. Each of these interventions is reviewed in detail below.

1. Stimulus control. Stimulus control, which was developed by Bootzin (1972), constitutes one of the mainstays of nonpharmacological treatments. The intervention is based on a conditioning model of insomnia. It consists of a set of procedures designed to help patients re-establish and strengthen the association between their beds and sleeping, as well as to break existing maladaptive sleep habits. The rationale for stimulus control was derived from clinical observations that many of the habits developed by people with chronic insomnia are incompatible with the maintenance of a regular and satisfying sleep routine. Hence, they may actually lead to states of conditioned arousal rather than sleep. Potentially maladaptive habits include keeping an irregular sleep schedule, napping during the day, and using the bed for activities other than sleep or sex (e.g., watching television, reading, resting). In treatment, the goal of stimulus control is to help the patient curtail and eventually eliminate as many of these behaviours as possible. Research has shown that this method is highly successful in improving sleep quality and increasing sleep efficiency (Murtagh & Greenwood, 1995).

2. Sleep restriction. This intervention is often implemented conjointly with stimulus control (Spielman, Saskin, & Thorpy, 1987). The aim of sleep restriction is to help the patient to concentrate his or her sleep into a shorter period of time spent in bed. The method is intended to counter the tendency of insomnia patients to try to compensate for their sleep loss by spending extra time in bed. In most cases, these extra hours in bed are spent lying awake, leading to increased frustration and anxiety that can perpetuate the cycle of sleeplessness. The sleep restriction procedure requires that the patient sharply reduce his or her time in bed to the total sleep time recorded during a pretreatment baseline (referred to as the “sleep window”).

This results in a temporary period of sleep deprivation. Over subsequent weeks, the patient is permitted to increase his or her sleep window gradually until sleep efficiency stabilizes at approximately 85% (i.e., 85% of the time in bed is spent sleeping). Studies have shown that sleep restriction is effective in decreasing sleep onset latency, improving sleep quality, and reducing the frequency of nocturnal awakenings (Morin, 1993; Spielman et al., 1987).

Although the principles of both stimulus control and sleep restriction are relatively simple, their implementation can prove challenging. As noted by Chambers (1992), “sleep-related behaviours can be particularly resistant to change; many patients may be uncomfortable about altering their usual bedtime or may have trouble getting out of bed in the middle of the night when they are not accustomed to doing so” (p. 135). Therefore, ensuring compliance with these interventions is an important consideration in psychologically based insomnia treatment. Several procedures are thought to assist compliance with stimulus control and sleep restriction. Foremost, it is critical that patients be provided with a clear rationale for the behavioural treatment approach (Chambers, 1992). The use of written instructions, as in a patient manual, would facilitate patients’ implementing the clinician’s recommendations. In addition, most investigators agree that interventions should be tailored to the individual patient’s particular needs and circumstances (Chambers, 1992; Espie, Lindsay, Brook, Hood, & Turvey, 1989; Lacks & Powlishta, 1989; Lichstein & Reidel, 1994).

3. Relaxation. Relaxation techniques are directed toward states of physiological and cognitive arousal. Relaxation training has been used extensively in the treatment of both insomnia and chronic pain (Coursey, Frankel, Gaardner, & Mott, 1980; Morin & Azrin, 1987; NIH Technology Assessment Panel, 1996; Turner & Ascher, 1979). A variety of relaxation methods have been investigated as treatments for insomnia, including muscle relaxation techniques that are designed to alleviate somatic arousal, and mental relaxation methods that target states of cognitive arousal. The active component in all relaxation methods is thought to be their effect in decreasing the activity of the sympathetic nervous system, resulting in the

induction of sleep onset at the level of the thalamus (NIH Technology Assessment Panel, 1996). Reviews of the insomnia treatment literature indicate that cognitive relaxation methods have shown a slight but consistent superiority over somatic methods in reducing sleep onset latency (Murtagh & Greenwood, 1995; NIH Technology Assessment Panel, 1996). This implies that cognitive arousal may play a stronger role than somatic arousal in the maintenance of sleep onset insomnia (Lichstein & Rosenthal, 1980).

4. Cognitive-behaviour therapy. Because stress and cognitive arousal can play important roles in perpetuating insomnia, there has been a move recently toward integrating behavioural interventions with more cognitively oriented approaches. Insomnia patients often spend time in bed worrying or ruminating about problems, leading to a state of prolonged mental alertness that is incompatible with sleep (Lacks & Morin, 1992). Although many complain of being physically fatigued, even exhausted, at bedtime, they are still unable to fall asleep because of “racing thoughts.” The prominence of cognitive arousal in the phenomenology of insomnia has led some investigators to speculate that anxiety may be a major precipitating factor for many individuals (Lacks, 1987; Nicassio, Mendlowitz, Fussell, & Petras, 1985). Stress that is not managed effectively can serve to maintain insomnia by perpetuating a vicious cycle of anxious thoughts, inappropriate coping behaviours, and poor sleep habits. Hence, the combination of cognitive and behaviour therapies in the treatment of insomnia makes intuitive sense, and has the potential to address a broader spectrum of sleep-related issues.

Recently, a model of cognitive-behaviour therapy (CBT) has been developed and applied to the treatment of chronic insomnia (Morin, 1993). Within this model, cognitive therapy is used to help patients curtail stressful thoughts at bedtime, thereby minimizing their level of cognitive arousal to break the cycle of anxiety and insomnia. The interventions are drawn from traditional cognitive therapy techniques used in the treatment of depression and anxiety disorders, but they are adapted specifically to insomnia problems. The therapist helps

patients explore how their thoughts, attitudes and beliefs about sleep influence sleep behaviours and emotions. Cognitive restructuring procedures are implemented to reduce negative self-talk, and to replace maladaptive thoughts about sleep with more adaptive substitutes. To date, there are relatively few published trials using a pure cognitive approach to treating insomnia. Most have integrated the principles of cognitive therapy with behavioural interventions such as stimulus control, with generally positive results (Morin, Kowatch, Barry, & Walton, 1993; Morin, Stone, McDonald, & Jones, 1994; Sanavio, 1988; Sanavio, Vidotto, Bettinardi, Rolletto, & Zorzi, 1990).

5. Sleep hygiene education. Sleep hygiene education is designed to increase patients' awareness of the impact of lifestyle and environmental factors on their sleep, and to promote more positive health behaviours that may improve sleep. Emphasis is placed on changing health practices that have a direct impact on sleep such as the use of caffeine, alcohol and nicotine products, prescription medication, and the effects of diet and exercise on sleep. Sleep hygiene education can also include information about the impact of environmental factors on sleep such as noise, light, temperature and mattress quality. As a primary intervention, sleep hygiene education has not proven to be especially effective in the treatment of chronic insomnia (Morin, 1993, Morin, Culbert, & Schwartz, 1994). Nevertheless, it is thought that lifestyle and environmental factors do play a role in complicating and worsening existing insomnia problems. For example, some individuals may attempt to cope with daytime fatigue from sleep loss by consuming excessive amounts of coffee, or by smoking. Hence, there is merit to making sleep hygiene education a part of any comprehensive insomnia treatment (Lacks, 1987; Morin, 1993).

6. Multicomponent treatments. Multicomponent treatments combine several interventions into a treatment 'package.' This approach is advocated by many sleep researchers in light of the complex nature of insomnia and the fact that "any single-component method may address only one aspect of the sleep problem" (Lacks & Morin, 1992, p.590).

Current thinking is that the multicomponent approach has the distinct advantage of providing patients with a variety of coping skills, increasing the chance that they will find a technique, or a combination of techniques, that work well for their unique sleep problems. Recent multicomponent interventions have structured treatment around the cognitive-behavioural model of insomnia. Using a randomized waiting-list control design, Morin, Kowatch, Barry and Walton (1993) demonstrated that multicomponent CBT, which included stimulus control, sleep restriction, cognitive therapy, and sleep hygiene education, was effective in reducing sleep onset latency, wake time after sleep onset, and early morning awakenings in older adults diagnosed with chronic psychophysiological insomnia. These improvements were well maintained at 3-month follow-up. Other studies have also found that multicomponent treatments are effective in the treatment of insomnia (Kupych-Woloshyn, MacFarlane, & Shapiro, 1993; Morin, Stone, & McDonald, 1994).

The most recent summary data suggest that, overall, multicomponent treatments are superior to most single-intervention treatments in terms of changing sleep patterns (Lacks & Morin, 1992; Morin et al., 1994; Murtagh & Greenwood, 1995). Meta-analyses have shown that multicomponent treatments and stimulus control are associated with the largest effect sizes for changes in sleep onset latency, wake time after sleep onset, and sleep quality (Murtagh & Greenwood, 1995). It is not yet clear whether multicomponent treatments are actually superior to stimulus control by itself; indeed, this determination is confounded by the fact that most combination treatments include stimulus control as a core intervention. In their review of the insomnia treatment literature, Lacks and Morin (1992) recognized the merit of additional research on multicomponent treatments, but were critical of investigators that combine treatments in a hit-or-miss fashion with little rationale or empirical support. In this context, it may be worthwhile to develop multicomponent treatments that are tailored to the needs of specific populations of patients with insomnia.

Nonpharmacological Treatments and Medical Patients

To date, clinical trials of nonpharmacological treatments have excluded patients with insomnia secondary to medical conditions on the assumption that these individuals would be better served by treating the primary medical pathology. This becomes problematic, however, for patients with chronic pain who have exhausted their options for obtaining relief from conventional medical treatments. For these patients, the indefinite use of medication for managing sleep problems is also contraindicated because of the uncertain efficacy of long-term use, and the potential health risks.

Another tacit assumption may be that medical patients would not benefit from nonpharmacological approaches for the treatment of insomnia because the source of their disturbed sleep (i.e., pain) is presumed to be physically based. However, the available evidence suggests that psychological factors are also important in the maintenance of insomnia secondary to chronic pain. Furthermore, several uncontrolled studies indicate that medical patients can indeed benefit from psychologically based insomnia treatments. For example, relaxation-based and behavioural therapy have been used successfully to alleviate sleep disturbances associated with cancer and hemophilia pain (Cannici, Malcolm, & Peek, 1983; Stam & Bultz, 1986; Varni, 1980). In addition, a small sample of patients with insomnia secondary to chronic back pain were shown to benefit from behavioural insomnia treatment (Morin et al., 1989), with self-report measures showing an average improvement rate of 48% across patients. Morin (1993) also reported summary data on thirteen patients with insomnia secondary to medical disorders (several of which involved significant pain) who were treated successfully with a multicomponent approach. The average improvement rate for wakefulness after sleep onset was 45%. Finally, the results of a pilot study involving three patients that was conducted in preparation for the present study indicated substantial treatment gains in two subjects (results described in more detail below). These studies indicate that although no controlled research has been done, the weight of evidence points to the potential value of nonpharmacological approaches in the management of insomnia secondary to chronic pain and

other medical conditions.

Additional Issues in the Treatment of Insomnia

Medication use and nonpharmacological treatments. There is some debate as to whether patients should be withdrawn completely from sleep medications prior to engaging in a nonpharmacological treatment for insomnia. Indeed, one meta-analysis concluded that, on average, drug-free individuals perform better in clinical trials (Murtagh & Greenwood, 1995). A shortcoming to the exclusion of medication users, however, is the limited generalizability of the results. Individuals relying on medication may, in fact, have the worst sleep disturbances and have the greatest need for assistance (Fleming, 1993). These patients may have developed poor sleep habits, but are reluctant to discontinue their medication until they have other self-management skills at their disposal. Hence, some investigators advocate for the inclusion of medication-users into clinical trials, but suggest that medication reduction be incorporated into the treatment protocol (Lacks & Morin, 1992; Morin, 1993).

Clinically versus statistically significant treatment effects. Reviews of the insomnia treatment literature have questioned the extent to which improvements following nonpharmacological interventions are clinically meaningful (Lacks & Morin, 1992; NIH Technology Assessment Panel, 1996). Most recently, the U.S. National Institutes of Health (NIH) Technology Assessment Panel (1996) evaluated the current state of knowledge on nonpharmacological approaches in the treatment of insomnia. Although the panel concluded that there was sound scientific evidence that behavioural techniques can help to relieve the severity of insomnia, they questioned whether the extent of symptom reduction was clinically significant. Within psychotherapy research generally, it is now recognized that statistically significant findings within a treatment group do not always reflect changes that are important for individual patients in terms of reduced symptoms or enhanced quality of life.

"Conventional statistical comparisons between groups tell us very little about the efficacy of psychotherapy...or its ability to make a difference in peoples' lives" (Jacobson & Truax, 1991,

p. 12). Determining the clinical significance of research results can be problematic when there are few criteria by which to define a 'clinically meaningful effect.' The reporting of effect sizes in standardized units would allow the reader to evaluate the results in terms of the categories for small, medium and large effects. Unfortunately, even large effect sizes are not necessarily clinically significant. Jacobson, Follette, and Revenstorf (1984) defined clinically significant change as the extent to which therapy moves someone outside the range of the dysfunctional population or within the range of the functional population. This definition has practical merit, but the reality is that many treatments do not 'cure' their clients in the sense that they emerge with functioning in the normal range.

Within the insomnia literature specifically, criteria have been proposed for distinguishing "good" and "poor" sleepers. Generally, a sleep onset latency or wake time after sleep onset of greater than 30 minutes on most nights is considered to be indicative of a significant sleep problem (Lacks & Morin, 1992). A sleep efficiency of less than 85% can also be used (Morin, 1993). Reviews of the treatment outcome literature suggest that many patients do not emerge as 'good' sleepers using these operational definitions, despite making substantial improvements in their sleep patterns. For example, Lacks' and Powlishta's (1989) review of seven outcome studies revealed that at one-year follow-up, 49% of subjects showed a reliable change in sleep but only 32% actually became 'good' sleepers. Lacks' and Morin's (1992) later review of 17 outcome studies revealed an average posttreatment sleep onset latency of 42 minutes, which is still in the range of poor sleep, although it represented a 50% reduction from the pretreatment average.

Summary and Rationale

The converging evidence is clear: a substantial sleep problem exists among patients with chronic pain. Furthermore, the scope of this problem is large, affecting as much as 11% of the general adult population. For many people with chronic pain, insomnia is a highly distressing aspect of their medical condition, which can further impair daytime functioning and

increase their risk for mental health difficulties. Pharmacological approaches to manage sleep disturbances in this population have not demonstrated long-term efficacy, and they may carry health risks. On the other hand, a large body of research now attests to the efficacy of nonpharmacological treatments for chronic primary insomnia, as well as preliminary evidence with insomnia secondary to medical conditions. Hence, the extension of psychologically based treatment trials to insomnia secondary to medical conditions is recognized as an underdeveloped, yet important, area for research (Lacks & Morin, 1992). Furthermore, the inclusion of only medically healthy individuals in treatment outcome studies ignores the largest proportion of insomnia patients in primary care settings--those who report sleep disturbances that are secondary to medical or psychological conditions (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Lacks, 1987; Morin et al., 1989). Therefore, the present research is significant because it represents the first randomized controlled trial of a nonpharmacological treatment for insomnia that is associated with chronically painful medical conditions.

Development and Pilot-Testing of the Treatment Protocol

In preparation for the present study, a multicomponent treatment program for insomnia was modified from an existing protocol by Morin (1993). The treatment methods centre around Morin's cognitive-behavioural model of insomnia, but they have been adapted to the particular circumstances of chronic pain patients. Hence, the intervention is based on the assumption that even though the major source of the insomnia may be the experience of pain that disrupts sleep, many people with chronic pain go on to develop behavioural habits that serve to exacerbate and maintain the problem. If so, then promoting better sleep habits would be expected to enhance the quality of sleep in patients with chronic pain, even though the experience of pain per se is not the target of intervention.

When developing the treatment protocol it was important to consider the nature of the sleep problems in this patient group. Because most patients experience a combination of sleep onset and maintenance insomnia (Currie et al., 1995; Haythornthwaite et al., 1991; Wilson et

al., 1998), a combined treatment approach incorporating empirically supported interventions for both onset and maintenance difficulties was the most appropriate to their needs. A multicomponent approach was also thought to be a good starting point, given that this was a new application of an existing treatment model (Kazdin, 1992).

A patient-oriented treatment manual, *Coping with Chronic Pain Sleep Problems* (Currie & Wilson, 1996; Appendix A), was written that included several interventions addressing different aspects of patients' insomnia experience. The manual employs a structured format that has proven useful in other self-management manuals (Caudill, 1996; Craske, Barlow, & O'Leary, 1992; Greenberger & Padesky, 1995). For example, it provides clear rationales and step-by-step instructions for implementing all of the treatment methods and coping techniques. The manual was used to structure a six-session group therapy. A separate therapist manual (Appendix B) was developed to assist in the running of the group treatment, and to ensure that the treatment procedures were applied consistently in subsequent therapy groups. The treatment protocol was structured so that the behavioural interventions (i.e., stimulus control and sleep restriction), which have the strongest empirical support, were introduced early in the course of treatment. This was done so that in the first few sessions of therapy, patients would be taught the skills that had the greatest potential for improving their sleep. In addition, this permitted the remaining group sessions to provide ongoing support to patients who were having difficulty implementing stimulus control and sleep restriction, even while other interventions were being introduced.

A pilot study was then conducted to determine the preliminary efficacy of the six-week group treatment protocol. Three subjects with chronic back pain were recruited, all of whom had been treated in the multidisciplinary pain program of The Rehabilitation Centre. Although they had some familiarity with pain-management techniques, all three subjects continued to experience pain-related insomnia. A complete psychodiagnostic assessment confirmed that all three subjects met diagnostic criteria for insomnia secondary to chronic pain, and that their

sleep problems were not the result of major depression or other psychiatric conditions. Apart from the use of low doses of non-narcotic analgesics, the three subjects did not engage in any other form of treatment for pain or insomnia during their participation in the pilot study.

Following a baseline assessment that involved self-monitoring with a sleep diary, the subjects participated as a group in six weekly outpatient therapy sessions. Each session was two hours in duration and included didactic presentations, group discussion, and weekly home assignments. Subjects received a copy of the patient manual at a rate of one chapter per week. The specific interventions included stimulus control, sleep restriction, cognitive therapy, relaxation training, and sleep hygiene education. Throughout the treatment, subjects monitored their individual progress via daily completion of a sleep diary. The beginning of each session was devoted to reviewing the diaries and identifying any problems encountered in the home practice.

The results of the pilot study provided encouraging preliminary support for the treatment approach. All three subjects completed the treatment protocol and participated in the posttreatment and follow-up assessments. Two subjects displayed evident improvements in their sleep patterns by the end of treatment. The sleep parameters that showed the most change were wake time after sleep onset and sleep efficiency. Wake time after sleep onset decreased substantially from the baseline to the last week of treatment (decreases of 88% and 61% for subjects 1 and 2, respectively), while sleep efficiency increased (increases of 73% and 27%, respectively), indicating an overall improvement in sleep continuity. The remaining parameters demonstrated smaller but noticeable improvements in both of these patients, including increased sleep quality (58% and 37%, for subjects 1 and 2, respectively), and decreases in sleep onset latency (26% and 33%) and nocturnal awakenings (25% and 33%). Final values for sleep efficiency for subjects 1 and 2 were 82.5% and 78.2%, respectively, while posttreatment values for sleep onset latency were 37 minutes and 45 minutes. These values still fell short of normative cut off values (>85% and <30 minutes for sleep efficiency

and sleep onset latency) used to distinguish good from poor sleepers (Lacks & Morin, 1992), although they approached these limits during the final weeks of treatment. The third subject did not demonstrate a robust change in her sleep pattern; she reported having difficulty in adhering fully to stimulus control and sleep restriction procedures due to episodes of severe pain and reduced function. The use of pain medication remained stable from the baseline to post-treatment for all three subjects.

Treatment gains in subjects 1 and 2 were generally maintained at a six-month follow-up assessment. Subject 1 displayed some marginal worsening in sleep onset latency and number of awakenings; however, the values were still improved compared to pretreatment levels. Subject 2 showed good maintenance of all improvements. A complete manuscript (under review) of the pilot study is provided in Appendix C.

The Present Study

The results of the pilot study provided justification for proceeding with a randomized controlled trial. The primary objective of the present study was to demonstrate the efficacy of the cognitive-behavioural treatment program for chronic pain patients who suffer from concurrent insomnia. The results will also provide empirical support for the cognitive-behavioural model of insomnia secondary to chronic pain, although it is recognized that any treatment outcome study provides, at best, indirect evidence for the theoretical rationale underlying the treatment.

Given that this study represents the first controlled trial of a nonpharmacological treatment for insomnia secondary to a chronic medical condition, the goal of the study was to compare the CBT treatment package with a waiting-list control (WLC) group. The protocol was modelled after recent well-designed treatment studies in the area of health psychology (Morin et al., 1993; Payne & Blanchard, 1995). The present trial also strove for methodological rigour by including detailed patient/therapist manuals to structure the treatment, quantifying medication usage, checking for subject adherence to specific

interventions, and using ambulatory activity monitors to provide an objective measure of sleep. The activity monitors were included because the sole reliance on self-report measures for evaluating outcome has been recognized as a limitation of the insomnia treatment literature (Lacks & Morin, 1992, NIH Technology Assessment Panel, 1996).

In preparation for the trial, the treatment manuals were revised slightly to incorporate feedback received from the pilot subjects. In addition, the protocol was amended to include an additional session on medications and sleep. In light of the high prevalence of medication use in patients with chronic pain, it was felt that excluding subjects who take medication for sleep would be practically limiting in terms of recruiting subjects, and conceptually limiting from the perspective of generalizing results. Therefore, patients who took medications were allowed into the trial, on the assumption that some may in fact choose to reduce their reliance on medication in favour of the behavioural skills and strategies acquired during the course of the treatment. Although this decision was left to the patients to discuss with their prescribing physicians, the treatment protocol included instruction to interested participants on how best to approach medication reduction.

Method

Subject Recruitment Procedure

A multistage recruitment protocol was used to find appropriate subjects for the trial. Subject recruitment extended over an 11-month period and consisted of three stages.

Stage 1: Mail outs. Prospective subjects were first identified on the basis of their previous involvement with either the pain clinic of The Rehabilitation Centre or the Orleans Clinic of Orthopaedic Medicine. Recruiting from both of these sources ensured that a broad range of patients, differing in the severity of pain and sleep problems, were offered the chance to participate. Mailing lists were compiled of all patients seen in these clinics in the last five years. Prospective subjects were sent a personalized cover letter (shown in Appendix D). The letter described the purpose of the study and the nature of patients' involvement. Patients

were informed that they would be reimbursed for all parking expenses incurred during their involvement in the study. Individuals who were interested in participating, or who wanted more information about the study, were asked to contact the primary investigator (either by phoning directly, or by mailing back a form using a self-addressed stamped envelope that was provided in the mail-out). Former patients who were not interested in participating were asked to return the form anyway, and to indicate the reason why they were not interested.

Letters were mailed in batches of 50 to 75 every 2 to 3 weeks. In total, over 1500 letters were mailed out.

Stage 2: Initial screening. Potential subjects who indicated an interest in participating were contacted by phone and administered a brief screening interview for the major exclusion criteria. A more detailed in-person assessment was scheduled only if the respondent: (a) had benign chronic pain of a musculoskeletal origin, excluding primary fibromyalgia; (b) reported sleep difficulties; (c) was willing to be assigned randomly to a treatment or control group; (d) was available to come to The Rehabilitation Centre on the required occasions for assessment and treatment appointments; (e) did not plan to undergo any new treatments for pain or sleep in the next four months; (f) did not have another major medical condition affecting sleep; (g) was not in a state of crisis or suffering from a concurrent major psychiatric disorder, and; (h) was under the age of 60 years. Individuals who regularly took prescription medication for sleep were not excluded; however it was established that medication use would remain constant over the course of the assessment period. A more detailed summary of the study's exclusion criteria is provided in Appendix E.

Stage 3: Interview. Prospective subjects who were not excluded on the basis of the initial telephone screening were scheduled for a formal in-person assessment of their sleep and psychological functioning. This first appointment served to confirm the diagnosis of insomnia secondary to chronic pain, and to screen for concurrent sleep and major psychiatric disorders. Any subject meeting criteria for a major psychiatric condition other than insomnia disorder

was considered ineligible for participation. In total, 70 patients were interviewed for the study, but only 50 met all inclusion criteria.

The majority (90%) of assessment interviews were conducted by the author. The remaining interviews were conducted by three advanced doctoral students in the clinical psychology program at the University of Ottawa. All had advanced training in assessment and interviewing procedures. Clinical supervision of the assessments was provided by Dr. Keith Wilson. All diagnoses were assigned by clinical consensus after consultation with Dr. Wilson. In addition, a random sample of 25 interviews were audiotaped and subsequently reviewed by Dr. Wilson as a reliability check. The assessment protocols are described in more detail below.

Subjects

Twenty-three men and twenty-seven women, who ranged in age from 29 to 59 years ($M = 44.5$, $SD = 8.3$) completed the assessment protocol and began their randomly assigned condition. All subjects had exhausted their options for obtaining permanent pain relief from conventional medical therapies. Apart from reimbursement of parking expenses, subjects received no remuneration for their participation. The demographic characteristics of the subjects are summarized in Table 1. Twenty-seven subjects (54%) were not working because of pain; 20 (40%) were employed in a full-time or part-time capacity. The remaining subjects ($n = 3$; 6%) were unemployed for reasons other than pain. Thirty subjects (60%) reported regular use of medication (i.e., taking the medication more than two times per week; Morin et al., 1993). The specific medications taken included non-narcotic analgesics ($n = 23$; 46%), weak narcotics ($n = 14$; 28%), antidepressants ($n = 18$; 36%), and sedative hypnotics ($n = 6$; 12%). Some subjects took more than one class of medication. Apart from medication, subjects did not engage in any other form of treatment for their pain condition or insomnia during their participation in the trial.

All subjects were assessed by a psychiatrist and were considered to have chronic benign

pain of a musculoskeletal origin. The specific diagnoses assigned by each subject's physiatrist are shown in Table 2. The majority of subjects reported back pain as their primary pain complaint ($n = 39$; 78%); seven subjects (14%) reported neck pain as their primary problem. The remaining subjects reported that their primary pain area was in the lower limbs ($n = 3$; 6%) or pelvic region ($n = 1$; 2%). Most subjects ($n = 40$; 80%) reported that they had pain in more than one anatomical location (median number of pain sites = 5; range = 1 to 19). The average duration of chronic pain was 9.2 years (range = 7 months to 34 years; $SD = 8.7$), whereas the average duration of insomnia was 7.9 years (range = 6 months to 30 years; $SD = 8.0$). Almost half of the subjects ($n = 24$; 48%) indicated that their sleep problems began concurrently with the onset of their primary pain condition. A smaller percentage of subjects ($n = 5$; 10%) reported that they were light sleepers prior to developing chronic pain, but the onset of their pain condition served to worsen their sleep problems. The remaining subjects ($n = 21$; 42%) reported that their insomnia began sometime after the onset of their pain.

To be considered eligible for the trial, all subjects were required to meet DSM-IV criteria for insomnia secondary to the general medical condition of chronic pain (APA, 1994). These criteria are (a) a predominant complaint of difficulty initiating or maintaining sleep, or of nonrestorative sleep, for at least one month that is sufficiently severe to warrant independent clinical attention, (b) the sleep disturbance is considered to be related etiologically to the experience of chronic pain; (c) the sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning, and (d) the disturbance does not occur exclusively during the course of another sleep disorder, mental disorder or other medical condition, or due to the physiological effects of a substance (e.g., medication or drug). Subjects were further subtyped according to the nature of their insomnia complaint (i.e., sleep onset vs. sleep maintenance) using the nosology of the International Classification of Sleep Disorders (ASDA, 1990).

Details of Assessment Procedures

During the first appointment with the subject, the interviewer reviewed the details of the study, and answered questions. The general treatment approach was explained without revealing details about the specific interventions involved. The subject was informed that many people with chronic sleep problems who undergo this form of treatment show improvements in sleep, but that the treatment was still experimental and might not help any particular individual. The subject was then asked to provide written informed consent (using the form shown in Appendix F), and the interview assessment was initiated.

Personal Information Form (Appendix G). A standard form was used to obtain basic demographic and medical information from each subject. Items on this form were drawn from the International Association for the Study of Pain (IASP) standard data collection protocol (IASP, 1995).

Primary Care Evaluation of Mental Disorders. (PRIME-MD; Spitzer et al., 1994). Each subject underwent a semi-structured interview to gather background information, a medical history, and to determine his or her readiness to undergo treatment. The subject was then administered the PRIME-MD, a semi-structured diagnostic interview based on DSM-IV criteria (APA, 1994). The PRIME-MD consisted of two components. First, the subject completed a one-page screening form (referred to as the Patient Questionnaire; Appendix H) prior to seeing the interviewer. The Patient Questionnaire consists of a series of “yes/no” questions about psychological difficulties experienced during the past month, which correspond to the central criterion symptoms of particular mental disorders. The interviewer then uses a structured interview guide (Appendix H) to follow up on positively endorsed items. For the present purpose, the PRIME-MD interview schedule was expanded slightly to include several open-ended questions and symptom severity rating scales, which were drawn from the Schedule for Affective Disorders and Schizophrenia (Endicott & Spitzer, 1978). This permitted more detailed exploration of particular symptoms and more thorough

application of the severity thresholds for individual disorders.

The PRIME-MD provided the basis for assessing subjects for major depression, panic disorder, generalized anxiety disorder, post-traumatic stress disorder, and alcohol abuse, all of which are known to affect sleep (Walsh & Sugarman, 1989; Ross, Ball, Sullivan, & Caroff, 1989). Subjects meeting full criteria for any of these disorders were excluded from participating in the trial. However, subjects with less severe presentations of depression were included. Although the PRIME-MD is a brief screening procedure, Spitzer et al. (1994) found good concordance between PRIME-MD diagnoses and those of independent mental health professionals using lengthier interview protocols ($\kappa = 0.71$ for any diagnosis).

Structured Interview for Sleep Disorders for DSM-III-R (SIS-D; Schramm et al., 1993). Each subject also underwent a comprehensive evaluation of the nature and severity of sleep disturbances using the SIS-D (Appendix I). The SIS-D consists of a structured inquiry about specific symptoms of sleep disorders as defined by the DSM classification scheme. Originally developed for DSM-III-R criteria (APA, 1987), for the present purpose the interview schedule was modified slightly to incorporate DSM-IV revisions (APA, 1994). The specific disorders assessed by the SIS-D are insomnia disorder, narcolepsy, sleep-wake schedule disorder, dream anxiety disorder, sleep terrors, and sleepwalking disorder. Subjects were excluded if they met full criteria for any disorder other than insomnia. Schramm et al. (1993) have shown that SIS-D diagnoses have high inter-rater reliabilities (average $\kappa = 0.85$), and show generally good concordance with diagnoses obtained with polysomnography.

Inter-rater reliability of interviews. An experienced rater, Dr. Keith Wilson, reviewed a random sample of 25 audiotaped interviews. He applied the PRIME-MD and SIS-D diagnostic criteria to arrive at independent diagnoses for each subject, and also decided whether that subject met any exclusion criteria. There was 100% agreement between Dr. Wilson and the initial interviewer for the diagnosis of insomnia. For decisions as to whether the subjects met any of the psychiatric exclusion criteria, the agreement between raters was

88%, kappa = .71. This represents a substantial level of agreement according to conventions described by Landis & Koch (1977).

Measures

Because this was the first controlled trial of a nonpharmacological treatment involving chronic pain patients, it was deemed necessary to assess outcome across different domains of functioning that could, potentially, be affected by the intervention. Outcome measures were considered on an a priori basis to be of either primary or secondary importance. The main target of the intervention was insomnia. Hence, the primary outcome measures were those that addressed different dimensions of sleep (e.g., quantity, continuity and quality of sleep). The secondary outcome measures addressed other constructs that were not necessarily the primary targets of the intervention, but which were relevant to the treatment model under investigation and represented clinically important dimensions in their own right (e.g., pain, emotional distress, medication use).

A third set of measures tapped into constructs that were predicted to have moderating effects on treatment outcome. The information provided by these moderating variables was considered to be of tertiary importance compared to the primary and secondary outcome measures. However, it was thought that the analyses of these data could prove useful in understanding the results from the primary and secondary outcome measures, and provide some indications for future research.

Primary Outcome Measures

Daily Sleep Diary (Haythornthwaite, Hegel, & Kerns, 1991: Appendix J). Prior to randomization, each subject self-monitored his or her sleep for a two week baseline period using a standardized sleep diary. There were entries on the diary for the subject to record: (a) hours slept (total sleep time); (b) time in bed; (c) sleep onset latency (defined as the time in minutes it took the subject to fall asleep after getting into bed), and; (d) frequency of awakenings. Subjects also used this form to monitor their daily intake of prescription and

non-prescription medications. The diary data were used to calculate wake time after sleep onset (the amount of time in bed minus total sleep time and sleep onset latency), and sleep efficiency (the ratio of total sleep time to time in bed). These measures, along with sleep onset latency, total sleep time, and number of awakenings, were used as primary outcome measures for determining the response to treatment. Consistent with other insomnia treatment studies (cf., Morin et al., 1993), the sleep diary measures were coded for each night and then averaged across nights within each of the three assessment periods (pretreatment, posttreatment, and follow-up). The test-retest stability of the sleep diary parameters have been shown to be adequate, with Spearman-Brown estimated reliability coefficients ranging from a low of .69 for sleep onset latency, to .87 for total sleep time over a four-day period (Haythornthwaite et al., 1991). In the present study, internal consistency was calculated from the data averaged over the 14-day baseline period. The Cronbach's alphas for sleep onset latency, sleep efficiency, wake time after sleep onset, total sleep time and awakenings were .89, .93, .93, .91, and .95, respectively.

The convergent validity of the sleep diary is known to be rather poor when the data are compared with the absolute values obtained from polysomnography (PSG), which is considered the "gold standard" for sleep assessment. In general, insomniacs tend to overestimate the severity of their sleep disturbances compared to objective sleep measurement via PSG (Carskadon et al., 1976). On the other hand, diary recordings for sleep onset latency and wake time after sleep onset correlate highly with their PSG-recorded equivalents (.98 and .88, respectively; Coates, Killen, George, Silverman, Marchini, & Thoresen, 1982). Furthermore, it has been suggested that one to two weeks of sleep diary recording provide a more representative sample of an insomniac's sleep than one or two nights of PSG given that insomnia is defined more by chronicity than discrete sleep events (Lacks & Morin, 1992). Nevertheless, in light of the obvious benefits of multimodal sleep assessment an objective measure of sleep was also included.

Objective Sleep Assessment. Ambulatory wrist monitoring units (Mini-motionlogger Actigraph, Ambulatory Monitoring Inc., Ardsley, NY) provided a measure of nocturnal motor activity. The actigraph is a small, lightweight (4.4 x 3.3 x .96 cm, 57 grams), unit worn on the non-dominant wrist that provides continuous monitoring of activity levels. The unit contains a piezoelectric transducer capable of detecting movement in all three axes of direction (threshold sensitivity = .01 g per rad/sec or greater). Any movement sufficient to displace the transducer is registered as an activity count. Activity level is subsequently measured in activity counts per epoch, which are then stored in a 32-kbyte solid-state memory. Studies have shown that low activity levels and prolonged episodes of uninterrupted immobility are associated with depth of sleep, whereas high activity levels and prolonged episodes of movement are associated with intermittent wakefulness (Middlekoop, Van Hilton, Kramer, & Kamphuisen, 1993). Hence, the basic rationale for including the actigraph assessments is that low mean activity levels reflect a less fitful sleep. Actigraph recordings have been used as outcome measures in several insomnia treatment studies, where they have been shown to be sensitive to changes in sleep patterns following treatment (Brooks, Friedman, Bliwise, & Yesavage, 1993; Sadeh, Hauri, Kripke, & Lavie, 1994; Schmidt-Nowara et al., 1992).

For the pretreatment, posttreatment, and follow-up assessments (Time 1, 2 and 3), each subject provided two nights of ambulatory monitoring data. The epoch length was set at 15 seconds to allow for this length of recording. The actigraph was initialized to begin recording at 9:00 p.m. on the first night the subject began wearing the unit. Subjects were provided with both verbal and written instructions on how to use the actigraph (Appendix L).

A computer-scoring program (Ambulatory Monitoring Inc., 1994) is available to estimate basic sleep-wake parameters from the actigraph data (Cole, Kripke, Gruen, Mullaney, & Gillin, 1992; Webster, Kripke, Messin, Mullaney, & Wyborney (1982). However, when the reliabilities of these derived parameters were examined in an ancillary study based on a subset of the present subjects (Wilson et al. 1998; Appendix M), they were

found to be quite low over only two nights of recording (ranging from a low of -.06 for sleep onset latency to a high of .67 for time spent awake after sleep onset). Furthermore, the nightly concordance between sleep diaries and the actigraph-scored sleep measures was also low, ranging from $r = .12$ for sleep onset latency to $r = .42$ for number of awakenings. These results are consistent with previous investigations of the actigraph's performance in estimating sleep in patients with severe insomnia (Cole et al, 1992). Generally, the scoring algorithm tends to overestimate the sleep of insomniacs because of periods when the subjects are immobile but awake. This results in lower agreement rates with polysomnography for poor compared to good sleepers (Cole et al, 1992; Hauri & Wisbey, 1992; see also Sadeh et al., 1994, for a complete review of actigraph technology).

In light of the reliability problem with the computer-scored parameters, a decision was made to forego analysis of specific sleep parameters in the evaluation of treatment outcome. Instead, only the actigraph data for mean activity level were considered. Mean activity level represents the average number of activity counts recorded per 15-second epoch (see Figure 3 for an example of the activity data produced by the actigraph). It is the direct measure of the actigraph, based on the raw data actually recorded by the unit. It should be noted, however, that Wilson et al. (1998) found that the reliability of this measure was only $r = .41$ over two nights of assessment, indicating a moderate degree of night to night variation in movement levels among the subjects.

Each subject's mean activity level during the night was used as a global index of body motility. The calculation of mean activity level was based on the bedtimes and rising times that the subject recorded on the sleep diary to mark the period that he or she was lying in bed. The total number of activity counts recorded during this period was divided by the total number of 15-second epochs to yield the mean activity level index. These values were then collapsed across the two nights of recording for each assessment period.

Pittsburgh Sleep Quality Index (PSQI); Buysse, Reynolds, Monk, Berman, & Kupfer,

1989; Appendix K). The PSQI assesses sleep quality in a multifactorial fashion; hence it was used as a global measure of treatment outcome. Unlike most other sleep inventories, the PSQI was designed specifically for use with clinical populations. It has shown high sensitivity and specificity in distinguishing good and poor sleepers in samples of medical and psychiatric patients (Buysse et al., 1989). The 19 items on the PSQI are retrospective, inquiring about the subject's sleeping habits for the past month. The PSQI produces seven component scores: sleep onset latency, sleep duration, sleep efficiency, reliance on medication, daytime dysfunction, and subjective sleep quality. The sum of the component scores yields a global index of sleep quality. The global score was used as a primary measure of outcome, as well as for individual assessments of clinical significance. For the latter purpose, scores of 6 and higher are indicative of poor sleep quality. The PSQI has good internal consistency (Cronbach's alpha = 0.83; Buysse et al., 1989). Over a one-month time interval, test-retest reliability for the PSQI global score was found to be 0.85 (Buysse et al., 1989).

Secondary Outcome Measures

Multidimensional Pain Inventory - Pain Severity Scale (MPI-PS; Kerns, Turk, & Rudy, 1985; Appendix N). Although the treatment was addressed to sleep problems rather than to pain management, it was considered possible that improved sleep could also lead to a secondary benefit of reducing patients' perceived levels of pain intensity (Affleck et al., 1996). Such an outcome would be clinically meaningful in itself, and also have implications for the treatment model. Therefore, a well-validated measure of pain intensity--the MPI-PS--was included as a secondary outcome measure. The three items on the MPI-PS address present pain level, average pain severity over the past week, and the extent of suffering because of pain (each using a 7-point scale). The sum of the items provides an index of the individual's overall pain intensity. Internal consistency of the scale has been demonstrated with chronic pain patients (Cronbach's alpha = .72), and the test-retest reliability has been reported as $r = .82$ for this population (Kerns et al., 1985). The MPI-PS has been used as an outcome

measure in several clinical studies of patients undergoing treatment for chronic pain complaints (Fischer & Corcoran, 1994).

Beck Depression Inventory (BDI; Beck et al., 1961). Although patients with comorbid major depression were excluded from the trial, some who were included did meet PRIME-MD criteria for less severe depressive syndromes, and others presented with varying degrees of general emotional distress. It was considered possible that improvements in sleep could have an indirect effect on reducing these levels of distress (Ford & Kamerow, 1989). For the present purpose, therefore, emotional distress was assessed with the BDI. The BDI is the most widely used self-report measure of depressive symptomatology. Internal consistency for the 21-item measure is reportedly good ($\alpha = .86$; Beck, Steer, & Garbin, 1988). The stability of the BDI has been found to be adequate, with test-retest coefficients ranging from 0.48 to 0.86 for the total score, depending on the patient sample and test-retest interval (Beck, Steer, & Garbin, 1988).

The validity of the BDI, and other self-report measures of depression with medical patients, is a subject of ongoing debate (Novy, Nelson, Berry, & Averil, 1995; Williams & Richardson, 1993). Given the number of somatic items on the scale, which overlap with commonly-reported symptoms of chronic pain (e.g., sleep loss, fatigue, impairment in daily activities; see Dworkin & Gitlin, 1991 for a review of diagnostic issues related to depression in chronic pain patients), concern has been expressed that the BDI may overestimate depression in the medically ill (Rodin, Cravin, & Littlefield, 1991). In the present study, the BDI was used to monitor relative change in distress levels rather than as a diagnostic tool. Hence, the use of an alternative scoring scheme (which deemphasizes the somatic items) as proposed by some researchers (Novy et al., 1995; Williams & Richardson, 1993) was considered unnecessary. However, to prevent improved sleep patterns from biasing analysis of the BDI data, the scale was scored without the insomnia item (i.e., only 20 items were included). This resulted in total scores that could range from 0 to 60.

Medication Quantification Scale (MQS; Steedman et al., 1992). Because patients who used sleep-altering medications were included in the study, it was considered necessary to collect detailed information on all drugs that were used by subjects during the trial. Furthermore, the intervention allowed for the fact that some individuals may, in fact, choose to reduce their medication intake during the treatment in favour of the nonpharmacological alternatives. The MQS provides a means of quantifying medication use so that any changes in drug consumption could be monitored and analyzed statistically. At the pre, post and follow-up assessments, subjects provided daily self-reports of their use of prescription and non-prescription medication (e.g., analgesics, antidepressants, hypnotics and muscle relaxants). For each medication, the subject provided the medication type, dose and number of pills taken each day. This information was used to calculate scores on the MQS. This scale provides a quantitative index of total medication consumption based on potential detrimental effects associated with long-term use in patients with chronic pain. Specifically, it provides a means of quantifying medications of different types into a common scale, based on a combination of assigned detriment weights and dosage levels. The test-retest reliability of the MQS with chronic pain patients wait-listed for treatment at The Rehabilitation Centre is 0.67 over nine weeks (unpublished data).

Moderating Variables

As noted above, the moderating variables reflect constructs that, unlike pain, distress, and medication use, were not clinically significant dimensions in their own right. However, changes in these measures could provide important insights into the psychological processes by which the insomnia intervention leads to improved sleep. Three of the moderating variables assessed aspects of the sleep experience that are not tapped by the primary outcome measures: sleep self-efficacy, presleep arousal, and knowledge of good sleep practices. Measures of these constructs were completed by subjects in both groups. Two additional measures-- an Adherence Checklist and a Client Satisfaction Questionnaire--were only

relevant to subjects in the actual treatment condition.

Sleep Self-Efficacy Scale (SSS; Lacks, 1987; Appendix O). The conceptual basis of the SSS adheres to Bandura's (1977) definition of self-efficacy as "individuals' judgements of their capabilities to organize and execute courses of action required to attain designated types of performance." The application of the concept of self-efficacy to the domain of sleep is a natural extension of Bandura's theory. Hypothetically, an individual who demonstrates improved performance in initiating and sustaining sleep would, accordingly, experience an increase in his or her confidence in executing the behaviours necessary to accomplish these tasks. Furthermore, an increase in sleep self-efficacy would be predicted when the individual attributes improved performance directly to his or her own actions (as opposed to crediting an external agent such as sleep medication). On the SSS, subjects indicate their level of confidence in performing various behaviours that are necessary to get to sleep.

Representative items include such behaviours as lying in bed feeling physically relaxed, controlling racing thoughts, and falling asleep in under 30 minutes. Subjects use a 5-point scale to rate their degree of confidence in their ability to perform these behaviours successfully. The sum of the confidence ratings provides an overall score of sleep self-efficacy. Psychometric data for the SSS are limited, although Lacks (1987) reports that the perceived self-efficacy of insomniacs increased by an average of 33% following behaviour therapy, suggesting good predictive validity.

Sleep and Pain Knowledge Quiz (SPKQ; Appendix P). Developed specifically for this research project, this 20-item multiple-choice test assessed subjects' levels of knowledge regarding insomnia and selected sleep practices. Items on the quiz were constructed to reflect the content of the treatment manual. The total number of correct answers provided each subject with a score ranging from 0 to 20. Subjects with a higher number of correct answers would be expected to possess a greater awareness of good sleep practices. This would, theoretically, put them in a better position to make improvements to their sleep patterns.

Pre-Sleep Arousal Scales (PSAS; Nicassio, Mendlowitz, Fussell, & Petras, 1985; Appendix Q). Some researchers consider that insomnia is associated with a physical state of activation or arousal while the insomniac lies in bed, which leads to difficulty in falling asleep (Morin, 1993; Nicassio et al., 1985). This can be reflected both in bodily tension (somatic arousal) and mental alertness (cognitive arousal). The insomnia intervention includes specific strategies to help the poor sleeper reduce both somatic and cognitive arousal. For example, the sleep restriction procedure is intended to prevent the patient from going to bed too early, thereby limiting the duration of wakefulness prior to sleep onset. Imagery relaxation and cognitive restructuring are taught to help attenuate cognitive arousal that could result from stressful thoughts. Hypothetically, an individual who is able to reduce his or her arousal levels should demonstrate a corresponding improvement in sleep pattern and sleep quality.

The PSAS is composed of two separate 8-item scales that measure the somatic and cognitive manifestations of arousal before sleep. On each scale, subjects indicate the degree to which they experience various symptoms, using 5-point severity ratings ranging from 1 = 'not at all,' to 5 = 'extremely.' Items on the somatic subscale include such symptoms as heart racing, muscle tightness, and upset stomach; the cognitive subscale contains items addressing symptoms of mental arousal, such as racing thoughts, worrying, and distraction by ambient noises. The cognitive and somatic subscales are both internally consistent (Cronbach's alphas = .88 and .79 for college students, and .76 and .81 for insomniacs) and stable over time (test-retest reliability coefficients of $r = .72$ and $r = .76$ for the cognitive and somatic subscales, respectively). Subscale scores successfully discriminate insomniacs from good sleepers, and they have been found to correlate moderately with self-reported sleep onset latency (Nicassio et al., 1985).

Adherence checklist. Adherence to homework assignments and behavioural tasks is thought to be an important predictor of success in CBT interventions (Burns & Nolen-Hoeksema, 1991; Primakoff, Epstein, & Covi, 1986; Startup & Edmonds, 1994). Therefore,

a brief adherence checklist (Appendix R) was developed for subjects in the active treatment condition, which they completed during the last two weeks of therapy. Subjects indicated how much of the manual they had read and how often they had used one of the core coping strategies on difficult nights. Core coping strategies were defined as: (1) getting out of bed if still awake after 20 minutes; (2) engaging in a non-stimulating activity while out of bed; (3) using relaxation exercises to promote sleep; (4) getting up at approximately the same time (i.e., within 30 minutes) every morning, and; (5) using cognitive coping strategies to deal with stressful thoughts. The checklist items were constructed such that the subject indicated both the number of opportunities he or she had to utilize a coping skill (e.g., the number of nights he or she experienced stressful thoughts that interfered with sleep onset), and the number of times the subject actually applied one of the skills on those nights (e.g., the number of times the subject used a cognitive coping strategy to deal with intrusive thoughts when they occurred). A composite adherence score was computed by taking the ratio of the number of opportunities the subject had to apply a coping skill to the number of times he or she actually did. This ratio was then multiplied by 100 to yield a percentage score.

Client Satisfaction Questionnaire (CSQ; Larsen, Attkisson, Hargreaves, & Nguyen, 1979). The CSQ (Appendix S) was used as a measure of subjects' satisfaction with the group treatment program. Scores on the CSQ have been shown to correlate with ratings of global improvement and symptomatology (Fischer & Corcoran, 1994). This 8-item questionnaire is widely used in mental-health settings as a general index of client satisfaction with services. The items cover dimensions of service delivery such as overall quality, the extent to which needs were met, and whether the treatment helped the client deal more effectively with targeted problems. Each item utilizes a 4-point rating scale, and the sum of the item scores provides an overall measure of client satisfaction (range = 8 to 32). The CSQ has high internal consistency (Cronbach alphas ranging from .86 to .94 in various studies), although test-retest reliability data are apparently not available.

Design

The basic design of the study was a 2 groups (CBT vs. WLC) x 3 time periods split-plot factorial with repeated measures on the second factor (time intervals corresponding to the pretreatment, posttreatment, and follow-up assessments). The principal dependent variables in the evaluation of treatment efficacy were the diary measures of sleep-onset latency, sleep efficiency, nocturnal awakenings, wake time after sleep onset, and total sleep time, as well as the global score on the PSQI and actigraph recordings of mean activity level. Secondary outcome measures included the MPI-PS, BDI, and MQS. Possible moderating variables included the SSS, PSAS, and SPKQ. The Adherence Checklist and CSQ were also viewed as moderating variables, but they were only administered to subjects in the CBT group at the posttreatment assessment.

Data Collection Timetable

For the pre and posttreatment assessments (Time 1 and 2), each subject completed the MPI-PS, BDI, PSQI, SPKQ, SSS, PSAS, and two weeks of sleep diary recordings. Each subject also underwent an objective sleep assessment over two nights via ambulatory monitoring with the actigraph. Subjects in the CBT group completed the adherence checklist for the last two weeks of therapy. They completed the CSQ at the end of the seven-week treatment. For the three-month follow-up assessment (Time 3), each subject completed the MPI-PS, BDI, PSQI, SPKQ, SSS, PSAS, and one week of sleep diary recordings. Another two-night ambulatory sleep assessment was also conducted. The timetable and study design are shown schematically in Figure 4.

Procedures

A table of random numbers was used to assign each subject to either the active CBT treatment or to the self-monitoring/minimal contact WLC condition. Randomization occurred after the pretreatment assessment had been completed (i.e., at the end of the baseline self-monitoring period with the daily sleep diary). Using this procedure, twenty-five subjects

($n=25$) were assigned to the CBT condition, and twenty-five subjects ($n=25$) were assigned to the WLC condition.

Cognitive-Behavioural Treatment.

The CBT program consisted of a structured multicomponent intervention that integrated behavioural procedures, relaxation training, cognitive therapy, sleep hygiene education, and information on sleep medications and medication reduction. The group treatment extended over seven two-hour sessions, held once per week. There were a total of five different therapy groups attended by between five and seven subjects. Each session followed a general format in which the first hour was devoted to reviewing the sleep diaries and progress achieved to date. In keeping with general principles of group CBT (Wessler & Hankin-Wessler, 1989), the therapists allotted time in each session for discussion, to allow members to share experiences and provide mutual support. Any problems encountered in the home practice were addressed by the therapists, and strategies for improving adherence were devised collaboratively with the subject. The second hour of each session was devoted to presenting new educational material and coping skills.

The complete treatment protocol is detailed in the patient manual provided in Appendix A. The seven sessions are described in abbreviated form below.

Sessions 1 & 2 - Introduction and basic facts about sleep. The first session served to introduce patients to the treatment approach, present the self-management philosophy on which the treatment is based, and to reinforce the use of the sleep diary for monitoring of progress. The nature and causes of chronic insomnia were reviewed using the multidimensional model shown in Figures 1 and 2 as a general framework. Through group discussion, subjects were encouraged to reevaluate the relative contributions of pain versus other psychological/behavioural factors in the maintenance of their sleep disturbances. In Session 2, basic facts about the nature and function of sleep were presented. Key concepts such as the nature of slow-wave (deep) sleep, the calculation of sleep efficiency, and their

relationship to sleep quality, were reviewed.

Sessions 2 & 3 - Stimulus control & sleep restriction. These two interventions, which target problems with sleep maintenance and sleep onset, constituted the behavioural treatment component. The goals of these interventions are to reestablish the bed as the dominant cue for sleep, regulate sleep-wake schedules, and consolidate sleep over a shorter period of time. Stimulus control consisted of a set of guidelines designed to help patients strengthen the association between their beds and sleeping (Bootzin & Engle-Friedman, 1987). These guidelines included instructing the patient to avoid napping, use the bedroom only for sleep and sex, and to get out of bed whenever unable to fall asleep within 20 minutes. Subjects were encouraged to maintain a regular sleep-wake schedule regardless of nightly variations in the quantity or quality of their sleep. In particular, the importance of a regular rising time was emphasized.

Stimulus control was combined with sleep restriction (Lichstein & Riedel, 1994; Spielman et al., 1987). Following Spielman's original sleep restriction protocol, patients were required (starting in the second week of treatment) to reduce their time in bed to the total sleep time that had been recorded during the baseline self-monitoring period (the "sleep window"). In subsequent weeks, each patient was permitted to increase his or her sleep window gradually until sleep efficiency stabilized at approximately 85%.

Session 4 - Medications. This session was devoted to discussing sleep medications. Factual information on sleep medications was presented, with an emphasis on how various medications alter sleep. Group discussions were initiated to elicit subjects' attitudes toward drug treatments for insomnia and to determine their interest in reducing or avoiding sleep medications. Guidelines for reducing medications were reviewed. Subjects were educated on the importance of gradual reduction, supervised by their primary-care physicians, to minimize withdrawal reactions and rebound insomnia. However, the decision to reduce medication was left up to the individual, and those subjects taking medications for sleep were not required to

enter into a formal tapering regimen.

Session 5 - Imagery relaxation. Relaxation training was provided to help subjects cope with problems initiating sleep. The imagery method was chosen based on current evidence demonstrating its superiority as a sleep-induction technique (Lacks & Morin, 1992; NIH Technology Assessment Panel, 1996). Guided imagery helps to inhibit cognitive arousal by distracting patients and refocusing their attention on pleasant scenes that evoke more positive emotions.

Sessions 5 & 6 - Cognitive therapy. The cognitive component of the intervention was designed to help subjects explore how their thoughts, particularly their attitudes and beliefs toward sleep, affect their sleep behaviours and emotions. These sessions were devoted to teaching cognitive coping skills designed to help patients minimize the impact of negative thoughts on sleep. For example, subjects were guided through cognitive restructuring procedures focused on reducing negative self-talk, and replacing maladaptive thoughts about sleep with more adaptive substitutes. Most of the techniques and examples were drawn from Morin's (1993) cognitive therapy approach to insomnia. General techniques for managing presleep stress were also introduced, such as the use of 'worrying time' and 'decatastrophizing' problems. Group discussion was used to tailor the cognitive interventions to the specific needs and stressors identified by group members.

Session 7 - Sleep hygiene education and relapse prevention. The sleep hygiene component was designed to increase patients' awareness of the impact of lifestyle and environmental factors on sleep quality, and to promote better sleep hygiene practices. The focus was on health practices that are known to affect sleep directly, such as the consumption of caffeine, alcohol and nicotine products, and the effects of diet and exercise on sleep. Finally, issues around long-term maintenance of gains and the prevention of relapses were covered in this last session.

Patient manual. Subjects received the patient manual, *Coping with Chronic Pain Sleep*

Problems (Currie & Wilson, 1996) at a rate of one chapter per week throughout the treatment period. The manual is structured to reflect the seven treatment sessions. It covers all the material presented in the groups, but in substantially greater detail. The manual also outlines the various homework assignments for each week.

Subjects who were absent from a group session were telephoned by the primary therapist to review the missed material, and to provide over-the-phone counselling if necessary. The manual chapter and other handouts from the missed session were mailed to the subject before the next session.

Sleep diaries and feedback on progress. Subjects continued filling out the daily sleep diary throughout the treatment. Completed diaries were collected at the beginning of each session. Subjects received individualized feedback via progress charts that were generated by plotting the weekly means for the variables of sleep efficiency, sleep onset latency and number of awakenings. Each subject received copies of his or her progress charts as they were updated throughout the treatment. These progress charts were intended to encourage the continued use of the sleep log as a means of monitoring progress, as well as to motivate subjects' adherence with the treatment interventions.

Posttreatment interview. Following the group treatment, each subject met with a therapist to review his or her individual progress through the intervention. This session was intended to help subjects consolidate the skills that they had found to be most beneficial for relieving their specific sleep problems. Informal feedback on the treatment was also obtained from the subject (e.g., which skills the subject found to be the most helpful) at that time.

Therapists and treatment fidelity. Each therapy group was led by a primary therapist and a co-therapist. The therapists consisted of the author and five advanced doctoral students in clinical psychology (only the author and one other student served as primary therapists for the active treatment groups). To ensure treatment fidelity, several procedures were implemented. First, all therapists had previous clinical experience and training in CBT

interventions. Second, all groups were, as noted, co-led by a primary and secondary therapist. Third, therapists followed a structured written manual developed specifically for the project using the guidelines put forth by the APA Task Force on empirically supported therapies (Chambless et al., 1995). This procedure was adopted to ensure that treatment interventions were applied consistently across the therapy groups. The therapist guide is provided in Appendix B. Finally, clinical supervision was provided on a weekly basis by Dr. Keith Wilson.

Symptom Monitoring Waiting-list/Minimal Contact Control Condition.

Spontaneous remission of chronic insomnia is reportedly rare (Chambers, 1992), suggesting that the use of traditional waiting-list or no-treatment comparison groups would provide little control for non-specific effects of group support and therapist contact, or reactive effects of simply monitoring one's sleep on a daily basis. Therefore, a symptom monitoring/minimal contact waiting-list control group was adopted as the comparison condition. This condition was intended to control for the effects of intensive self-monitoring via the sleep diary and for the influence of weekly contact with a therapist. This type of control group has been used in recent controlled treatment trials for insomnia, as well as for other health problems in which physical symptoms were present and amenable to self-monitoring (Morin et al., 1993; Payne & Blanchard, 1995). Although this procedure is thought to provide a more appropriate degree of control over non-specific factors, it should be noted that it does not account for changes that may be due mainly to participation in a supportive therapy group.

Subjects randomized to the WLC condition continued to monitor their sleep using the sleep diary for a further seven weeks after the end of the baseline recording period. Each subject was contacted by phone on a weekly basis by the author to encourage adherence with the self-monitoring protocol. Phone contact was limited to ten minutes. Following the self-monitoring period, each control subject met individually with the author to assess the extent of change, positive or negative, to his or her sleep. Subjects in the control condition completed

the same posttreatment and follow-up assessments as subjects in the CBT condition. At the conclusion of their follow-up assessment, they were offered the CBT treatment.

Hypotheses and Statistical Analyses

Hypothesis No. 1. Based on the results of the pilot study and the large body of research demonstrating the efficacy of nonpharmacological interventions in the treatment of primary insomnia, a prediction was made that the sleep of the CBT subjects would show significantly greater improvement than the WLC subjects at posttreatment. Specifically, it was predicted that sleep onset latency, sleep efficiency, wake time after sleep onset, awakenings, total sleep time, mean activity level, and overall sleep quality would all show significant improvements in treated subjects relative to the control subjects from the baseline to posttreatment periods.

No significant degradation in these variables was expected to occur in CBT subjects from the posttreatment to follow-up assessment periods, thereby demonstrating the maintenance of gains. The rationale for this prediction also derived from the results of the pilot study, as well as from the study by Morin et al. (1989) which demonstrated that posttreatment gains were reasonably maintained at follow-up. Furthermore, recent reviews indicate that CBT approaches for primary insomnia generally produce sustained benefits (Murtagh & Greenwood, 1995).

Hypothesis No. 2. Because the target of the intervention was to improve sleep habits, the impact of the treatment on the secondary outcome measures was largely unknown, although there was some *a priori* basis to consider the possibility that they might improve. Hence, the inclusion of the secondary outcome measures was considered relevant to assess possible change in areas of functioning that are clinically meaningful in themselves, and which are also thought to affect sleep (i.e., pain, depression, and medication usage). However, no specific predictions were advanced with respect to these variables, and the null hypothesis was adopted for the analyses of the MPI-PS, BDI, and MQS.

Hypothesis No. 3. It was predicted that the three moderating variables that assessed dimensions of sleep not tapped by the primary outcome measures (i.e., knowledge of good sleep practices, presleep arousal, self-efficacy), would show greater improvement at posttreatment in the CBT subjects relative to the WLC subjects. No significant degradation in these variables was expected to occur from the posttreatment to follow-up assessment periods.

Hypothesis No. 4. It was expected that among the CBT subjects, treatment gains would be related to adherence and client satisfaction. Specifically, a prediction was made that adherence to the treatment regimes, in particular utilization of the core coping strategies to modify maladaptive sleep habits, would be correlated significantly with global gain scores (the difference from pretreatment to posttreatment in the primary outcome measures). Scores on the satisfaction scale were also predicted to be correlated significantly with global gain scores.

Hypothesis No. 5. It was predicted that following treatment there would be a higher proportion of subjects in the CBT group, as compared to the WLC group, who qualify as "good" sleepers. The definition of a good sleeper required having both a sleep onset latency and wake time after sleep onset of 30 minutes or less (Lacks & Morin, 1992). Hence, this hypothesis specifically addressed the clinical significance of the intervention. Other criteria for identifying good sleepers were also examined, including the relative proportions of subjects who had sleep efficiencies greater than 85% (Lacks & Morin, 1992), and the numbers who had a PSQI global score of less than six (Buysse et al., 1989).

Statistical Analyses

To test Hypotheses 1, 2, and 3, separate split-plot 2 x 3 analyses of variance (ANOVA)¹, with group (treatment vs. control) as a between-subjects factor, and time as a repeated measures factor (pre-test, post-test, and follow-up), were conducted on each of the measures. Violations of the sphericity assumption were addressed by using Huynh-Feldt epsilon (Huynh & Feldt, 1976) to adjust the degrees of freedom for the F-ratios (although

nominal degrees of freedom are reported in the text). In using a split-plot ANOVA to analyze outcome data, the main statistical contrast of interest is the Group x Time interaction, which tests whether the change from pre to posttreatment is different for the two groups.² When relevant, the main effects for group and time are also reported.

To test Hypothesis 4, Pearson correlations were computed between the adherence scores, CSQ scores, and global gain scores in each of the primary outcome measures. For Hypothesis 5, separate chi-square or Fisher's Exact tests were conducted that compared the percentages of subjects in the CBT and WLC conditions who met each of the criteria for "good sleep" at posttreatment and follow-up. Another exact test was conducted that compared the percentages of subjects in the treatment and control conditions who met all of the criteria for good sleep at posttreatment and follow-up.

Simple effects analyses. Significant main effects were followed-up with the appropriate analyses of simple effects. A significant Group x Time interaction effect for any variable was followed by an examination of the time effect within each group. A significant time effect for either group was then followed by three within-subjects contrasts: (a) a comparison of the pretreatment and posttreatment means to determine the extent of symptom reduction that occurred between these assessment periods; (b) a comparison of the follow-up and posttreatment means to assess the maintenance in treatment gains over time (the absence of a significant change at follow-up was considered indicative of good maintenance of posttreatment improvement), and; (c) a comparison of the pretreatment and follow-up means to determine whether the follow-up values were still significantly improved compared to baseline. In accordance with Keppel (1991), separate error terms were used for testing simple within-subjects effects. Following the within-group contrasts, between-group comparisons were conducted on the posttreatment and follow-up scores.

Type I error considerations. Exact p-values are reported in the results. However, in light of the number of outcome measures employed, the level of alpha to be taken as

statistically significant for individual analyses was modified to safeguard against undue inflation of the overall Type I error rate for the study. For alpha modifications, the approach of Dar, Serlin, and Omer (1994) was used, in which control of the error rate was executed at the level of ‘families’ of hypotheses. A family of hypotheses constitutes a set of predictions made for a group of conceptually related measures. An advantage of this method is that protection of the cumulative Type I error rate is achieved, while still maintaining sufficient statistical power to detect important clinical effects (Kazdin, 1992).

Among the primary, secondary, and moderating variables, there were five families of hypotheses. The impact of the treatment on the sleep-wake parameters derived from the daily diaries (i.e., sleep onset latency, sleep efficiency, awakenings, wake time after sleep onset, and total sleep time) represented one family of hypotheses. Change in the questionnaire measure of subjective sleep quality (scores on the PSQI) represented another family. Mean activity level (from the actigraph data) also represented a distinct outcome measure meriting a separate family. The impact of the treatment on the secondary outcome measures (depressive symptomatology, pain severity, and medication use), and the set of moderating variables (self-efficacy, presleep arousal scales, knowledge, adherence, and client satisfaction) made up the last two families of hypotheses.

For each group of hypotheses, the familywise (FW) Type I error rate was set at 0.15 (Dar et al., 1994; Kazdin, 1992; Keppel, 1991). A modified Bonferroni procedure was employed to adjust the alpha level (up to a maximum of 0.05) for each set of analyses based on the number of dependent variables that made up the family (Keppel, 1991; Simes, 1986). Hence, each of the five self-report sleep-wake parameters was tested using a critical value of 0.03 ($\alpha_{FM}/5 = 0.03$). Mean activity level was evaluated using $\alpha = 0.05$, as was the PSQI. The three secondary outcome measures were each tested at 0.05, whereas analyses involving the six moderating variables were each tested at 0.025 ($\alpha_{FM}/6 = 0.025$). Simple effects, pursued only when a significant main effect was found, were tested using $\alpha = 0.05$ as the

critical value.

Attrition and Missing Data

Forty-one subjects completed all three assessments. Of the nine remaining subjects, three (one CBT and two WLC) dropped out of the trial before completing the posttreatment assessment package, and six subjects (three CBT and three WLC) were lost to follow-up. Two subjects left the group treatment after attending only three sessions but did complete the posttreatment assessment package (except for the actigraph); one of these subjects also completed the follow-up assessment. Reasons for discontinuing varied. Among the three subjects who left the group treatment early, one felt that it was not working, another had to leave the city unexpectedly for work reasons, and the other did not provide a clear reason. Two WLC subjects dropped out because they lost interest in receiving the treatment after the waiting period; another two WLC subjects could not complete the follow-up assessment due to family difficulties; the fifth subject did not provide a clear reason for discontinuing. Independent t -tests and chi-squares, conducted to determine if the drop-outs differed from the completers in terms of age, gender, chronicity and severity of insomnia, or depressive symptomatology were all non-significant (all $ps > .05$).

An equipment malfunction spoiled one WLC subject's baseline actigraph data (a reassessment was not possible because of transportation problems, and the subject's unwillingness to repeat the procedure). Two of the subjects who left the CBT treatment after three sessions declined to do the posttreatment actigraph assessment but did complete the psychometric battery. One subject who completed the CBT group was not available to do the posttreatment actigraph assessment because of illness. This subject did, however, complete the follow-up actigraph assessment. Finally, one WLC subject refused to do the follow-up actigraph assessment, but completed the remaining assessment measures.

Missing data were managed by using the intention-to-treat principle, a widely used procedure that is recommended when attempting to account for the clinical status of non-

completers in randomized controlled trials (Begg et al., 1996; Lavori, 1992; Lee, Ellenberg, Hirtz, & Nelson, 1991; Thase, Simons, & Reynolds, 1996). With this method, the last valid observation for each dependent variable is carried forward to account for the missing observations of subjects who drop out. The procedure is based on the argument that the primary analysis of a randomized clinical trial should compare subjects grouped according to intention to provide treatment, rather than to treatment actually received. The object is to remove the potential bias of including only those subjects who complete the intervention (who may be benefitting more than treatment failures who become discouraged and drop out), as well as to increase the power of statistical procedures by having fewer missing observations.

Results

Subject Recruitment

The results of the letter mail outs are presented in Table 3. As is evident in this table, the task of finding appropriate subjects proved to be challenging. Only 23% of individuals who received the letter responded. Presumably, non-responders did not have sleep problems, were not interested in the study, or were unable to participate. Of the 334 individuals who responded to the letter, 43% percent were inappropriate for the trial because they did not have chronic pain-related sleep problems that were severe enough to require treatment, or because they were not interested in receiving treatment with this particular approach. Sixty-three prospective subjects were excluded over the phone due to the exclusion criteria. Another group of 54 prospective subjects passed the initial clinical screening, but were unable to participate because of reasons such as transportation problems, unavailability, or language barriers.

In total, 70 individuals were interviewed. Among this group, 12 (17%) were determined to have a current major psychiatric condition that precluded their participation. This included seven individuals with major depression, two with post-traumatic stress disorder, and one case of panic disorder, all of which were diagnosed from the PRIME-MD

interviews. Also excluded from participation were two individuals who were suspected to have psychiatric conditions not included in the PRIME-MD interview protocol (bipolar disorder and schizoaffective disorder). Two other individuals failed to meet DSM-IV diagnostic criteria for insomnia disorder. There were three patients who met the study's inclusion criteria but withdrew from the study prior to randomization. A total of 54 patients were randomized to treatment conditions. Four subjects subsequently defaulted from participation after being randomly assigned to the CBT condition. Three of these subjects experienced family deaths and had to withdraw. The fourth subject began another treatment program soon after being randomly assigned. The four defaulters were not included in the statistical analyses.

Diagnostic Interviews

All subjects enrolled in the trial were required to meet SIS-D criteria for insomnia secondary to the general medical condition of chronic pain. The majority of subjects ($n = 33$; 66%) were diagnosed with a combination of sleep onset and sleep maintenance insomnia (Table 1). The remaining 17 subjects (34%) reported occasional difficulties with sleep onset, but the severity was insufficient for it to be considered a chronic problem. These subjects were diagnosed as having sleep maintenance insomnia only. From the mental health assessment, twelve subjects were diagnosed with mild presentations of depression, including ten subjects with major depression in partial remission and two subjects with dysthymic disorder.

Baseline Differences

Independent groups t-tests and chi-square tests were used to determine if subjects assigned to the CBT and WLC conditions differed on any of the demographic, diagnostic, or dependent variables prior to randomization. The groups were equivalent on all baseline measures (all $ps > .05$), except for pretreatment scores on the SPKQ, which were significantly higher in the CBT group ($t = 2.14$, $p = .037$). There were no differences between male and female subjects on any of the dependent variables at baseline (all $ps > .05$).

Primary Outcome Measures

Sleep diary data. Table 4 shows the group means and standard deviations for diary measures of sleep onset latency, sleep efficiency, time in bed, wake time after sleep onset, total sleep time, and awakenings across the three assessment phases.

Sleep efficiency. The analysis of the sleep efficiency data revealed a significant Group x Time interaction, $F(2, 96) = 14.4, p < .001$, which reflected the fact that there was a substantial change in the CBT group, $F(2, 48) = 23.89, p = .001$, but not in the WLC group, $F(2, 48) = 0.13, p = .878$. Within the CBT group, both the posttreatment, $F(1, 24) = 30.24, p < .001$, and follow-up, $F(1, 24) = 22.11, p < .001$, scores showed significant improvements over baseline. Scores at the latter assessment periods suggested a minor, albeit non-significant, trend for CBT subjects to show some reduction in the extent of this increase by the time of the follow-up, $F(1, 24) = 3.59, p = .070$. However, the CBT subjects still had higher sleep efficiencies than WLC subjects (86.4% vs. 72%, respectively) at both posttreatment, $F(1, 48) = 14.3, p = .000$, and follow-up (84.3% vs. 72.3%, respectively), $F(1, 48) = 10.06, p = .002$, assessments.

Sleep efficiency can be affected simply by changing the amount of time spent in bed, regardless of whether the subject's sleep has actually improved. Time in bed was not considered a relevant outcome measure, but in order to examine its contribution to the sleep efficiency effects, the data were analyzed using the same ANOVA procedures. This revealed a significant Group x Time interaction, $F(2, 96) = 4.57, p = .014$, which indicated that CBT subjects reduced the amount of time spent in bed across the assessment phases, $F(2, 48) = 3.47, p = .043$, whereas the WLC subjects did not, $F(2, 48) = 1.20, p = .309$. Consistent with the sleep restriction procedure, the time spent in bed for CBT subjects decreased significantly from pretreatment to posttreatment, $F(1, 24) = 5.50, p = .028$. There was a marginal, albeit non-significant, increase in time in bed from the posttreatment to follow-up, $F(1, 24) = 3.82, p = .062$. The mean time in bed at follow-up was not significantly lower than the baseline mean,

$F(1, 24) = 1.04, p = .317$. In contrast to the findings with sleep efficiency, between-group comparisons revealed no significant difference in mean time spent in bed for CBT and WLC subjects at either posttreatment, $F(1, 48) = 2.63, p = .111$, or follow-up assessments, $F(1, 48) = 0.28, p = .599$. Hence, the between-group differences in sleep efficiency are not due only to a reduction in the amount of time spent in bed.

Sleep onset latency. The 2 x 3 split-plot ANOVA conducted on sleep onset latency revealed a significant Group x Time interaction, $F(2, 96)^3 = 13.95, p < .001$. In this case, there were reliable changes over time for both the CBT, $F(2, 48) = 16.17, p < .001$, and WLC subjects, $F(2, 48) = 3.51, p = .038$. Within the CBT group, sleep onset latencies at posttreatment were reduced by an average of 22.9 minutes from baseline values, $F(1, 24) = 23.78, p < .001$. This improvement was maintained well over time, in the sense that the follow-up scores were also lower than baseline values, $F(1, 24) = 17.37, p < .001$, and were comparable to those observed at posttreatment, $F(1, 24) = 0.01, p = .927$. Unexpectedly, the sleep onset latencies of WLC subjects actually increased over the 7-week period of self-monitoring, by an average of 14.5 minutes, $F(1, 24) = 5.26, p = .031$. By the time of the follow-up, these values were no longer elevated over baseline, $F(1, 24) = 1.01, p = .304$, although they were also not significantly different from the posttreatment sleep onset latencies, $F(1, 24) = 0.328, p = .462$. Simple effects tests of between-group differences indicated that subjects in the CBT group had lower sleep onset latencies than those of WLC subjects at posttreatment, $F(1, 48) = 4.17, p = .046$, but not reliably so at follow-up, $F(1, 48) = 3.44, p = .069$.

Because some of the sample (17 subjects) did not have sleep onset insomnia prior to treatment, the sleep onset data were re-analyzed with these subjects excluded. The pattern of results was similar to the analysis using the full sample, but it was stronger in demonstrating differences between the groups at follow-up. Again, there was a significant Group x Time interaction, $F(2, 62) = 11.10, p < .001$. Treated subjects ($n = 18$) showed a reliable decrease in

sleep onset latency over time, $F(1, 34) = 15.64, p < .001$, whereas the WLC subjects ($n = 15$) did not, $F(1, 34) = 2.75, p = .08$. At both posttreatment and follow-up, the sleep onset latencies of CBT subjects were significantly improved over baseline, $F(1, 17) = 24.01, p < .001$ and $F(1, 17) = 17.36, p < .001$, respectively. Between-group tests showed that the CBT subjects required less time to fall asleep than did the WLC subjects at both posttreatment, $F(1, 31) = 4.88, p = .03$, and follow-up, $F(1, 31) = 5.15, p = .03$.

Wake time after sleep onset. The Group x Time interaction for wake time after sleep onset was also statistically significant, $F(2, 96) = 3.73, p = .028$. Subjects in the CBT group improved over time on this measure, $F(2, 48) = 10.37, p < .001$, whereas subjects in the WLC group did not, $F(2, 48) = 0.42, p = .660$. At posttreatment, CBT subjects had reduced their time spent awake during the night by an average of 43.6 minutes, $F(1, 24) = 12.95, p = .001$. Although there was some deterioration in this measure by the time of the follow-up assessment, $F(1, 24) = 5.37, p = .029$, the follow-up values were still improved compared to those observed at baseline, $F(1, 24) = 8.40, p = .008$. Between-group comparisons showed that, compared to WLC subjects, CBT subjects spent less time awake at both the posttreatment, $F(1, 48) = 10.58, p = .002$, and follow-up, $F(1, 48) = 6.60, p = .013$, assessments.

Awakenings. The ANOVA conducted on number of nocturnal awakenings showed a different pattern of results in which only the main effect for time was significant, $F(2, 96) = 8.51, p = .001$. In post-hoc contrasts (collapsed across the CBT and WLC groups), fewer awakenings were recorded at the posttreatment, $F(1, 48) = 9.35, p = .004$, and follow-up assessments, $F(1, 48) = 10.87, p = .002$, than were recorded at baseline. The lack of a significant Group x Time, $F(2, 96) = .78, p = .441$, or group effect, $F(1, 48) = 2.99, p = .090$, indicated that there was no reliable difference in awakenings between the CBT and WLC groups.

Total sleep time. A similar trend was observed in the analysis of the total sleep time

data. There was a significant increase over time, $F(2, 96) = 4.53, p = .013$, with longer sleep times recorded at posttreatment, $F(1, 48) = 4.71, p = .035$, and follow-up assessments, $F(1, 48) = 7.82, p = .007$, than at baseline. As with awakenings, however, the group and Group x Time effects were not significant ($F(1, 48) = 2.72, p = .106$ and $F(2, 96) = 2.22, p = .114$, respectively), indicating that the CBT and WLC subjects did not differ reliably in the degree of change in hours slept.

Actigraph data: mean activity level. As shown in Table 4, the insomnia program reduced the nocturnal activity levels of the subjects in the CBT group. The ANOVA conducted on the activity data revealed a significant Group x Time interaction, $F(2, 94) = 3.33, p = .040$. Simple effects testing showed that the CBT subjects improved over time, $F(2, 48) = 4.70, p = .014$, whereas the WLC subjects did not, $F(2, 46) = 0.70, p = .500$. Within the CBT group, mean activity levels were significantly reduced at posttreatment, $F(1, 24) = 7.87, p = .010$, compared to baseline values. The posttreatment gains remained stable until the time of the follow-up assessment, $F(1, 24) = 0.46, p = .503$, although the follow-up mean was only marginally improved over baseline, $F(1, 24) = 4.20, p = .052$. Between-group analyses showed that the CBT subjects had lower mean activity levels than the WLC subjects at posttreatment, $F(1, 47) = 8.00, p = .007$, but the difference by the time of follow-up were no longer significant, $F(1, 47) = 2.69, p = .107$.

Sleep quality. The 2 X 3 split-plot ANOVA conducted on the mean PSQI global scores (also shown in Table 4) revealed that the main contrast of interest, the Group x Time interaction, was statistically significant, $F(2, 96) = 12.11, p < .001$. In this case, there were reliable changes over time for both the CBT, $F(2, 48) = 26.23, p < .001$, and WLC, $F(2, 48) = 4.11, p = .022$, subjects. At posttreatment, the CBT subjects showed a significant improvement in sleep quality over baseline, $F(1, 24) = 24.26, p < .001$. There was good maintenance of this improvement over time; the follow-up scores were also significantly improved compared to baseline, $F(1, 24) = 41.88, p < .001$, and there was no reliable change

from posttreatment, $F(1, 24) = 3.57, p = .071$. Within the WLC group, subjects also showed a small, but reliable, improvement in overall sleep quality at posttreatment over baseline, $F(1, 24) = 7.60, p = .011$. However, this improvement was not especially robust, and at follow-up the WLC subjects' PSQI scores were no longer significantly different from baseline, $F(1, 24) = 1.78, p = .195$. Importantly, the between-group analyses showed that CBT subjects had significantly lower PSQI scores than the WLC subjects at both the posttreatment, $F(1, 48) = 12.74, p < .001$, and follow-up, $F(1, 48) = 31.51, p < .001$, assessments.

Secondary Outcome Measures

Group means and standard deviations for the secondary outcome measures (scores on the BDI, the MPI-PS, and the MQS) across the three assessment periods are provided in Table 5.

Pain. Although not explicitly predicted, pain levels did indeed show an improvement with treatment. The analysis of the MPI-PS data revealed a significant Group x Time interaction, $F(2, 96) = 3.40, p = .037$, which involved a decrease in pain levels in CBT subjects, $F(2, 48) = 9.08, p < .000$, but not in WLC subjects, $F(2, 48) = 1.03, p = .366$. Compared to baseline, the treated subjects showed a significant decrease in overall pain severity at both posttreatment, $F(1, 24) = 7.67, p = .011$, and follow-up, $F(1, 48) = 8.84, p = .005$, assessments. There was good maintenance of the posttreatment gains at follow-up for these subjects, $F(1, 24) = 2.04, p = .165$. Although the improvement shown by CBT subjects was not large enough to differ significantly from WLC subjects at posttreatment, $F(1, 48) = 1.75, p = .193$, between-group analysis confirmed a reliable difference in MPI-PS scores at the follow-up assessment, $F(1, 48) = 5.63, p = .020$.

Depression. The ANOVA conducted on BDI scores (minus the insomnia item) revealed no significant effects (all $ps > .10$).

Medication Usage. The analysis of the MQS data revealed a significant effect for time only, $F(2, 96) = 3.99, p = .037$. When collapsed across the CBT and WLC groups, MQS

scores were not significantly lower at posttreatment than at baseline, $F(1, 48) = 1.91, p = .174$, but they were so at follow-up, $F(1, 48) = 6.55, p = .014$. The absence of a significant Group x Time, $F(2, 96) = 1.24, p = .284$, or group effect, $F(1, 48) = 0.56, p = .459$, indicated that the CBT and WLC showed the same degree of decrease in MQS scores at the follow-up assessment.

To clarify this effect, further analyses were undertaken using only those classes of medication that have known sedating properties (i.e., weak narcotics, sedative antidepressants, and sedative hypnotics), and which may have been used to assist sleep. Table 6 shows the number of subjects at pretreatment, posttreatment, and follow-up phases who were regularly taking medication of this type (note that some subjects took medication from more than one category). The change in the use of these medications was then examined within the CBT and WLC groups, using the Friedman ANOVA procedure (the nonparametric equivalent of the one-way ANOVA). The results indicated that three CBT subjects and one WLC subject eliminated the regular use of such medications from pretreatment to follow-up. However, the overall change across the three assessment phases was not statistically significant for either the CBT group, Friedman ANOVA, $\chi^2 = 1.62, p = .449$, or WLC group, Friedman ANOVA, $\chi^2 = 0.06, p = .970$.

Moderating Variables

Group means and standard deviations for the three moderating variables (i.e., scores on the SPKQ, SSS, and PSASs) are shown in Table 7.

Knowledge. Because the groups' scores differed on the SPKQ at baseline, a 2 x 2 analysis of covariance (ANCOVA) was applied to the quiz data using the pretreatment scores as a covariate.⁴ A significant main effect for group was found, $F(1, 47) = 13.17, p = .001$, indicating that, after controlling for the baseline differences, the CBT subjects had higher quiz scores than the WLC subjects. Within the CBT group, knowledge scores showed no significant deterioration from posttreatment to follow-up, $F(1, 24) = 3.33, p = .080$.

Between-group analyses showed that the CBT subjects had higher covariate-corrected scores at both the posttreatment, $F(1, 24) = 7.87, p = .010$, and follow-up, $F(1, 48) = 12.49, p = .001$, assessments.

Presleep Arousal. The analysis of the PSAS cognitive subscale revealed a significant Group x Time interaction, $F(2, 96) = 4.65, p = .019$, based in a change over time in the CBT group, $F(2, 96) = 6.52, p = .003$, but not in the WLC group, $F(2, 96) = 0.48, p = .619$. Within the CBT group, subjects showed a reliable decrease in presleep cognitive arousal at posttreatment, $F(1, 24) = 8.20, p = .009$, and follow-up, $F(1, 24) = 6.17, p = .020$, over baseline. Nevertheless, the between-group analyses showed that CBT subjects' scores were not significantly greater than those of WLC subjects at either the posttreatment, $F(1, 48) = 1.40, p = .242$, or follow-up, $F(1, 48) = 0.34, p = .523$, assessments. The ANOVA conducted on the PSAS somatic subscale revealed no significant effects (all $ps > .10$).

Self-Efficacy. The analysis conducted on the SSS data revealed only a significant main effect for time, $F(2, 96) = 20.53, p < .001$. The entire sample demonstrated higher self-efficacy ratings at the posttreatment, $F(1, 48) = 32.25, p < .001$, and follow-up assessments, $F(1, 48) = 24.20, p < .001$, than at the baseline. The absence of a significant Group x Time effect, $F(2, 96) = 3.19, p = .048$, indicated that CBT and WLC subjects showed comparable increases in self-efficacy.

Correlations between changes in moderating variables and changes in primary outcome measures. The correlations between the moderating variables and changes in primary outcome measures for CBT subjects are provided in Table 8. From this table, it is evident that improvements (i.e., a decrease) in sleep onset latency among treated subjects were correlated significantly with increased self-efficacy ratings, $r = -.65, p < .001$. Furthermore, improvements in overall sleep quality were related to decreased somatic and cognitive arousal at bedtime, $r = .55, p = .005$, and $r = .52, p = .008$, respectively.

Adherence and Client Satisfaction. In terms of adherence, the median number of

treatment sessions attended by CBT subjects was 6.0 (range = 3 to 7 sessions), yielding an overall attendance rate of 86%. On average, the CBT subjects reported that they read 91.4% ($SD = 15.8$) of the treatment manual. None of the correlations between the adherence score and primary outcome measures was significant. However, the correlation between PSQI change scores and client satisfaction approached but did not reach statistical significance, $r = .41$, $p = .045$.

Effect Sizes

Effect sizes for the primary outcome measures are shown in Table 9. The effect size indices (f) reflect the magnitude of change from pretreatment to posttreatment in the CBT subjects relative to the WLC subjects. Using these values, the standards for determining small, medium, and large effects are 0.10, 0.25, and 0.40, respectively. (Cohen, 1992). Thus, based on these conventions, the effect sizes for sleep onset latency and sleep efficiency were in the medium to large range, while the effect sizes for wake time after sleep onset, PSQI, and mean activity level were small. The effect sizes for awakenings and total sleep time were negligible.

Clinical Significance of Results

At posttreatment, the average sleep onset latency for CBT subjects was 27.6 minutes, indicating that the group as a whole met the clinical criteria for good sleep on this parameter. However, the mean posttreatment wake time after sleep onset for the CBT group ($M = 39.6$ minutes) still exceeded the 30 minute cut-off that is often used to distinguish good and poor sleepers. When both of these clinical criteria were applied to the posttreatment sleep values of individual subjects, 10 subjects (42%) in the CBT group were classified as having good sleep, compared to two subjects (9%) in the WLC condition, $\chi^2 = 6.72$, $p = .009$.

The use of alternative criteria for defining good sleep produced different results (see Table 10). When sleep efficiency of 85% or greater was used as the standard, then 16 subjects (64%) in the CBT group reached this criterion at posttreatment, compared to four

subjects (16%) in the WLC condition, $\chi^2 = 12.0$, $p = .009$. On the other hand, only six CBT subjects could be classified as good sleepers when the criterion used was having a PSQI global score of 5 or less at posttreatment. Only one (4%) WLC subject met this criterion, however so subjects in the CBT group still had a higher rate of improvement, Fisher's Exact Test, $p = .050$. When all four clinical criteria (sleep onset latency/wake time after sleep onset < 30 minutes, sleep efficiency > 85%, and PSQI score < 6) were combined, only four (16%) CBT subjects, and none of the WLC subjects, were classified as good sleepers. Given the small numbers involved, however, the Fisher's Exact Test applied to these data was not significant, $p = .11$.

Some deterioration in the clinical significance of the observed changes was evident at follow-up. Nevertheless, eight treated subjects (32%) remained good sleepers according to the combined sleep onset/wake time after sleep onset clinical criterion, compared to one (4%) WLC subject, Fisher's Exact Test, $p = .009$. Fourteen (56%) CBT subjects still had a sleep efficiency greater than 85%, compared to four (16%) WLC subjects, $\chi^2 = 8.68$, $p = .003$. On the PSQI, treated subjects showed good maintenance of sleep quality. In fact, an additional three CBT subjects were classified as good sleepers according to the PSQI. This brought the total to nine (36%) PSQI-defined good sleepers among the CBT group at follow-up and none among the WLC group, $\chi^2 = 10.99$, $p < .001$. However, only four (16%) CBT subjects (and no WLC subjects) were classified as good sleepers according to all four clinical criteria, Fisher's Exact Test, $p = .11$.

Discussion

The results of the present study provide compelling evidence that cognitive-behavioural therapy can help to relieve the insomnia that is secondary to chronic pain conditions. As hypothesized, subjects in the CBT group showed significant improvements in most sleep parameters. The parameters that showed the greatest sensitivity to change were sleep onset latency, sleep efficiency, and wake time after sleep onset. Importantly, CBT

subjects also reported an increase in the overall quality of their sleep, in addition to changes in sleep habits. Moreover, the improvements in the self-report measures were corroborated by improvement in an objective measure of sleep, nocturnal motor activity levels. This measure showed decreased movement during sleep in CBT subjects, indicating that they were, indeed, having a more restful sleep period. Posttreatment gains in all of these measures were maintained reasonably well at a 3-month follow-up, indicating that this treatment has the potential to help patients achieve long-term improvements in their sleep.

Two diary parameters--number of awakenings and total sleep time--did not show reliable Group x Time interactions that would support an interpretation of robust differences between the groups. In the case of total sleep time, the lack of an immediate and specific treatment effect was not necessarily surprising given the equivocal findings from previous research regarding the responsiveness of this parameter to nonpharmacological treatments. Most studies have found that only minimal increases in the total hours of sleep occurs following behaviour therapy, particularly in patients whose primary problem is sleep fragmentation (Morin et al., 1993; Murtagh & Greenwood, 1995). Interestingly, both total sleep time and awakenings showed main effects for time, suggesting a gradual improvement across subjects in both conditions. The total sleep times of both CBT and WLC subjects showed the most improvement at follow-up, although the mean for CBT subjects, 6.5 hours, was still below the population average for good sleepers (which is about 7.5 hours; Morin, 1993). The fact that awakenings showed a small decrease over time is encouraging, given the severity of sleep fragmentation in persons with chronic pain.

It is noteworthy that the absence of significant group differences for total sleep time and awakenings indicates that, statistically speaking, the CBT and WLC subjects showed the same degree of change on these parameters, even though the group means suggest that overall greater improvement occurred in the subjects who actually received the treatment. Without disconfirming evidence, however, the present data support the conclusion that some control

subjects did, indeed, benefit from the prolonged period of self-monitoring. This interpretation is supported by the fact that some WLC subjects did emerge as “good” sleepers according to the clinical criteria. Although the reasons for this are unclear, it is possible that these WLC subjects were able to identify patterns to their sleep problems, and perhaps initiated behavioural changes that led to meaningful gains in some sleep parameters. Previous research has also found that self-monitoring can produce changes in sleep pattern in the absence of a therapeutic intervention. For example, Morin et al. (1993) reported that sleep duration increased in control subjects after a comparable period of sleep diary recording.

Nevertheless, the main results of the study show that the efficacy of the CBT intervention cannot be explained by the mere effects of self-monitoring or therapist contact. The improvements shown in sleep efficiency, wake time after sleep onset, and sleep quality suggest that, on the whole, sleep continuity was better improved with the complete treatment package. Evidently, CBT subjects returned to a sleeping state more quickly after each awakening, even if their total numbers of awakenings were comparable to the WLC subjects. Furthermore, the reduced activity levels in CBT subjects confirmed that the periods of sleep between awakenings were more restful. This pattern of results was, in fact, consistent with the intention of the behavioural interventions for sleep maintenance insomnia, which is to promote the consolidation of the subject’s sleep over a shorter time period. Certainly, there may have been additional therapeutic value derived from the group therapy modality. The mutual reinforcement, vicarious learning, and normalizing factors, which are embedded processes within any group therapy, could have contributed to the success with which the specific interventions were implemented by the group members.

The current findings substantiate earlier uncontrolled studies of the effectiveness of nonpharmacological interventions in the treatment of sleep disturbances in medical patients (Cannici et al. 1983; Morin et al., 1989; Stam & Bultz, 1986; Varni, 1980). In addition, the magnitude of the treatment effects are consistent with previous controlled research with

primary insomniacs (Morin et al., 1994; Murtaugh & Greenwood, 1995). The treatment gains in the diary measures for sleep onset latency, wake time after sleep onset, and sleep efficiency were comparable to those reported in studies of sleep maintenance and late-life insomnia (Lacks, Bertelson, Sugarman, & Kunkel, 1983; Morin et al., 1993; Morin & Azrin, 1987). The effect size for sleep quality (as measured by the PSQI) was not as large as that reported in the most recent metaanalysis (Murtaugh & Greenwood, 1995). However, this analysis excluded studies involving patients with comorbid medical conditions. The negligible effect sizes for awakenings and total sleep time indicate that these parameters are not very responsive to the CBT intervention in this population. This, combined with the relatively small sample size, contributed to low statistical power, which may also help to explain the lack of significant Group x Time interactions for these variables. Larger samples may prove that the small group differences in these parameters can be statistically significant.

After three months, there was some relapse in the measures of sleep efficiency and wake time after sleep onset, although both variables still showed clear improvement relative to control subjects. Both sleep quality and sleep onset latency showed good maintenance from posttreatment to follow-up. Inevitably, there were some subjects who eventually began to regress toward their baseline sleep pattern, suggesting that CBT is unlikely to provide sustained improvement for everyone who participates. However, the results are clearly very promising. A potentially worthwhile direction for future research would be the integration into the protocol of more intensive methods addressed to the issue of relapse prevention. One approach would be to adapt some of the concepts and strategies for relapse prevention from the field of addictions to the long-term maintenance of good sleep habits. For example, attention could be given to helping patients cope with situations of high risk for slipping back into bad habits (e.g., staying in bed late on the weekend; feeling the urge to use the bed to rest on a day of high pain). It may be worthwhile to restructure some of the cognitive coping strategies with a greater emphasis on dealing with setbacks (Marlatt, 1985). These methods

could be worked into treatment much earlier in the protocol rather than waiting until the final week as in the present study. Another option would be to structure a booster session, which could be held one or two months after the final session, specifically around the topic of relapse prevention. This may increase the salience of the issue and be greeted with enhanced receptiveness among participants, given that it is the time when they would be at highest risk for relapse into maladaptive sleep habits.

There was little change in BDI scores associated with the insomnia treatment. Of course, the exclusion of individuals with major depression necessarily limited the degree to which depressed mood could be expected to improve. In light of this, the BDI may not have been the optimal measure for assessing change in general distress, given that it focuses solely on depressive symptomatology. On the other hand, it may be that the treatment does not have a substantial impact in reducing mild to moderate distress even among patients whose sleep improves. It remains to be seen if patients with concurrent major depression could also benefit from the intervention, and whether an improvement in sleep pattern would result in a reduction of depressive symptomatology within this particular group.

Although there was a reduction in medication consumption across time, the change could not be attributed to the specific effects of the treatment because subjects in both groups showed a small, but significant, decrease in MQS scores. It should be noted, however, that only a minority of subjects actually took medications for sleep. Among this group, a few were identified as making substantial reductions in their use of sedative medication. Because medication reduction was optional, the individuals who chose to decrease their medications presumably did so in the interest of exploring other ways to cope with their insomnia. However, some subjects who engaged in the extensive self-monitoring of the WLC condition also managed to reduce their medication utilization by the time of the follow-up. Hence, the information about medication reduction that was provided to the CBT subjects may not be the only factor involved in achieving this effect. Nevertheless, the medication module of the

intervention maintains an important educational function within the multicomponent intervention. Even non-users appeared to benefit from this information because it reinforced their preference for alternative coping strategies.

Despite the fact that the intervention was not directed at reducing pain levels, it apparently did so as a secondary benefit. Hence, the CBT program may be helpful in breaking the cycle of poor sleep leading to increasing pain. This result is consistent with Affleck et al.'s (1996) finding that poor sleep predicted worse daytime pain in fibromyalgia patients. Interestingly, during the third week of treatment, the therapists for the intervention observed that many CBT subjects reported an increase in pain levels following the implementation of sleep restriction. Although it is common during the first few weeks of sleep restriction for insomniacs to feel that their sleep is worse (Morin, 1993), among chronic pain patients this reaction may be accompanied by a worsening of their pain levels. These observations, albeit anecdotal, provided little basis to expect that pain levels in the treated subjects would eventually fall below their baseline values. Furthermore, the mechanism behind this effect is still unclear. The fact that depression showed no change suggests that the improvement in pain was not mediated by an improvement in affective distress. On the other hand, it is possible that, with improved sleep, subjects were less fatigued during the day, and consequently found their pain more manageable, as Affleck et al. (1996) have speculated. It is worth noting that the actual change in pain among CBT subjects was relatively small (only a 16% decrease from baseline to follow-up), and only differed significantly from control subjects at the final assessment. The absence of a group difference at posttreatment suggests that reduced pain may be a delayed effect that emerges in the months following treatment. One could speculate that it takes several months of improved sleep to initiate any meaningful change in patients' experience of pain. What is now needed is replication of this finding, and further research to elaborate on the nature of the relationship between improved sleep and pain.

Even though the present findings support a relationship between pain levels and the

severity of insomnia, it is important to consider that all subjects continued to experience chronic pain following treatment. The fact that patients were still able to effect positive changes in their sleep reinforces the view that pain is not the only factor contributing to their sleep disorder. Consequently, the results provide indirect evidence for the cognitive-behavioural model of insomnia secondary to chronic pain, which argues for the importance of psychosomatic over biological factors in the maintenance of the disorder.

The present data offer some insight into the relative contributions of cognitive, affective, and behavioural elements in the model. Neither depression nor presleep arousal showed large treatment effects, suggesting that the role of affective distress in maintaining patients' insomnia may be less than hypothesized by previous investigators (Atkinson et al., 1988; Haythornthwaite et al., 1991; Pilowsky et al., 1985). However, these earlier studies did not exclude patients with major depression. Nevertheless, the lack of robust changes in these measures of distress could mean that behavioural (e.g., conditioning) factors are more salient in accounting for sleep disturbances in this population. This idea is consistent with recent findings in the depression treatment literature, where it has been reported that the addition of cognitive elements contributes little to the efficacy of behaviour therapy (Gortner, Gollan, Dobson, & Jacobson, 1998). Certainly, behavioural interventions for insomnia have the most empirical support, and likely made the greater contribution to the favourable outcomes found in the present study. Without further research, however, it is impossible to reach any definitive conclusions as to the relative importance of the behavioural versus cognitive interventions.

Depending on the definition of clinical significance that was used, between 16% and 56% of CBT subjects could be classified as having good sleep at follow-up. Conversely, 44% to 84% of subjects were still in the dysfunctional range. In light of the chronicity of the sleep problems reported by these subjects, it is perhaps impressive that any became good sleepers after only seven weeks of treatment. Nevertheless, the overall magnitude of these

changes must be placed in their proper context; only four CBT subjects met all of the criteria for good sleep. Hence, for most patients, treatments of this type are unlikely to provide a ‘cure’ for all of their sleep problems. On the other hand, it is debatable whether the same criteria that are used to define good sleep in the healthy population should also apply to individuals who are at continued risk for sleep disturbances because of painful medical conditions. The reality may be that “perfect sleep” is not attainable by most patients with chronic pain, even though the severity of their insomnia can certainly be improved. In light of this, it would be important for future studies to include other indices of clinical significance that would be relevant to this patient group (e.g., return to work, quality of life, daytime functioning).

The correlational analyses of the changes in the moderating variables and the primary outcome measures within the CBT group revealed a few interesting trends. For example, there was a robust association between improvements in sleep self-efficacy and reduced sleep onset latency. In fact, many of the items on the SSS refer to activities that are helpful in initiating sleep. Hence, subjects who experienced a decrease in sleep onset latency may come to feel increased mastery over these aspects of their sleep behaviour. On the other hand, changes in sleep onset latency and presleep arousal were not correlated. Rather, changes in presleep arousal showed a robust association with changes in sleep quality, suggesting that arousal has a stronger impact on the overall quality of patients’ sleep than on initially getting to sleep. Interestingly, neither self-efficacy nor presleep arousal showed significant treatment effects, in the sense that the CBT group did not change more on these measures than the WLC subjects. In light of this finding, the utility of these constructs as clinically important outcome measures in their own right appears to be limited.

No support was found for the hypothesis that treatment outcome would be related to the extent of adherence to the recommendations on how to cope with difficult nights. However, this finding may be due to the way in which adherence was measured. Admittedly,

the adherence checklist had no established psychometric properties, and it included only a sample of the skills that were taught in the CBT condition. Another problem may be that even when subjects did attempt to implement a particular strategy, they may not all have done so with equal diligence. By focusing only on the frequency of implementation--and then only when there were appropriate opportunities on difficult nights--other important dimensions of adherence may have been missed. In short, the task of assessing adherence with a program of such complexity was greater than anticipated, and it is a topic that needs further investigation. It is worth noting that the reduction in time in bed and robust increase in sleep efficiency shown by CBT subjects provides strong evidence that they adhered to at least one important intervention, sleep restriction. Furthermore, sleep restriction was introduced in the same way for all subjects, in contrast to some of the other skills which were more individually tailored in their application. This suggests that sleep restriction is a fundamental component of the treatment package, and should be retained in future applications of the intervention.

A significant limitation of the present study is the fact that the changes shown following treatment were based almost entirely on patient self-report. The most notable exception is the actigraph measure of mean activity level, which did show a significant treatment effect. It is unfortunate that the actigraph failed to yield reliable collateral estimates of the traditional sleep parameters such as time to fall asleep and awakenings. Such objective validation of the sleep diary estimates of specific sleep-wake parameters would have provided strong additional confirmation of the efficacy of the intervention. The low reliability of the actigraph sleep estimates points to known methodological problems with the scoring program when applied to insomniacs (Cole et al., 1992), as well as to the limitation of using only a two-night period of ambulatory monitoring. The most recent research on the actigraph's performance indicates that a longer assessment period is needed to obtain stable estimates of traditional sleep parameters (Acebo & Carskadon, 1997; Wilson et al., 1998). Using the identical equipment and scoring software as in the present study, Acebo and Carskadon

(1997) found that a minimum of four nights of averaged actigraph data were necessary to obtain reliable (i.e., $>.70$) estimates of individual sleep parameters in healthy subjects. With a clinical population, an even longer recording period would be optimal given the amount of night-to-night variability associated with insomnia.

On most measures, the WLC group showed no independent change. The main exceptions were sleep onset latency and sleep quality, both of which showed change in the WLC subjects that was significantly different from the CBT group. At posttreatment, control subjects reported that they were taking longer to fall asleep than at baseline. Paradoxically, however, they also reported increased sleep quality. As previously noted, reactivity to self-monitoring of sleep is not uncommon (Morin et al., 1993). In the present study, time to fall asleep worsened during the period of self-monitoring, although this was the only parameter to show a significant deterioration from baseline values. If this was an iatrogenic effect resulting from an increased focus on sleep performance, then one might have expected that presleep arousal would also have increased, which was not the case. Nevertheless, the possibility must be acknowledged that with this population, prolonged self-monitoring in the absence of any other intervention, may exacerbate sleep onset problems for some patients. It does not appear to be a long-lasting effect, because the follow-up values were not significantly different from those observed at baseline. Nevertheless, it is clear that this type of control condition can lead to a number of changes in different aspects of sleep. Apparently, it is not an inactive condition, and self-monitoring of sleep can have both a therapeutic impact on some parameters and a deleterious effect on others.

The use of strict inclusion criteria, coupled with the difficulties encountered in recruiting patients for the trial, raises questions as to the generalizability of the results. Narrow screening criteria were adopted to ensure proper control over extraneous factors that may influence outcome (Kazdin, 1991). With a new treatment in particular, some sacrifice of external validity is considered a reasonable trade-off in order to enhance internal validity and

to make firmer conclusions regarding the source of the treatment effects. In this study, the subjects were a relatively select sample of patients who were homogenous with respect to their presenting medical complaint, absence of major psychiatric comorbidity, and willingness to embrace this form of treatment. Furthermore, the sample was over-represented by patients with quite severe and chronic forms of insomnia. On the other hand, the sample did include patients with a range of chronic pain conditions, different degrees of functional disability, and both sleep onset and sleep maintenance insomnia. At present, the generalizability of the results is limited to the clinical population represented by the present sample, and further research is needed to identify other groups of medical patients that may benefit from the treatment.

The problems encountered in recruiting subjects were partially due to the use of narrow inclusion criteria. It also suggests the demand for the treatment may be less than was originally predicted. Generally, only a small proportion of insomnia sufferers, typically the most severe cases, actually seek treatment (Mellinger et al., 1985). However, the poor response to the mail-outs points to a relatively low consumer interest in a sleep treatment that does not involve medication, or possibly to a degree of skepticism as to the potential of psychological treatments to relieve insomnia. Clinically, it was also evident that some potential subjects had difficulty grasping the concept of treating their sleep disturbances directly, without addressing what they perceived to be the underlying problem--chronic pain.

This study has several implications for future research. First, it needs to be established that the present results are reproducible with a larger and more heterogenous sample of patients. Individuals with other chronic pain conditions (fibromyalgia, arthritis, cancer, etc.) may also benefit from this treatment approach, and should be included in future trials. It would also be interesting to learn if the treatment would be effective on a group of patients with less severe sleep problems. Logically, if the treatment can be shown to work on individuals in the upper range of the spectrum of insomnia severity, then it should be effective

for people with milder sleep disturbances. On the other hand, patients with mild insomnia may not have such deeply entrenched behavioural habits contributing to the maintenance of their sleep problem. Hence, there is no guarantee that a treatment focused on promoting better sleep habits would work with such patients.

Second, a longer follow-up interval is also necessary to determine if the treatment gains can be maintained beyond three months. Third, additional corroborating evidence from objective sleep measures would strengthen the self-report findings. This could be achieved by the use of a longer actigraph assessment period to obtain stable estimates of the computer-scored sleep parameters. Alternatively, polysomnographic recordings could be obtained to verify the improvements in the sleep diary. However, one or two nights, which is the standard for sleep lab assessments, would likely be insufficient given the variable nature of insomnia. At least four nights of recordings would be necessary, albeit at considerable cost as well as inconvenience for the subject.

Fourth, it appears that regular self-monitoring of sleep may have a therapeutic effect on its own in terms of increasing total sleep time, reducing awakenings, and improving sleep quality. On the other hand, it may lead to a worsening of sleep onset problems, at least in the short term. It would be important to replicate these effects, and determine why such self-focused attention results in changes to patients' sleep patterns. Some objective verification of these changes would also assist in understanding this phenomenon.

Fifth, it would be helpful to identify predictors of treatment success, both for the purpose of screening future participants, as well as for addressing conceptual issues that remain unresolved in the present study. For example, the hypothesis that adherence would be necessary to achieve a positive outcome was not supported by the data, even though it is a compelling hypothesis on an intuitive level. A larger sample would also permit analyses to determine if factors such as chronicity of insomnia, severity of sleep problems, and type of pain condition have a significant impact on outcome. Finally, determining the active elements

of the multicomponent treatment package would help in the refinement of the protocol for more efficient administration. Are seven sessions necessary? Is the cognitive therapy module beneficial? These questions could be addressed by comparing different versions of the treatment under controlled circumstances. Furthermore, greater research attention to therapy process variables is needed to determine the relative contribution of group process factors (i.e., social support, instillation of hope, etc.) to treatment outcome.

The success of the current study indicates a clear clinical potential for this treatment. Clinicians wishing to use the intervention could run it either as an independent intervention, or attempt to integrate it into a conventional, multidisciplinary pain management program. The principles of pain management programs are quite compatible with the insomnia intervention. For example, both rely on cognitive-behavioural models and strive to teach patients long-term coping strategies. The integration of the two treatments also makes practical sense given that sleep hygiene education is already a component of most structured pain management programs. On the other hand, the use of an independent treatment format for patients who already have some basic knowledge of pain management might facilitate their adoption of the treatment model. If it is embedded within another program, there is the potential that the insomnia intervention would not be given the time and attention that it seems to require. Patients might also have difficulty implementing the strategies concurrently with other assignments that may be part of a comprehensive pain management program.

The patient manual developed for this study proved to be very useful in administering the treatment. Foremost, it provided subjects with a comprehensive resource on the treatment methods to which they could turn outside of the group sessions. An interesting question is whether the treatment could be self-administered using just the patient manual. There is, in fact, a growing interest in evaluating the efficacy of self-help treatments for psychological problems (Christensen, & Jacobson, 1994). Recent reviews suggest that self-help treatments can be an effective and economical use of psychological resources, at least for some problems

(Christensen, & Jacobson, 1994; Glasgow & Rosen, 1979; Gould & Clum, 1993; Morawetz, 1989). A significant limitation of self-help therapy is the absence of a therapeutic milieu to encourage change. Research has shown that the effectiveness of self-instructional materials for health behaviour change can be augmented by minimal therapist support to encourage and supervise their use (Brown, Hunt, & Owen, 1992; Jamison, & Scogin, 1995). Thus, the patient's use of the self-help manual should probably include periodic contact with a therapist to maximize its therapeutic benefit.

In conclusion, disturbed sleep is one of the most common, but undertreated problems associated with chronic pain. Ironically, the most accepted form of treatment for insomnia in medical patients, pharmacotherapy, can result in iatrogenic effects that make it an unsuitable long-term solution. Nonpharmacological treatments, on the other hand, have been researched extensively and appear to be superior to drug therapy in the management of chronic insomnia. Yet, psychologically based interventions are underutilized in the treatment of insomnia resulting from chronically painful medical conditions. Within the limitations of the present study, CBT appears to be a safe and efficacious way of improving the sleep of these patients. The present study should encourage further exploration of the CBT approach for secondary insomnia.

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Footnotes

¹ The option of combining the outcome measures into a multivariate analysis of variance (or, in this case, a doubly multivariate analysis because repeated measures were involved) was not considered a tenable one. In addition to being unnecessarily complex, the results of a significant omnibus MANOVA test would provide little information that would be clinically useful in a treatment outcome study, such as the measures most sensitive to change (Dar et al., 1994).

² An alternative approach to split-plot ANOVA is analysis of covariance (ANCOVA) in which the treatment differences at post-test are examined using the pre-treatment values as covariates. This approach was considered for application in the present study; however, initial analyses revealed that the assumption regarding homogeneity of regression slopes was violated with most of the dependent variables. This finding precluded the use of ANCOVA, because it implied that the magnitude of treatment effects were not the same at different levels of the pretreatment scores (see Sheeber, Sorensen, & Howe, 1996 for a comprehensive review of analytic strategies for pretest-posttest treatment outcome data).

³ Although the reported significance levels are adjusted with Huynh-Feldt epsilons, the uncorrected degrees of freedom are displayed with unadjusted F-ratios. This was done in the interest of simplifying the results output.

⁴ The assumption of homogeneity of regression was satisfied for this measure.

Table 1

Demographic Characteristics of the Sample

Variable	CBT (n=25)	WLC (n=25)	Total (N=50)	t or χ^2
Age	42.9 (7.6)	45.9 (8.4)	44.5 (8.28)	-1.4
Sex, No. (%)				0.7
Male	13 (52.0)	10 (40)	23 (46)	
Female	12 (48.0)	15 (60)	27 (54)	
Marital Status, No. (%)				3.1
Married/Common law	19 (76.0)	21 (84.0)	40 (80)	
Never married	5 (20.0)	2 (8.0)	7 (14)	
Other	1 (4.0)	2 (8.0)	3 (6)	
Employment status, No. (%)				4.4
Employed (full or part-time)	11 (44.0)	9 (36.0)	20 (40)	
Not employed	1 (4.0)	2 (8.0)	3 (6)	
Not working due to pain	13 (52.0)	14 (56.0)	27 (54)	
Primary pain site, No. (%)				4.4
Lower back	15 (60.0)	18 (72.0)	33 (66)	
Upper/middle back	5 (20.0)	1 (4.0)	6 (12)	
Neck	3 (12.0)	4 (16.0)	7 (14)	
Pelvic	-	1 (4.0)	1 (2.0)	
Lower limbs	2 (8.0)	1 (4.0)	3 (6)	
Duration of pain (months)	118.7 (98.1)	104.9 (115.3)	111.8 (106.2)	0.5
Duration of insomnia (months)	106.8 (100.8)	83.1 (91.1)	95 (95.8)	0.9
Insomnia diagnosis, No. (%)				0.8
SM only	7 (28.0)	10 (25.0)	17 (34)	
SM and SO	18 (72.0)	15 (72.0)	33 (66)	
Psychiatric diagnosis, No. (%)				2.0
None	17 (68.0)	21 (84.0)	38 (76)	
Dysthymia	1 (4.0)	1 (4.0)	2 (4)	
MDE in partial remission	7 (28.0)	3 (12.0)	10 (20)	

Note: Values are means (SD) unless otherwise specified; CBT = cognitive-behaviour therapy; WLC = symptom monitoring/ waiting list control; SM = sleep maintenance; SO =sleep onset; MDE = major depressive episode.

Table 2

Medical Diagnoses of Subjects

Subject No.	Medical Diagnosis
	<u>CBT</u>
1	Mechanical back, neck and shoulder pain
2	Neck and cervical root strain; chronic pain syndrome
3	Thoracic spine dysfunction; chronic pain syndrome
4	Chronic pain syndrome
5	Myopathy disorder; chronic pain syndrome
6	Chronic low back pain; congenital dislocation of right hip
7	Chronic back pain
8	Chronic back pain
9	Myofascial pain disorder; chronic pain syndrome
10	Low back pain secondary to lumbar spine ligamentous laxity and nerve root irritation
11	Low back and leg pain secondary to lumbar spine dysfunctions, lumbar spine ligamentous laxity and nerve root irritation
12	Low back and leg pain secondary to lumbar spine dysfunctions, lumbar spine ligamentous laxity and nerve root irritation
13	Widespread myofascial pain
14	Low back pain secondary to thoracic spinal dysfunctions
15	Cervical and low back pain secondary to spinal dysfunctions and ligamentous laxity
16	Chronic low back pain
17	Low back and left leg pain secondary to lumbar spine ligamentous laxity and nerve root irritation
18	Chronic pain syndrome; mechanical back dysfunction
19	Chronic pain syndrome; cervical myofascial pain disorder
20	Thoracic pain secondary to thoracic spine dysfunctions
21	Chronic low back pain syndrome; SI joint dysfunction
22	Chronic pain syndrome
23	Chronic pain syndrome
24	Chronic pain syndrome
25	Chronic pain syndrome; failed back syndrome

Table 2 (continued)

Subject No.	Medical Diagnosis
	<u>WLC</u>
26	Low back and left leg pain secondary to lumbar spine ligamentous laxity and nerve root irritation
27	Chronic pain syndrome
28	Chronic pain syndrome; degenerative disc disease
29	Chronic pain syndrome
30	Chronic pain syndrome
31	Chronic pain syndrome
32	Myofascial pain disorder; secondary fibromyalgia
33	Chronic pain syndrome; strain syndrome
34	Chronic neck pain
35	Chronic pain syndrome
36	Chronic pain syndrome; secondary fibromyalgia
37	Chronic pain syndrome
38	Chronic pain syndrome
39	Right hip and right leg pain secondary to cervical spine and SI joint dysfunctions
40	Right arm pain secondary to stretched ligaments; right shoulder and low back pain secondary to lumbar nerve root irritation
41	Myofascial pain disorder
42	Low back pain secondary to spinal dysfunctions, ligamentous laxity, and leg length inequality
43	Chronic pain syndrome
44	Low back and leg pain secondary to lumbar spine ligamentous laxity and nerve root irritation
45	Low back and leg pain secondary to SI joint dysfunction and lumbar spine ligamentous laxity
46	Head, neck and thoracic pain secondary to spinal dysfunctions and ligamentous laxity at cervical and thoracic spine
47	Chronic low back pain
48	Myofascial pain cervical and lumbar area; ligamentous laxity thoracic and lumbar spine
49	Chronic pain syndrome; SI joint dysfunction
50	Chronic pain syndrome; mechanical back pain

Note: CBT = cognitive-behaviour therapy; WLC = symptom monitoring/ waiting list control;

Table 3

Results of Subject Recruitment Protocol

Stage 1: Mail Outs	
Total letters sent to prospective subjects	1566
Letters with no response	1093 (69.8%) ^a
Letters returned unopened (wrong address, moved, etc.)	142 (9%)
Responders	334 (21.2)
Stage 2: Initial Screening (by phone and letter)	
No sleep problems	91 (27.2%) ^b
Declined participation (reason unknown)	55 (16.4%)
Excluded by clinical criteria	63 (18.8%)
Interested but unable to participate due to other reasons ^c	55 (16.4%)
Scheduled for assessment interview	70 (20.9%)
Stage 3: Interview	
Excluded due to major depressive episode (MDE)	7 (10.0%) ^d
Excluded due to other concurrent psychiatric disorder	5 (7.1%)
Insomnia disorder criteria not met	2 (2.8%)
Declined participation before randomization	3 (4.3%)
Randomized into trial	54 (77.1%)
Defaulted after randomization	4 (5.7%)

^a Percentage of letters sent. ^b Percentage of responders. ^c e.g., language difficulties, scheduling/transportation problems. ^d Percentage of subjects interviewed.

Table 4

Primary Outcome Measures: Means and Standard Deviations

Variable	Pretreatment		Posttreatment		3-month FU		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Sleep onset latency (minutes)							
CBT	50.5	30.5	27.6 ^{a b}	18.7	27.2	16.7	
WLC	35.8	27.9	50.3 ^b	52.4	39.9	29.9	
Time in bed (hours)							
CBT	7.9	1.5	7.4 ^b	1.6	7.7	1.3	
WLC	7.8	1.1	8.0	1.0	7.9	1.0	
Total sleep time (hours)							
CBT	5.8	1.5	6.4	1.6	6.5	1.4	
WLC	5.6	1.1	5.7	1.3	5.7	1.2	
Awakenings (No.)							
CBT	3.0	1.8	2.3	1.3	2.0	1.3	
WLC	3.9	4.0	3.3	2.8	3.4	2.7	
Wake after sleep onset (minutes)							
CBT	83.2	71.0	39.6 ^{a b}	41.7	52.7 ^{a c}	52.9	
WLC	96.9	54.4	88.5	62.5	94.4	61.4	
Sleep efficiency (%)							
CBT	73.6	14.3	86.4 ^{a b}	11.0	84.3 ^a	11.7	
WLC	72.8	12.0	72.0	15.8	72.7	14.0	
Pittsburgh Sleep Quality Index							
CBT	13.0	4.0	8.8 ^{a b}	3.7	7.5 ^a	3.4	
WLC	13.9	2.8	12.4 ^b	3.5	13.2	3.7	
Actigraph mean activity level							
CBT	8.9	5.8	5.3 ^{a b}	3.3	5.9	3.8	
WLC	7.8	5.0	10.3	8.2	9.4	9.9	

Note. CBT = cognitive-behaviour therapy; WLC = Symptom-monitoring-minimal contact/waiting-list control. ^a Significantly different from WLC ($p < .05$). ^b Significant change from pretreatment to posttreatment ($p < .05$). ^c Significant change from posttreatment to follow-up ($p < .05$).

Table 5

Secondary Outcome Measures: Means and Standard Deviations

Variable	Pretreatment		Posttreatment		3-month FU	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
MPI - Pain Severity						
CBT	11.7	2.9	10.5 ^b	3.6	9.8 ^a	3.7
WLC	12.5	3.1	11.8	3.8	12.2	3.5
Beck Depression Inventory						
CBT	13.2	9.1	10.5	7.6	10.6	8.5
WLC	11.7	6.1	11.8	6.2	12.4	7.6
Medication Quantification Scale						
CBT	3.8	5.6	2.7	5.5	2.3	4.3
WLC	4.1	4.5	4.0	4.5	3.6	4.0

Note: CBT = Cognitive-behaviour therapy; WLC = Symptom-monitoring-minimal contact/waiting-list control; FU = Follow-up. ^a Significantly different from WLC ($p < .05$). ^b Significant change from pretreatment to posttreatment ($p < .05$).

Table 6

Patients Taking Medications with Sedating Properties ^a

	Pretreatment	Posttreatment	3-month FU
CBT	8	5	5
WLC	13	13	12
Total Sample	21	18	17

Note: CBT = Cognitive-behaviour therapy; WLC = Symptom-monitoring-minimal contact/waiting-list control; FU = follow-up (3- month). ^a Weak narcotics, sedative antidepressants, and sedative hypnotics.

Table 7

Moderating Variables: Means and Standard Deviations

Variable	Pretreatment		Posttreatment		3-month FU	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Sleep Self-Efficacy Scale						
CBT	21.7	5.4	27.2 ^b	4.8	28.1 ^a	6.1
WLC	22.3	5.9	25.4 ^b	4.9	24.8	5.2
Pre-Sleep Arousal Scale - Cognitive						
CBT	20.6	8.4	16.2 ^b	6.3	16.2	7.7
WLC	17.7	7.6	18.5	7.5	17.4	7.3
Pre-Sleep Arousal Scale - Somatic						
CBT	16.0	6.7	14.7	6.2	14.9	7.4
WLC	15.0	5.5	15.7	6.0	15.4	5.7
Sleep and Pain Knowledge Quiz						
CBT	10.9	2.5	13.7 ^{a b}	2.5	13.0 ^a	2.6
WLC	9.3	2.6	10.5	2.6	10.3	2.9
Adherence Checklist						
CBT	--	--	52.2	18.6	--	--
WLC	--	--	--	--	--	--
Client Satisfaction Questionnaire						
CBT	--	--	28.2	3.9	--	--
WLC	--	--	--	--	--	--

Note: CBT = Cognitive-behaviour therapy; WLC = Symptom-monitoring-minimal contact/waiting-list control; FU = Follow-up. ^a Significantly different from WLC ($p < .05$). ^b Significant change from pretreatment to posttreatment ($p < .05$).

Table 8

Correlations Between Changes in Moderating Variables and Changes in Primary Outcome Measures in Patients Receiving CBT (n = 25)

	Moderating Variable					
	Self-Efficacy	Cognitive Arousal	Somatic Arousal	Knowledge	Adherence	Satisfaction
SEF	.08	-.14	.00	.06	.02	-.24
SOL	-.65**	.39	.39	-.14	.07	.33
AWK	.10	.15	-.14	.21	.16	.06
TST	-.24	-.28	-.04	.08	-.31	-.13
WASO	.09	-.18	-.07	.02	-.11	.05
PSQI	-.28	.52*	.55*	.04	.07	.41*
MAL	.13	.17	.05	.15	-.32	.24

Note: SEF = Sleep efficiency; SOL = Sleep onset latency; AWK = Awakenings; TST = Total sleep time; WASO = Wake time after sleep onset; PSQI = Pittsburgh Sleep Quality Index; MAL = Actigraph mean activity level. * $p < .05$. ** $p < .01$.

Table 9

Effect Sizes Indices for Pretreatment to Posttreatment Change^a

Measure	Effect Size Index (f)
Sleep onset latency	.34
Awakenings	.00
Wake time after sleep onset	.11
Sleep efficiency	.36
Total Sleep Time	.04
PSQI	.13
Mean activity level	.14

Note: PSQI = Pittsburgh Sleep Quality Index. ^a Effect sizes were calculated by dividing parameter estimates for the standard deviations of population means by the common within-population standard deviation (Cohen, 1988). Sleep-wake parameters derived from the sleep diary. Mean activity level derived from actigraph recordings.

Table 10

Clinical Significance of Results According to Various Criteria

	Criterion			
	SOL/WASO < 30 minutes	SEF > 85%	PSQI < 6	All criteria
Posttreatment				
CBT	10	16	6	4
WLC	2	4	1	0
Follow-up				
CBT	8	14	9	4
WLC	1	4	0	0

Note: CBT = cognitive-behaviour therapy; WLC = symptom monitoring/ waiting list control.

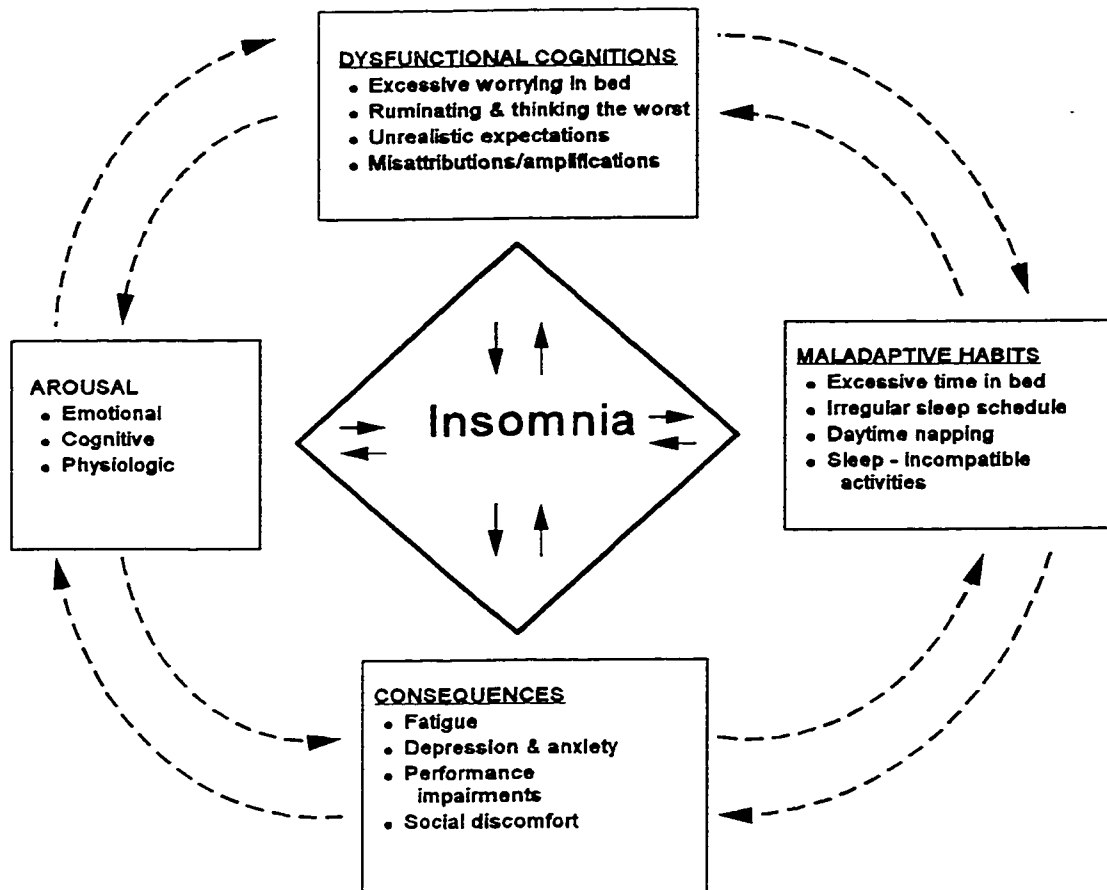


Figure 1. Cognitive-behavioural model of insomnia. From Morin (1993) *Insomnia: psychological assessment and management*. New York: Guilford Press.

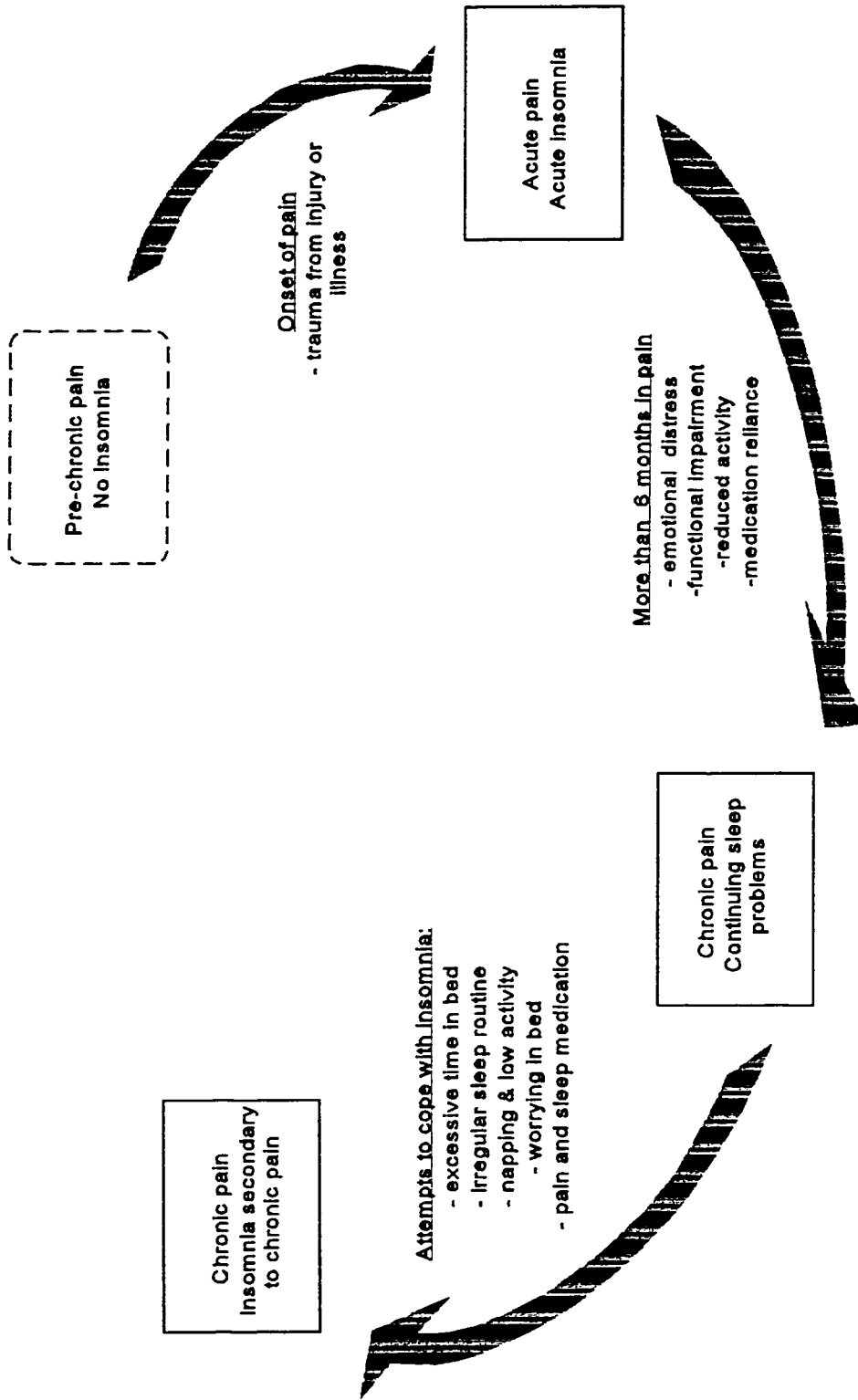


Figure 2: Conceptual model showing the development of insomnia secondary to chronic pain. The model identifies putative stages depicting the transition from no pain/no insomnia to chronic pain/chronic insomnia, with suggested precipitating factors for each stage.

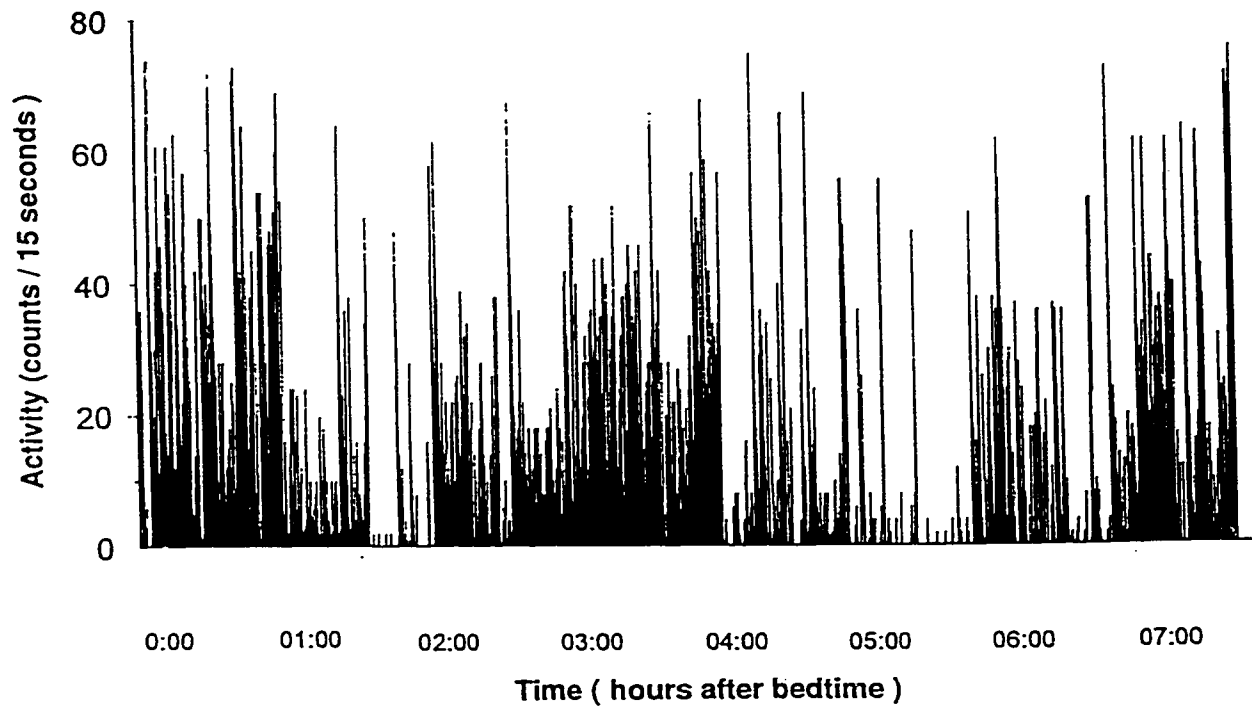
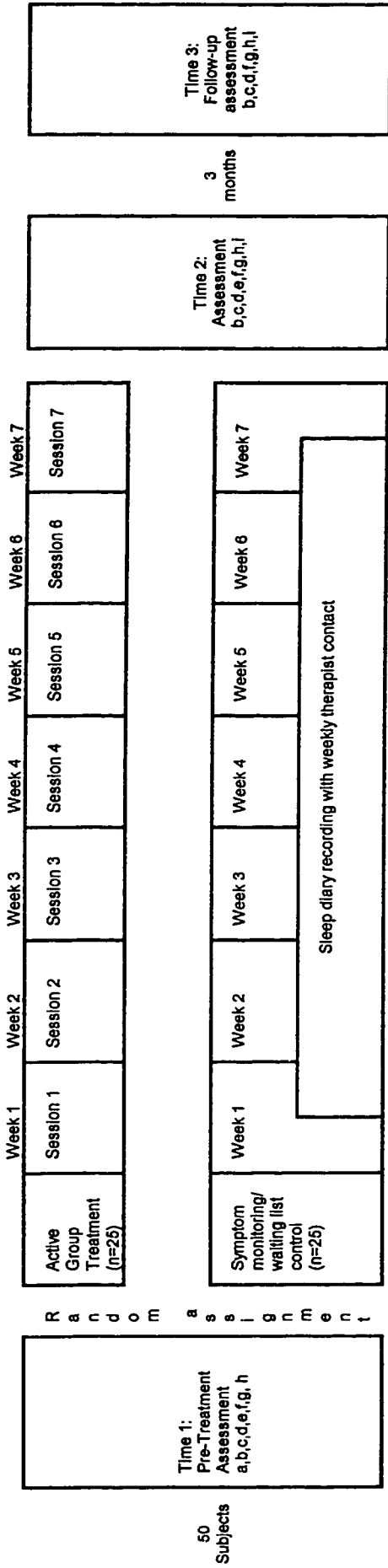


Figure 3. Representative actigraph recording from a chronic pain patient obtained during the pretreatment assessment.



- a. Structured Interview (PRIME-MD & SIS-D)
- b. BDI
- c. PSQI
- d. MPI Pain Severity
- e. SPKQ
- f. SSS
- g. PSAS
- h. Two weeks self-monitoring with daily sleep diary
- i. Two nights of ambulatory monitoring
- i. CSQ and Adherence Checklist

Figure 4. Timetable of assessment and intervention procedures.

Appendix A

Coping with Chronic Pain Sleep Problems patient manual

**COPING WITH CHRONIC PAIN
SLEEP PROBLEMS:
*A Self-Management Approach***

*Shawn Currie & Keith Wilson
1996*

Chapter 1

In this chapter you will:

- ◆ Find out about the self-management approach for insomnia
- ◆ Learn the about the importance of self-monitoring your sleep
- ◆ Discover the art of setting realistic goals

Goals for the chapter:

- 1) To grasp the basic principles of how to cope with sleep problems
- 2) To practice using the Daily Sleep Diary
- 3) To set realistic goals for what you can to get out of the program

OVERVIEW OF THE PROGRAM

A common story:

Jane is a 37 year old former employee of a large legal firm. Two years ago she slipped on some ice and injured her back. Her back had already been causing her some pain because of long hours spent sitting in her job. This new injury just worsened the sleep problems she was already having. Before the accident, she was able to sleep most of the night through, but felt her sleep wasn't satisfying, and she generally woke up feeling stiff, sore and tired. After the accident, however, it took her 45 minutes or more to fall asleep, and she usually woke up 2 or 3 times during the night. Finding a comfortable position to sleep in was one of her main problems. She found that she could not concentrate at work and her tolerance for sitting for long periods decreased a lot. Her prescription sleeping pills were no longer very effective and she began to take higher and higher doses to get some relief.

Does Jane's story sound familiar to you? If so, take a minute to respond to the following questions. Check off all the questions that are true for you.

- Do you... have chronic back pain that makes it hard for you to get a good night's sleep? _____
 ...wake up several times in the middle of the night and can't get back to sleep? _____
 ...spend hours lying in bed hoping that sleep will come? _____
 ...feel fatigued during the day? _____
 ...fall asleep in inappropriate places? _____
 ...feel your pain and other problems are worse because of your disturbed sleep? _____
- Does it take a long time for you to fall asleep on most nights? _____
 Are you upset and frustrated by your sleep problems? _____
 Have you tried sleeping pills and found that they just don't work as well anymore? _____
 Are you ready to try something different to manage your sleep problem? _____

If you answered yes to any of these questions, then there is probably something in this program that will help you sleep better. Chances are, if you have chronic back pain, you answered 'yes' to at least several of the questions.

Disturbed sleep caused by chronic pain can be one of the most distressing forms of sleep disorder. Some people feel as though they have two major medical problems: chronic pain and disturbed sleep. They can't work or do many activities because they feel tired and run down most of the time. They may have difficulties concentrating, focusing attention or staying alert. Emotionally, their problems in getting a good night's sleep have led to more stress in their lives, adding to the burden that chronic pain has already put on them. In fact, it is common to hear people say that disturbed sleep is one of the most distressing aspects of their condition.

Who Should Benefit from this Program?

The program described in this manual is meant for people with chronic back pain that causes sleep disturbances for whom long-term treatment with drugs is neither a realistic nor an acceptable option. People who begin this program are generally at the point where they feel little or no control over their sleep. Their sleep disturbances have become quite severe.

The people who will benefit most from this program are those who are willing and motivated to change the ways they think and act around sleep. This means a fair amount of work and commitment on your part. In addition to reading this manual, personal projects in the form of exercises will be assigned throughout the program.

This program is not designed to reduce your pain. The focus is on learning how to manage sleep disturbances that have resulted from having chronic pain. It is possible, however, that as your sleep improves, you will find some improvement in your pain levels or overall sense of well-being.

What Are You Doing to Cope with Your Sleep Disturbances Right Now?

It is not uncommon for people with chronic pain to have suffered from disturbed sleep for years before starting a program like this one. You have probably tried lots of things in the past to help your sleep problem whether they be homemade or physician-prescribed methods. What are some of the things you have tried to make your sleep better? Check any of the following that apply:

- | | | | |
|--------------------------|-----------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Sleeping pills | <input type="checkbox"/> | Warm milk |
| <input type="checkbox"/> | Alcohol | <input type="checkbox"/> | Avoiding coffee |
| <input type="checkbox"/> | Relaxation methods | <input type="checkbox"/> | Napping |
| <input type="checkbox"/> | Pain medications | <input type="checkbox"/> | Changing mattresses |
| <input type="checkbox"/> | Over-the-counter sleep aids | <input type="checkbox"/> | Other drugs |

The next question is, 'how much success have you had with these methods?' If you are like most people, you probably had limited success with some of them, but found that they didn't work on a consistent basis in the long run. Actually, most of these approaches are really valid remedies for disturbed sleep. Throughout the program, we will be discussing how you can use them with the other important strategies you will be learning.

Don't worry if you are beginning this program with a history of treatment disappointments and frustrations—that can actually work to your advantage. For starters, you are probably ready to try something new and different from the other types of treatments you have tried in the past. Second, with the mere passage of time, you have no doubt become an expert on your own sleep problems and you are probably aware of the many psychological and physical factors that can affect your sleep.

Is this Program Effective?

The answer is yes. The program described in this manual is based on several different procedures that are used in the treatment of insomnia. Each of these strategies on its own has been proven to be helpful for people with chronic sleep problems. Research has shown that combining several different treatment strategies is even more effective than relying on any one method. The reason is simple: different people respond to different types of techniques. By using a variety of approaches, the chances of helping more people are increased. What's more, complex sleeping problems usually require more than one strategy. For example, you may have difficulties falling asleep and you may also wake up repeatedly through the night. There are specific strategies you can use for coping with each of these problems. This is why it is important for you to try all the strategies in this manual and find the ones that work the best for you.

Unfortunately, however, this program will not help everyone who tries it. There is no miracle cure. In general, about 75% of people suffering from chronic sleep problems will experience an improvement in their sleep by using this program. How much improvement? Again, you should be aware that most people who complete this program do not necessarily become perfect sleepers. However, if you use the strategies and guidelines as outlined in this manual you should experience a noticeable improvement in your sleep. In light of this, you should try to set realistic goals for yourself and remember not to get discouraged from occasional bad nights. Try to focus on improving your sleep, rather than trying to become a "perfect" sleeper. However, success with this program does require that you take control over your sleep behaviour, and make a commitment that for the next eight weeks, you will make this program a priority.

By continuing to use the skills you learn with this program, the improvements you make in your sleep can be maintained indefinitely. Research has shown that improvements made during the course of a self-management program for insomnia are actually better than those obtained from the long-term use of sleeping pills. In fact, the prolonged use of sleeping pills often leads to an eventual worsening of sleep.

What are the Costs of this Program?

This program doesn't involve any drugs or special diets. Furthermore, there is no special equipment or sleep aids that you are expected to buy. The only costs involved are the price of a few pencils and some photocopying. Time, energy and motivation are the major human costs involved. Reading this manual is only a small percentage of the work involved. It is vitally important that you do the personal projects and other exercises provided in this manual. This cannot be emphasized enough. Just remember the saying that "you only get out what you put into it". Also remember that old habits are sometimes hard to break and it takes to time to develop new skills and new ways of looking at things.

Format of the Manual

In the remaining chapters, you will be introduced to the complete self-management approach for coping with sleep problems caused by chronic pain. Each chapter will begin with an outline of the goals for the chapter and a discussion of the rationale for the specific strategies to be practiced. You will then be provided with detailed step-by-step instructions on how to apply the strategies to help you improve your sleep.

The sequence of chapters is structured so that behavioural strategies—things to do about your bedtime routine—

-are presented in the first few chapters. This is so that you can begin right away acquiring the skills that will help you modify your sleeping pattern. Many people will experience some improvement in their sleep within the first couple of weeks if they follow these behavioural strategies carefully.

The next few chapters focus on cognitive skills—ways to change the way you think and feel about sleep-related problems. In these chapters, you will explore the various ways that your thoughts can affect your sleeping behaviour, and how various exercises can help you put your mind at rest.

The second last chapter is devoted to a review of various drugs and foods that can affect your sleep. You will be provided with guidelines on things you should probably avoid. We will also explore the effects of various environmental factors on your sleep, and the importance of remaining physically active.

The final chapter discusses ways in which you can maintain the progress you achieve as a result of the program. Tips on how to incorporate the skills you learn into your daily routine will be presented. Information on how to prevent relapses will be reviewed, as will strategies that can be used to deal with "bad nights" when they occur.

INTRODUCTION TO THE SELF-MANAGEMENT APPROACH FOR INSOMNIA

The Self-Management Philosophy

The philosophy of self-management is a simple one. Although we can show you a variety of techniques and teach you new skills to cope with your sleep problems, it is up to you to use them on a daily basis. Reading this manual is only about 10% of the work involved; the main part must be done by you on your own time. In a sense, you are both the therapist and client, and it is up to you to motivate yourself to complete the work. This manual contains several exercises and personal projects for you to try. Of course, it is completely up to you, how many and how often you practice them. The only encouragement we can provide you is to tell you that most people who try them consistently do manage to improve their sleep.

In this way, the program is designed to help you take control of your sleep. Using step-by-step instructions, we will guide you through a series of skills-training exercises and personal projects designed to help you cope with your sleep problem. *Coping* is probably a word you have heard before in conjunction with chronic pain. To some people, coping means 'just getting by' or surviving a problem. However, this way of thinking is an example of *passive* coping. This may be reasonable strategy to use during the initial stages of your condition, but after awhile you realize that it is not making your problem any better. Unfortunately, using passive coping strategies during the initial phases of a sleep problem often results in several bad habits being formed. It's easy to fall into a routine of doing nothing about a sleep problem, especially when you are not aware of some of the more active coping strategies you could be using.

In this program, we emphasize a more *active* approach to coping. One way to think of the difference between active and passive coping is to think of the difference between moving forward and staying in one place. When you use passive coping strategies, you stay where you are; your condition may not be getting any worse, but it is also not getting any better. Active coping may involve a little more work on your part in the beginning, but the rewards will be long-term improvement.

One example of passive coping for chronic insomnia is taking sleeping pills. Initially, they may make your sleep better but with continued use the effects start to wear off and you have to take more and more of the drug to get the same effect (this is called developing a "tolerance" to the drug). Eventually, you reach a point when you're taking the maximum dosage allowed—or worse, more than the maximum safe dosage—just to keep your sleep disturbance at a moderate level of severity.

Take a minute to look at Table 1.1 which compares the self-management approach to chronic insomnia to treatment with sleeping pills. We have already discussed some of the points in this table. There are pros and cons of both treatment approaches. For acute or 'transient' insomnia, sleeping pills do have an advantage over a self-management or psychological approach since they work very quickly and they do not require any real effort on your part. Side-effects and the risk of addiction are the most significant dangers involved in the short-term use of sleeping pills to treat insomnia.

For the long-term treatment of chronic insomnia, the reality is that sleeping pills do more harm than good. The National Institute of Health in the U.S. issued a statement to this effect. In short, sleeping pills were never designed to be taken for months or years at a time and their prolonged use typically results in a continuing sleep problem rather than making it better.

What Will You Do in the Next Seven Weeks?

Over the next seven weeks, . You will be introduced to many ways of coping with your sleep problem besides the use of drugs. In essence, you are going to learn how to make use of the most powerful resource at your disposal: **yourself**. Different techniques will be presented with easy step-by-step instructions that will help you to achieve more consistent and satisfying sleep.

The Art of Setting Goals and Making Realistic Expectations

Goal-setting should reflect not only what you would like to get out of the program, but how you would like to take permanent control of your sleep. Although your goals may be expressed in numerical terms such as a '25% decrease in the time it takes to fall asleep', the underlying motivation should be one of lifestyle change. Quality sleep should be thought of as one component in an overall healthy lifestyle along with maintaining a proper diet, reducing stress, etc. Therefore, before you set your goals, you have to make a decision as to how much of a lifestyle change you are prepared to make. This is by no means a small decision. Remember that you spend almost one-third of your life in

bed, so you are making a commitment to alter a substantial portion of your life. If you are ready to make this decision, then the rest of the program should proceed smoothly.

GUIDELINES FOR SETTING GOALS

Setting realistic goals is a skill that involves both creativity and logic. The following criteria are taken from Margaret Caudill's excellent self-management manual, *Managing Pain Before it Manages You* (1994):

	<u>Criteria</u>	<u>Something to ask yourself</u>
◆	A goal should be measurable.	How will you evaluate the goal when it has been reached?
◆	A goal should be realistic.	Is the goal within your grasp?
◆	A goal should be behavioural.	Does achieving it involve specific actions to take?
◆	A goal should be "I"-centered.	Are you the one taking the actions to be measured?
◆	A goal should be desirable.	Is the end result one that you are willing to put enough effort into?

At the end of this chapter, you will be asked to define your goals in more specific terms. In accordance with the first criterion above, your goals will be expressed in terms of actual numerical changes that can be measured by the sleep diary. Before getting into the details of your specific goals for sleeping better, take a minute to reflect on what your overall goals for this program are. Think about them using Caudill's five goal-setting criteria.

If you are having a hard time coming up with some goals, you can try the following exercise. Long before you started this program, you probably had some ambitions for sleeping better. Maybe these were expressed as "I wish" statements that you said to yourself (e.g., "I wish I could sleep through the night without waking up so often"). Think back on some of your ambitions and wish statements and then complete the following "I wish" sentences with a statement concerning your sleep:

I wish _____
 I wish _____
 I wish _____

Now, look at your "I wish" statements. Do they meet the goal-setting criteria? If possible, modify and rewrite the goals that don't meet all the criteria. Consider making a goal smaller as a means of making it more realistic; hardly anyone falls asleep within 5 minutes of going to bed" is probably unrealistic. For one, most people without chronic pain can't fall asleep within 5 minutes. Rather, if it now takes you an hour to fall asleep, consider setting a goal of being able to fall asleep within 30 minutes.

Having realistic goals is very important. One of the reasons many people fail at making lifestyle changes is that they set goals for themselves that are unrealistic or in some cases completely unattainable. How many times have you made a New Year's resolution and failed to stick with it? It is probably because the resolution was made quickly with little forethought into the magnitude of the change and the actions necessary to carrying it through. Consider the case of someone trying to quit smoking. Deciding to go 'cold turkey' at 12:01 a.m. on January 1 is probably an unrealistic goal when it comes to quitting smoking. Many people who try to quit smoking in this manner don't consider how big a lifestyle change they are pledging to make. As a result, the rate of relapse for smokers is around 90%.

An important thing to keep in mind is that there is nothing wrong with occasional relapses when trying to make permanent behaviour changes. Later in the program, we will talk about relapses in more detail and ways of dealing with them without getting discouraged. For now you should consider that coping with relapses is a little easier when your goals are realistic.

Table 1.1

**Comparison of Self-Management of Chronic Insomnia vs.
Treatment with Sleeping Pills**

Self-Management		Sleeping Pills	
◆	Take control of own sleeping behaviour (ACTIVE treatment)	◆	No control; you are dependent on the pills to do all the work (PASSIVE treatment)
◆	More effective in long-term control of sleep disturbances (research to back this up)	◆	Pills lose their effectiveness after 2-3 weeks of use at constant dosage; it is well-established that after this time, pharmacological effect of sleeping pills is minimal—primary effect is psychological ¹
◆	Doesn't lead to addiction	◆	Can become addicted (i.e., physically dependent on the drug so that your body constantly needs the drug)
◆	No side-effects	◆	Side-effects: daytime drowsiness, alertness and performance at psychomotor tasks (e.g., driving) impaired, memory difficulties, 'hangover'
◆	No health dangers involved	◆	Health dangers: risk to fetus if taken during pregnancy; risk of overdose if combined with alcohol or other drugs
◆	Under right circumstances, will increase slow-wave and REM sleep	◆	Most sleeping pills reduce slow-sleep and REM sleep
◆	No risk of tolerance; actually, opposite generally occurs: your sleep gets better with continued application	◆	Tolerance builds with prolonged use
◆	Low risk of rebound insomnia effects	◆	Rebound insomnia can occur with sudden discontinuation of pills
◆	Free	◆	Expensive (\$\$)

¹ National Institutes of Health (1984). Drugs and insomnia: The use of medications to promote sleep.

THE IMPORTANCE OF SELF-MONITORING

An integral part of this program involves monitoring your progress via the Daily Sleep Diary. This is a brief measure that you will complete every morning. On the form, you will record information about your previous night's sleep, such as how long it took you to fall asleep and the number of awakenings you had. Careful self-monitoring your sleep is a necessary step for determining your success in this program since it provides the primary means for evaluating changes in your sleep that occur over the course of the program.

Some other important reasons for using the Daily Sleep Diary are:

- ◆ You can document the type and severity of your sleep problems. You may be able to detect a specific pattern to your sleep problem that you were not previously aware of. Part of the treatment can be focused on changing or interrupting this pattern.
- ◆ It is used for research purposes to evaluate the effectiveness of the program.
- ◆ It can be used to explore how your daytime activities, thoughts and feelings are related to your sleep.
- ◆ The diary can actually be therapeutic. For example, some people find that after self-monitoring their sleep for a period, they discover that their sleep disturbances were not as severe as they originally believed and that they actually have several nights of good sleep in the course of the week. This can reduce some of the anxiety around their sleep problem, which can sometimes be as harmful as the loss of sleep itself.

Step-by-Step Instructions for Completing the Daily Sleep Diary

Step 1: All items, except those referring to daytime medication use and napping, should be completed first thing upon rising in the morning. This is important since your memory of the previous night's events fades quickly.

Step 2: The sleep measures Time in Bed (TIB), Total Sleep Time (TST), and Sleep Efficiency (SEF) are easily calculated from the information recorded on the sleep diary.

Time in Bed = Time got out of Bed - Time to Bed

[Note: "Time got out of bed" may be different from the time when you wake up. For example, you may wake up at 5:00 a.m. but lie in bed for another 2 hours trying to get back to sleep until you finally get out of bed at 7:00 a.m. In this case, you would record 7:00 a.m. as your time got out of bed]

e.g., 8:00 a.m. - 11:00 p.m. = 9 hours spent in bed (Time in Bed)

Total Sleep Time = estimated number of hours actually spent sleeping

From Time in Bed and Total Sleep Time, we can calculate the **Sleep Efficiency ratio**:

Sleep Efficiency (%) = Total Sleep Time / Time in Bed.

This number represents the percentage of time you spend in bed actually sleeping. Sleep efficiency is one of the best indicators of a person's sleep behaviour and therefore it will be used as one of the main indicators for monitoring your progress throughout the program. *Generally, as your sleep improves your sleep efficiency ratio will increase.* Just to give you an idea, the average sleep efficiency ratio for healthy adults (i.e., people without pain) is between 85% and 95%. A person with a sleep efficiency ratio above 90% is considered to have very good sleep. The cut-off value for distinguishing 'good' sleepers from people with insomnia is 85%.

Step 3: Another indicator of how well a person is sleeping is **Sleep Onset Latency (SOL)**. Put simply, this figure represents how long it takes a person to fall asleep for the first time (item #4). The average Sleep Onset Latency for healthy adults with no sleep problems is between 10 and 20 minutes. However this value can range considerably. The cut-off value for distinguishing good sleepers from poor sleepers is 30 minutes. That is, someone who takes longer than 30 minutes to fall asleep at least three or more times per week is considered to be having a problem falling sleep.

Step 4: Another indicator that will be used to monitor your progress is the number of awakenings you have during the

night (item #5). With these, we ask that you distinguish between the total number of times you wake up during the night and the number of times you wake up and have difficulty getting back to sleep. In other words, how many awakenings do you have during the night that are actually contributing to your sleep problem? You will learn in the next chapter that it is perfectly normal for someone to wake up during the night. They only have a problem if they can't get back to sleep.

Step 5: Sleep efficiency and number of awakenings tell you how much sleep you are getting. They tell nothing about the quality of your sleep; that is, whether you feel your sleep was refreshing and satisfying. The amount of sleep you get is not always directly related to the quality of your sleep. For example, some research with people who have chronic pain has shown that many of them may actually sleep as many hours per night than people without pain, but in fragmented chunks that doesn't feel very restful.

In order to assess this aspect of your sleep, you are asked to make a rating of the quality of your sleep each morning. When making these ratings, it is important that you not compare yourself to someone without chronic pain, or even to yourself before your pain began. Rather, you should judge each night's sleep on the basis of the best and worst nights you have had since your chronic pain sleep problem started. For example, if you feel your previous night's sleep was one of the best you have had in a long time, you should give it a rating of 4 or 5 on the scale. The same is true of the rating for how refreshed the previous night's sleep was to you.

Step 6: Once you have a grasp of what the different items on the diary are meant to measure, you should begin completing the Daily Sleep Diary form every morning from now until the end of the program. You are welcome to continue using the Daily Sleep Diary even after you are finished with the program; just make enough photocopies of the original blank form to keep you going.

Step 7: Charting your progress – On the next couple of pages are weekly progress charts for summarizing the Daily Sleep Diary measures of sleep efficiency and time to fall asleep. There is space on the charts for 6 weeks worth of daily recordings.

Using the progress chart is an easy matter. Take your sleep efficiency and time to fall asleep values from your Daily Sleep Diary and plot them on the progress chart (an example is provided to help you). Please do this on a daily basis. Keep the progress chart in a visible place (bathroom mirror or fridge) so that you can be reminded of your progress and the positive changes in your sleep that you are making. It is important that you keep track of making positive changes, so that you can follow your progress and try new things if you get stuck.

Goal-Setting Form for Treatment

Once you have the basics on how to complete the daily sleep diary, you are ready to define your goals for the program. To do this, complete the goal-setting form below. First, indicate your current sleep pattern by averaging the first week of sleep diary recordings. Then, indicate your desired sleep pattern.

Current sleep pattern (before treatment)

- A. Based on a typical night's sleep (i.e., average for past week), how long does it take you to fall asleep after turning the lights off? _____ minutes
- B. How many times do you wake up in the middle of the night? _____ times
- C. On average, how many hours can you sleep in a row before waking up? _____ hours
- D. On a typical night, how many hours of sleep do you get in total? _____ hours
- E. Other concern about sleep (specify): _____

Desired sleep pattern (after completing treatment)

- A. After turning the lights off, I would like to fall asleep in . . . _____ minutes
- B. If I still wake up in the middle of the night after treatment, I would like to wake up no more than . . . _____ times
- C. I want to be able to sleep this many hours in row before waking up. . . _____ hours
- D. I need this much sleep to feel rested and function well during the day and would like to achieve this sleep duration: _____ hours
- E. Other goal for sleeping better (specify): _____

Chapter 2

In this chapter you will:

- ◆ learn about the biological and psychological aspects of sleep
- ◆ find out about sleep disturbances and chronic pain
- ◆ learn the technique of sleep restriction as a method of limiting your time in bed

Goals for the chapter:

- 1) To acquire a basic understanding of the sleep process, and to become familiar with terms such as sleep efficiency, sleep stages, slow-wave sleep.
 - 2) To recognize and understand the controllable and uncontrollable factors that affect your sleep.
 - 3) To understand the rationale behind the behavioural strategies for managing sleep disturbances
 - 4) To master the technique of sleep restriction
-

Review of Daily Sleep Diary

Before proceeding, you should review your Daily Sleep Diary records and progress chart for the previous weeks. Although you may not show any significant progress after only two weeks in the program, you may start to notice things about your sleep that you were not aware of previously. For example, do your sleep problems persist through the entire week, or do you actually experience a number of good and bad nights? Do your bad nights tend to cluster together around the same time of the week—weekends for example? Do you sleep better when you are away from home?

Focus on your good nights now. Try to remember if you did anything different on those days as compared with your bad nights. Try to remember general things for now—were you more active on your good days, for example? The point of this exercise is to identify those behaviours which may be having an influence on your sleep. Finding such behaviours is the first step to realizing that your sleep problems are at least partially under your control. Recognizing that some sleep problems are reactions to your own actions implies that you can do something about them. That is, by changing your behaviours you can improve your quality of sleep. This attitude is central to the self-management philosophy of this program.

A FEW FACTS ABOUT SLEEP

Introduction

To benefit fully from this program, it is important that you know of some basic facts about the function of sleep and some of the things that are known to affect it. The aim of this discussion is to demystify the process of sleep and increase your understanding of what actually happens while you are asleep. There are a number of reasons for doing this. First, it will be helpful for you to be familiar with some of the terms we use when discussing sleep. You are already familiar with some of the words used to describe *how much* sleep you are getting (e.g., sleep efficiency). Other terms will be introduced shortly and will become more important later in the program.

Second, it is also important that you know more about the problem that has given you so much frustration. Providing people with such information is one of the first steps in providing them with some control over their problem. You can probably learn to sleep better, but you need to know what to do and why you are doing it.

What Happens to the Brain When You Sleep

It is a common misconception that sleep is a 'passive' event. In fact, your body and mind are hard at work when you sleep. Consider the phenomena of dreaming which occurs mostly during REM sleep. 'REM' stands for Rapid Eye Movements which describes the activity of your eyes during this stage of sleep. REM sleep is only one stage of sleep, however. There are in fact five stages to human sleep. The other four stages are simply referred to as stages 1 to 4.¹ These are collectively referred to as the "non-REM" stages of sleep.

Sleep stages are numbered to indicate progressively 'deeper' sleep; that is, stage 1 is the lightest form of sleep while stage 4 is the deepest. Stages 1 can be thought as "light sleep" since a person in this stage can be awakened more easily than during slow-wave or REM sleep. Stages 3 and 4 sleep are referred to as 'slow-wave', or 'delta' sleep which is the technical name for the slow, low frequency brain waves observed on someone's EEG during these stages. During slow-wave sleep, a person is quite still and breathing very slowly. It is very difficult to wake someone up from slow-wave sleep. If you have ever tried to wake someone up and found it took a lot of poking and shaking, the person was probably in stage 3 or 4 sleep. Throughout the program, we will make several references to slow-wave sleep given its importance to the sleep continuum. We will discuss, for example, ways in which you might be able to increase your night-time slow-wave sleep.

Now you know that the process of sleeping is not as simple as being awake or asleep. There are in fact several stages to sleep and these stages differ in terms of their depth. You might now wonder how your body organizes all these different sleep stages. It is actually not that complicated. Your body cycles through the five stages of sleep on an interval of approximately 90 minutes. You can use the occurrence of REM sleep as a marker for this cycle. Thus, every 90 minutes or so, you enter the REM or dreaming stage of sleep.

The most important thing to remember about the sleep cycle is that throughout the night, a person actually reaches a waking state several times. That is, it is quite normal for someone to experience awakenings during the night. In fact, the average adult awakens between 15 to 20 times during the night. Most of these awakenings last a very short time, less than 15 seconds in most cases. People generally don't remember awakening during the night unless they open their eyes, wake up from a bad dream or get up to go to the bathroom.

There is much more about the biology of sleep that we could have discussed, but most of it is not essential to this program. What is critical, however, is that you are familiar with the terms *slow-wave sleep*, *awakening*, and *sleep cycle* because they will become important in subsequent chapters.

Why Do We Need to Sleep?

We spend almost one third of our lives sleeping, so it is no wonder that quality sleep is an important part of our lives. No doubt everyone is aware that sleep is hardly a voluntary process. Although we may have some control in prolonging the onset of sleep (e.g., staying up late to watch a good movie), one way or the other, we eventually need to sleep. Thus, it could be said that we have an inborn need to sleep.

People differ in the amount of sleep they require to function adequately. Although the average for healthy adults

¹ Dreaming can also occur during the other sleep stages, but most people associate REM sleep with dreaming.

is about 7 to 8 hours per night, the range of sleep time that people find refreshing is between 4 to 12 hours per night. Thus, the notions of 'oversleeping' or not getting enough sleep are highly personal. For example, a person who habitually sleeps 5 hours per night and then sleeps 8 hours on one particular night may actually feel that he or she has overslept.

The precise function of sleep is not yet fully understood but many ideas have been proposed. The theory of sleep which has received the most attention and scientific support is the notion of sleep as a *restorative* process for the body. In essence, it is proposed that during sleep we recover the physical and mental energy expelled during the day. This theory is supported by a great deal of research. For example, it is known that in children, the body grows more during sleep. Furthermore, exercise and physical activity are known to affect sleep. Research has shown that people who get little exercise have lighter sleep than people who exercise regularly. However, it is not necessary to do strenuous exercise to make an impact on your sleep. Even mild forms of exercise and physical activity can result in your having more slow-wave sleep. A good example of mild exercise is walking. The benefits of physical activity on sleep will be discussed in more detail in a later chapter.

It is important to know that slow-wave sleep appears to be the most critical part of the sleep continuum as far as sleep's restorative properties are concerned. This is known from sleep deprivation studies in which volunteers over a number of nights are deprived of all or part of their sleep. On subsequent nights when they are allowed to sleep as much as they want, they spend more time in slow-wave and REM sleep than usual. Because of this, it is felt that slow-wave and REM sleep are the most important stages of sleep.

In summary, we know that sleep is very important for our lives. Sleep seems to serve primarily as a restorative mechanism for our bodies and minds. That is, we need to sleep to "recharge our batteries." When we do not get enough sleep on one night, our bodies try to recover some of that sleep on the next night. Slow-wave sleep shows the most recovery on such nights. For this reason, scientists believe it is the most restful of all the sleep stages.

Sleep and Chronic Pain

Now that you have a basic understanding of the sleeping process, we can turn our attention to what we currently know about chronic pain and sleep problems. Keep in mind, research on this topic is only just beginning and new findings are bound to surface in the future.

One thing you should know is that you are not alone with your sleep problem. Insomnia is a very common complaint; in fact, about 10% of North American adults report having serious insomnia. Among people with medical disorders, the rate is even higher: about 40 to 60%. Furthermore, people with pain problems seem to be particularly at risk. A national survey conducted in Canada found that 44% of adults who reported some kind of painful medical condition also reported serious sleep disturbances. Over 60% of chronic pain patients who come to The Rehabilitation Centre report severe insomnia. This shows that sleep problems are very common among people with chronic pain. On the other hand, it also shows that not everyone with chronic pain has a sleep problem.

People with chronic pain tend to report three main sleeping problems: (1) it takes them a long time to get to sleep initially (i.e., they experience delayed sleep onset); (2) they have many awakenings during the night, and; (3) they have poor quality sleep. Our own research indicates that people with chronic pain report taking about 60 minutes on average, to get to sleep and have about 3-4 awakenings per night that they can clearly remember. Most people with chronic pain report only being able to sleep about 4-6 hours per night although they stay in bed anywhere between 8 to 12 hours. Because of this, the typical sleep efficiency ratio for people with chronic pain is quite low (65 to 75%) compared with healthy sleepers.

If you recall our discussion of awakenings, even people with no particular sleep problems will actually reach a waking state a number of times during the night. That is, it is perfectly normal to awaken in the middle of sleep. The difference, of course, is that a person with chronic pain wakes up feeling discomforting pain. Thus, while a healthy sleeper can usually fall back asleep again with ease, for people with chronic pain it is a bigger challenge. They may have to go through the cycle of finding a comfortable position again. In essence, it may be like trying to fall asleep for the first time.

People with chronic pain have more awakenings than healthy sleepers. That is, while a person without chronic pain may have 1 to 2 awakenings during the night that they can remember, a person with chronic pain can remember waking up 4 to 6 times. The exact number is variable and depends on the individual. However, frequent awakenings can lead a person with chronic pain to feel as though their sleep is fragmented and unrefreshing.

The reason for these numerous awakenings is unclear. We do know, however, that people with chronic pain spend less time in deep (slow-wave) sleep and more time in the lighter sleep stages (stages 1-2) than people without pain. Thus, the periods in-between awakenings are spent in a lighter sleep that is easier to be awakened from. It could be, then, that people with chronic pain are generally more easily aroused and therefore more susceptible to being awakened by external influences (e.g., noise, room environment, bodily sensations).

There are a number of factors which could explain why persons with chronic pain have lighter sleep than normal. Furthermore, a number of the drugs commonly taken by people with chronic pain act to suppress slow-wave sleep. These drugs include aspirin, most sleeping pills, and some antidepressants.

Things That Affect the Quality of Your Sleep

There are many things that can influence the amount and quality of your sleep. Many of these things, such as sleep routine, medications, exercise and diet, you have control over and we will discuss them in more detail in the next few chapters.

Your age can affect your sleep. It is a well known fact that for most people the amount of sleep required each night generally decreases as they get older. This is usually a gradual process, so gradual that many people don't notice it until they reach their 30's. Between the ages of thirty and sixty, most people start to notice that they have more awakenings and that they are getting less sleep. Moreover, it is more difficult to sleep straight through the night. This is because as you get older the amount of time you spend in slow-wave and REM sleep decreases while the time spent in the lighter sleep stages increases. For some people, these changes can also result in a decline in their sleep quality and they may feel that their sleep is no longer as refreshing to them. On the other hand, there are lots of people in their 60's and 70's who experience no problems with their sleep quality, thus illustrating again the highly variable and individual nature of sleep.

Another factor that affects sleep is depression. Depression is a common and understandable reaction to chronic pain. Many people with chronic pain experience quite severe episodes of depression. Depression will generally make someone with chronic pain have even worse sleep. For example, depression may cause more mid-sleep awakenings and early morning awakenings. Since depression alone can cause sleep disturbances, it is sometimes difficult to distinguish whether a patient's sleeping problems are due more to chronic pain or to depression. This is why we prefer that no one start this program if they are experiencing serious depression. We want to make sure we are treating the right problem.

Finally, it is known that many lifestyle and behavioural factors can affect the amount and quality of restful sleep you get. It was mentioned, for example, that physical activity is known to increase slow-wave sleep. Furthermore, when someone with chronic pain begins to have sleep disturbances, they can develop many bad sleep habits. They may keep an irregular sleep schedule, get into the habit of napping during the day, spend longer periods of time in bed trying to sleep, or any combination of these. People with chronic pain can get into the habit of organizing their lives around their bedroom and sleeping. They may read and watch TV in bed, and use their bed to relax during the day. Many people do these things in an attempt to cope with sleep loss, but ultimately it ends up being self-defeating because such a pattern of behaviour only serves to maintain a sleep problem. In the next chapter, we will begin to discuss ways in which you change your sleep habits to regulate your sleep pattern to achieve more a restful night's sleep.

WHAT CAN YOU DO ABOUT YOUR SLEEP PROBLEM?

Now it is time for you learn some specific techniques you can use to make your sleep better. Keep in mind, we will be discussing a number of different strategies for coping with sleep disturbances, some of which will work well for some people and some of which will work for others. Therefore, don't get discouraged if you try a particular technique and find it does not work with complete success. It is important, however, that you at least try all of them. You will eventually find the combination of techniques that works best for you.

SLEEP MORE, WORRY LESS: SLEEP RESTRICTION PROCEDURES

Also remember that these procedures are meant to be applied gradually over a period of one to three weeks. Don't try them all at once! It may become overwhelming and confusing for you. You don't want to get completely frustrated and give up on the treatment prematurely. We'll give you suggestions on how to apply these procedures gradually.

Because of the pervasive nature of sleep disturbances, it is not uncommon for people to develop various bad sleep habits. Check off if you currently engage in any of the following behaviours on a regular basis:

- Keep an irregular sleep schedule (i.e., get up or go to bed at different times every day)
- Nap during the afternoon
- Spend a lot of time in bed at night not sleeping
- Use the bed to relax or rest during the day as a means of coping with pain
- Use the bed or bedroom for activities other than sleep or sex (e.g., watch TV, read, eat, etc.)

If you have checked any of these, then without realizing it, you may be contributing to your sleep disturbances. Most people engage in these activities as a means of coping with sleep loss. For example, if you have a bad night you may feel it necessary to nap the next day to cope with the fatigue. However, in the long run this habit only serves to maintain your sleep problem. You can see how easy it is for a vicious cycle of bad sleep habits and poor sleep can develop.

The objective of this portion of the program is to limit these and other problematic sleep activities as much as possible. By doing this, you are attempting to *break* the vicious cycle. Of course, this isn't a cure for your sleep disturbances but rather a well-established technique to short-circuit the vicious cycle and stabilize your sleep pattern.

Over the next three weeks we will introduce you to the following coping strategies for attaining better sleep:

1. Sleep restriction
2. Stimulus control
3. Imagery relaxation training

All of these techniques have been well-researched and found to be effective with people suffering from similar chronic sleep problems. These techniques are not meant to cure your sleep problems, but rather correct some of the factors that may be maintaining your insomnia. We'll start with the sleep restriction method.

Introduction

The goal of sleep restriction is to gradually concentrate your sleep into a shorter period of time spent in bed. This will be done by getting you to limit the amount of time you spend in bed, shortening it and bringing it closer to the amount of time you actually spend asleep. Recall from our discussion in the previous chapter the difference between time in bed and time spent sleeping. Recall also that the ratio of time in bed and total sleep time is sleep efficiency. The goal of sleep restriction is to increase your sleep efficiency by decreasing your time in bed.

The rationale behind this procedure derives from the fact that many people with chronic pain spend too much

time in bed at night not sleeping. For example, you may try to compensate for your sleep loss by spending extra time in bed. You may continue your habit of spending 8 hours in bed no matter how much sleep you get. The fact is, there is no need for you to spend time in bed if you are not sleeping. If you can only sleep 5-1/2 hours a night, then spending 9 hours in bed is only making your sleep problems worse. Those extra hours are probably being spent getting frustrated, more anxious and upset, rather than sleeping. Over time, your body comes to recognize that your bed is a place where you stay awake rather than get to sleep.

As a starting point, try the following exercise. Review your Daily Sleep Diary records for the past 2 weeks. Try to find two or more occasions when your time spent sleeping was similar, but your time in bed was very different. Your sleep efficiency ratio must have been higher on the nights you spent less time in bed. Now check your ratings for sleep quality and feeling refreshed on those nights. Did you rate your sleep quality as higher on the nights you spent less time in bed? Even if your sleep quality was the same, you have just made an important realization: **spending more time in bed doesn't make you sleep better**. Most people with insomnia try to cope with their inability to get enough sleep by spending more time in bed in hope of recovering the lost sleep. Ironically, this is the worst thing you can do since it only strengthens the negative association of the bed with lying awake. Even if you do recover some sleep, it will be fragmented, light and ultimately unsatisfying. Research has shown that a shorter period of uninterrupted sleep is more refreshing than the same amount of sleep spread over a longer period in bed. Think of what you do with those hours spent in bed not sleeping!

Step-by-Step Procedure

Before beginning this procedure, you should have a good understanding of the sleep measures **time in bed**, **total sleep time**, and **sleep efficiency**. You should know how to calculate each of these measures for your own sleep. If you don't, go back to Chapter 1 and review the material on these measures.

Step 1: Look at your progress chart and calculate your average sleep efficiency for the past week. (i.e., add the sleep efficiency values for the past 7 days and divide by 7; the average should be a value that makes sense—if it is out of proportion, greater than 100% for example, you have made a error in calculation). This value is your present sleep efficiency. The object of the sleep restriction procedure will be to increase this value to your target goal value (e.g., > 85% sleep efficiency).

NOTE: IF YOU CALCULATE YOUR AVERAGE SLEEP EFFICIENCY TO BE GREATER THAN 90% THEN STOP! YOU DON'T HAVE TO CONTINUE WITH THIS PROCEDURE

Step 2: Again, from your progress chart, calculate your average nightly total sleep time (TST). This will be your "sleep window" (i.e., amount of time from bedtime to arising).

Step 3: Starting with tonight, restrict the amount of time you spend in bed (TIB) to the value for your sleep window. It is best to do this by going to bed later at night rather than getting up earlier in the morning. When you are trying to improve your sleep, you should try to maintain a regular arising time each morning.

Note: Never go below 4 hours for your sleep window; if your average nightly total sleep time is less than this amount, then use 4 hours as your starting sleep window.

Step 4: Increase the amount of time you spend in bed by 15 minute intervals every week. Continue to complete your sleep diary. Keep increasing the amount of time in bed until your sleep efficiency is somewhere between 85% and 90%. Maintain this final night's pattern. Be sure to keep on charting your sleep efficiency on your progress chart.

Step 5: It is important that you do not nap during the day. You may feel like you are not getting enough sleep during the first week of this procedure but you should not try to compensate by napping since this will interfere with the sleep restriction process.

Case Example:

Steps 1 & 2: For the past week, Mary spent on average 5-1/2 hours sleeping out of 8 hours spent lying in bed each night. Her average sleep efficiency for the past 7 days was 65%. She wants to increase this to 85%.

Step 3: Starting on Monday, Mary decreased her time spent in bed to 5-1/2 hours. She did this by going to bed 2-1/2 hours later at night.

Step 4: Every week she increased her time in bed by 15 minutes. She did this by going to bed 15 minutes earlier every week. She was able to maintain this schedule for the next 5 weeks until she reached her goal of having 85% sleep efficiency.

Step 5: Although she found it difficult, Mary avoided napping. Whenever she felt the urge to nap, she left the house and went for a walk.

Summary:

Week 1	time in bed = 5 1/2 hours total sleep time = 5 1/2 hours	} sleep efficiency = 100%
Week 2	time in bed = 5 3/4 hours total sleep time = 5 1/2 hours	} sleep efficiency = 96%
Week 3	time in bed = 6 hours total sleep time = 5 1/2 hours	} sleep efficiency = 92%
Week 4	time in bed = 6 1/4 hours total sleep time = 5 1/2 hours	} sleep efficiency = 88%
Week 5	time in bed = 6 1/2 hours total sleep time = 5 1/2 hours	} sleep efficiency = 85%

Table 2.1

Sleep Restriction Worksheet

Determine your sleep window:

What was the average number of hours you spent sleeping each night for the past 7 days? _____ hours. This is your sleep window.

Week 1	time in bed = _____ (sleep window)*	total sleep time = _____	} sleep efficiency = <u>100%</u>
Week 2	time in bed = _____ (sleep window + 15 mins)	total sleep time = _____	} sleep efficiency = _____
Week 3	time in bed = _____ (sleep window + 30 mins)	total sleep time = _____	} sleep efficiency = _____
Week 4	time in bed = _____ (sleep window + 45 mins)	total sleep time = _____	} sleep efficiency = _____
Week 5	time in bed = _____ (sleep window + 60 mins)	total sleep time = _____	} sleep efficiency = _____
Week 6	time in bed = _____ (sleep window + 75 mins)	total sleep time = _____	} sleep efficiency = _____
Week 7	time in bed = _____ (sleep window + 90 mins)	total sleep time = _____	} sleep efficiency = _____

* For the first week, your time in bed will be equal to your sleep window making your sleep efficiency ratio 100%.

Tips for Applying Sleep Restriction Procedure

1. Use the steps as guidelines but use your own judgement as to how much you increase your time in bed each week (e.g., 15, 30, or 45 minutes). Don't use increments of less than 15 minutes since it will be too difficult to monitor your progress.
2. Similarly, follow a schedule of gradual increases that you are comfortable with. For example, if a one-week step is to quick, increase your time in bed every two weeks. Don't rush!
3. Don't reduce your time in bed to anything less than 4 hours no matter how poor your sleep efficiency is. If you are only sleeping 2 to 3 hours per night in total, you should try some of the other procedures in this manual first to increase your total sleep time. When you are sleeping at least 4 hours each night, you can attempt sleep restriction.
4. As mentioned above, you should avoid altering your arising time in the morning. Decrease your time in bed by going to bed later. If you are now in the habit of arising at 6:00 a.m. every morning, stick to that. You may find that applying sleep restriction will force you to alter your regular arising time. For example, if you are in the habit of waking up at 4:00 a.m. and lying in bed until 6:00 a.m. before arising, then by all means get out of bed earlier. Use 4:00 a.m. as your arising time if you have to.
5. Initially, your sleep may seem worse. Or, it may seem as though you are fighting sleepiness in order to comply with your sleep window. Don't let this discourage you, however. Keep in mind that it takes several weeks for you to adjust to the new sleep schedule. Just remember that a little short-term discomfort now is a small price to pay for long-term satisfaction.
6. Another common reaction to sleep restriction during the first couple of weeks is that you may feel sleepy during the day. However, you should avoid napping during the day. This will disrupt the sleep rhythm you are trying to develop with the procedure and lessen its benefits.
7. Lastly, if you find the sleep restriction procedures too complicated to apply, you can use a simpler 'rule-of-thumb' approach:

ABBREVIATED SLEEP RESTRICTION PROCEDURE

In general, your time in bed should never exceed your total sleeping time by more than one hour (this includes the time it takes you to fall asleep, awakenings, and time spent in bed after awakening in the morning). For example, if your are sleeping an average of 5 hours per night, then you should

How Does Sleep Restriction Work?

One of the reasons why this procedure works well is that it actually concentrates your sleep into a shorter time period in bed. Although you are sleeping about the same amount of time, your sleep will be more efficient, less fragmented, and ultimately more refreshing. When you get up in the morning and recall the night's sleep, you will remember sleeping most of the time while in bed. You won't remember that long period when you lay in bed trying to get to sleep.

To illustrate the benefits of having 'concentrated' sleep, consider the following. Have you ever had a really refreshing short nap? That is, a time you were very tired, lay down for an hour, and slept the whole one hour through? You probably woke up feeling a little tired, but generally feeling refreshed. The reason is that you just had a 'concentrated' sleep session. It probably didn't take you long to fall asleep and you probably didn't wake up much. Well, ideally you would like your night-time sleep to resemble this 'concentrated' short nap (except longer of course!). We will discuss naps and their advantages and disadvantages later in the program.

Another reason why sleep restriction works is that, initially, you are subjecting your body to a state of sleep deprivation. This results in a number of effects the next time you try to sleep: you fall asleep sooner, have fewer awakenings, and spend more time in deep sleep. Of course, this will only occur if you keep from napping during the day (we'll talk more about napping in the next chapter).

Chapter 3

In this chapter you will:

- ◆ Review your progress using sleep restriction procedures
- ◆ Learn stimulus control procedures as a means of re-establishing a positive association between your bed and sleeping

Goal for the chapter:

- 1) Master the technique of stimulus control
-

Review Your Progress with Sleep Restriction

By this time, you will be into your second week of sleep restriction. Many people find this time very hard. You may be finding it difficult to stick to the sleep restriction rules. You may feel more sleepy during the day than before you started. Understand that these are all natural reactions to using sleep restriction; changing old habits is hard. However, always remember that a little inconvenience now is a small hardship for long-lasting improvement in your sleep. Think about this procedure on a weekly basis and don't worry about whether the inconvenience will last forever because it won't.

As an incentive, take a look at your progress chart for the past week. Your sleep efficiency should be at or very close to 100% for every night during the first week you started sleep restriction. Your sleep onset latency will probably shorten for most nights as well since you are probably falling asleep soon after you allow yourself to go to bed. The daytime sleepiness you may be experiencing will gradually go away as you start to increase your time in bed and get a set routine. The next set of procedures will help you to stick with sleep restriction.

STIMULUS CONTROL PROCEDURES: CHANGING SLEEP HABITS FOR THE BETTER

Introduction to Stimulus Control

Stimulus control was developed by Dr. Richard Bootzin in 1972 and is now one of the most accepted treatments for insomnia. Although it can be used alone, stimulus control works best in conjunction with sleep restriction.

Stimulus control procedures have one primary objective: to re-establish and strengthen the association between sleeping and your bed. Many of the habits people with chronic pain can get into are incompatible with maintaining a regular and satisfying sleep routine. We reviewed some of these at the beginning of the last chapter (napping in the afternoon, using the bed for things other than sleep or sex, etc.). For people with chronic sleep problems, the bed and bedroom are often associated with activities other than sleeping. The goal of stimulus control is to get you to phase out as many of these activities as possible. Since this may be difficult to do at first, we will provide you with tips and alternative activities to help you achieve your goal.

When reading, please don't feel as though any of your present habits or lifestyle choices are being judged. As well, don't feel as though you are just being told what to do without thinking about it. It is important that you explore these procedures on your own and test how well they work for you and why. We know, for example, that simply watching TV in bed is not enough to cause or even sustain long-term sleep disturbances. There are lots of people who can regularly watch TV, or nap during the day and still have satisfying sleep at night. Research shows, however, that most people with chronic insomnia tend to engage in many of these behaviours on a consistent basis. Furthermore, the fact that stimulus control works so well to improve sleep suggests that these behaviours are partially responsible for the poor sleep quality in some individuals.

It doesn't matter how your current sleep routine developed; all that matters now is that you are committed to changing it in an effort to achieve more satisfying sleep.

Step-by-Step Instructions for Stimulus Control Procedures

Unlike sleep restriction, the application of stimulus control is not guided by a formula. Rather, it is a set of guidelines and instructions on how to break certain habits which may work against good sleep, while at the same time reinforcing other sleep-friendly behaviours. One of the goals is to re-establish and strengthen the association between your bed and sleeping. Table 4.2 summarizes the stimulus control procedures. We will go through each of these procedures in detail one at a time:

Step 1: Do not use the bed or bedroom for any activity other than sleep and sex. The reason for this rule is to get you to associate your bedroom with sleeping. Adhering to this rule will help you to break the negative association between your bed and not sleeping, and reduce the feelings of frustration, anxiety, and of helplessness that may have plagued you. In essence, your goal is to make your bed a friend rather than an enemy.

Tips. Another way to look at this rule is to think in terms of developing positive sleep *habits*. Most of the habits people have are formed by strong associations developing between a specific environment and a set of behaviours. For example, have you ever walked into the kitchen and suddenly felt hungry? The feeling gets even stronger when you open the refrigerator door! So, what is your response to this feeling? Probably you make yourself something to eat. This is because going to the kitchen and getting something to eat is a habit for most people. Being in the kitchen environment brings on feelings of hunger and serves as the cue or *stimulus* for a set of behaviours to occur (i.e., making something to eat).

Think of this example as a model for what you want to achieve with the stimulus control procedure. For people who sleep well, their bed acts as a cue to feel sleepy and fall asleep quickly (think of those people who tell you that they fall asleep as soon as their head hits the pillow). So, your goal is to see if you can reach the point where you walk into your bedroom and feel sleepy. The way to do this is to

not do anything else in your bedroom other than sleep.² Following the next rule will also aid in this.

Step 2: Establish a set of presleep routines to signal the onset of sleep - Your goal with this procedure is to develop a ritual set of behaviours that for you clearly separates day and night. Thus, reserve a set of activities to do only before going to bed. Perform these activities every night until they become a routine. Ensure that none of the activities in your presleep routine is contrary to inducing sleep. Examples of such counter-sleep activities would be: (a) having a cup of coffee or tea; (b) reading stressful or stimulating material; (c) exercising in any way. Examples of good pre-sleep activities would be: (a) taking a warm bath; (b) laying out clothes to wear for next day (or any other activity which makes it easier for you to get up in the morning); (c) practicing relaxation techniques (to be discussed in more detail in next chapter); (d) drinking warm milk; (e) reading a fiction novel.

Tips. Ideally, your presleep routine should consist of mostly sleep-friendly or neutral activities. If your routine consists mostly of neutral behaviours, consider incorporating a few relaxing activities. This can be something as simple as reading a good book, or taking a bath. Try to make the one hour period before going to bed a time to wind down. In other words, consider activities that will clear any anxious thoughts out of your mind and will gradually put your body into a state of relaxation.

Step 3: Go to bed only when you are sleepy- There is no reason to go to bed if you are not tired enough to fall asleep. Getting into bed prematurely will only prolong the time you will spend lying in bed awake, getting frustrated. Going to bed early only gives you more time to worry about tomorrow's events, think about unpleasant memories, and ruminate over your sleep problem. All of these strengthen the association between your bedroom and not sleeping when your goal is the opposite.

Tips. If you are having difficulty judging how sleepy you are, you can use the following scale.

1	2	3	4	5	6	7
"feeling active and vital; alert; wide awake"	"functioning at a high level, but not at peak"	"relaxed; awake; not at full alertness; responsive"	"a little foggy; not at peak; let down"	"fogginess; beginning to lose interest in being awake; slowed down"	"sleepiness; prefer to be lying down; fighting sleep; woozy"	"sleep onset soon; lost struggle to remain awake"

This is the *Stanford Sleepiness Scale*. You can use it to gauge how sleepy you feel when you are thinking of going to bed. Using the various descriptions at each scale point, find the number that matches how sleepy you are. Generally, you should not think of going to bed unless you are at level 6 or 7 on the scale.

Step 4: Get out of bed if you can't get to sleep within a reasonable time period - You may ask what is a reasonable time period? Some sleep specialists will say 10 to 15 minutes is long enough to wait. Others will say 20 to 30 minutes. The fact is that it depends on the individual and what is normal for you. You may choose to use the normal time it took you to fall asleep before your pain began—assuming this was a satisfying amount of time—to guide you in applying this rule. However, this may be unrealistic. Instead, we suggest you use your personal goal for sleep onset latency. That is, if you indicated on your goal-setting form that your desired time to fall asleep is 25 minutes, then every time it takes you more than this time to fall asleep you should get out of bed.

Tips. It is important that you do not watch the clock every minute when applying this rule. This will

² Obviously, this becomes somewhat difficult if you live in a one-room apartment. In this case, you will have to use your imagination and ingenuity to come up with some alternatives. Here are some suggestions, however:

- 1) Concentrate your bedroom furniture to one corner or space in the room and don't use that area except at night when you want to go to sleep.
- 2) If you use your bed to read or watch TV, DON'T!. Turn the TV away from the bed. The investment of a comfortable reading chair will be money well spent if it results in your sleeping better in the long-run.
- 3) Get a divider to physically separate your bed from the rest of the room.
- 4) Trade in your bed for a fold-up futon that can also be used as a couch. Don't get a sofa-bed, however, as most are extremely uncomfortable.

only serve to draw your attention to your sleeplessness causing you to be more aroused. You should be able to tell in your mind when your personal time criterion has elapsed. If you find yourself watching the clock, then this is probably a sign that you are not tired enough to sleep yet.

Another way to approach this is to think of the process of falling asleep as a continuum rather than an all-or-none event. Falling asleep is like travelling down the slope of a hill—the further down you go, the harder it is for you to get back to the top. After 15 minutes have passed, ask yourself: "Am I more sleepy now than I was 15 minutes ago?" If the answer is no, then get out of bed.

When you get out of bed you should get out of your bedroom altogether to remove yourself from all associations of sleeplessness. Engage in some non-stimulating activity while up (for a list of suggestions, see Table 3.2). However, do not lie on the couch. Many people find that they can't get to sleep in their bed but when they lie down on the couch they can fall asleep within 10 minutes. What does this mean? Obviously, their bed and bedroom have become associated with the inability to sleep. The couch, on the other hand, starting out as a neutral object, has now become associated with sleeping. You may argue that since getting to sleep is the goal, sleeping on the couch should be all right. Unfortunately, doing it repeatedly will only reinforce the sleep-inhibiting quality of your bedroom and turn your otherwise neutral couch into a positive sleep-promoting object. So, unless you want to spend the rest of your life sleeping on the couch at night, it's probably best to avoid this activity as much as possible.

Go back to bed only when you start to feel sleepy. Think of the mountain slope example again and the strategy of asking yourself: "Am I more sleepy now than I was 10 minutes ago?"

Step 5: Repeat the above procedure throughout the night every time you can't get to sleep within a reasonable time period - Following this rule is especially important for people with chronic pain since waking up from sleep is their most commonly reported problem. This is also one of the most demanding rules to follow. Admittedly, getting out of your warm comfortable bed is difficult to do at 3:00 a.m.. However, just remember that there's no point to lying in bed if you are not sleeping.

Tips. To make it easier to get out of bed, try the following tricks: (1) Leave a warm bathrobe and pair of slippers at the foot of your bed so that exposing yourself to the cold room air will not be a deterrent to getting up; (2) plan to have your non-stimulating activities ready and available (e.g., put a videotape in the VCR, book on the table, etc.); (3) avoid clock watching to prevent from getting anxious or distressed at the thought of having to get up at an irregular hour.

When you get out of bed, make sure you don't return until a reasonable time has elapsed. As a rule-of-thumb, stay out of bed for at least 25 minutes. Try to follow this rule even if you think you can fall asleep before 25 minutes have elapsed. Don't confuse feeling fatigued with feeling sleepy. Getting out of bed at 3:00 a.m. may leave you feeling run down or sluggish, but this doesn't always translate into feeling sleepy. Also remember that the longer you stay up and prolong sleep, the faster sleep will come when you do get into bed.

Step 6: Get up at the same time every morning - Set your alarm clock for a specific time and get out of bed when it goes off. Do this regardless of how much or little you slept, and on both weekdays and weekends.

The reason for this procedure comes from scientific research showing that most animals, including humans, have an internal biological clock which regulates how much time we spend sleeping and how much time we spend awake for every 24-hour period. This sleep-wake schedule is also called a circadian rhythm ("circadian" is latin for 'about a day'). The sleep-wake circadian rhythm is actually linked to other internal biological rhythms. Body temperature, for example, fluctuates during the 24-hour day, with the lowest value occurring in the early morning when most people are in the deepest sleep stages.

Circadian rhythms take some time to develop but once they do, they are a powerful force in our need to sleep. Unfortunately, the onset of chronic pain can be a sudden and disruptive influence on your circadian rhythm. For example, the presence of pain during awakenings disrupts your normal sleep rhythm. When the individual tries to compensate for a poor night's sleep with bedrest and napping, the sleep rhythm is disrupted even more. You can see how a vicious cycle of disrupted sleep, fatigue, napping, and increased pain, can develop.

To help your circadian sleep rhythm return to a more regular cycle, it is important to minimize the number of disruptions. Maintaining a regular rising time is one important step towards doing this. Another way to think of this is to imagine that a regular wake-up time is an *anchor* which your otherwise irregular sleep rhythm can hold on to:

Tips. This can be another challenging rule to follow, particularly if you are currently off work and don't have regular daytime activities. However, this makes following this rule even more important because the temptation to stay in bed is greater when you have no job or other activity which takes up the normal 'business' day. To overcome the temptation of staying late in bed, you might consider planning a regular activity every morning after you get up at your scheduled time. For example, plan your daily stretching exercises or a morning walk for after you get out of bed. If you do any volunteer work or other out of home activity, arrange it to be in the morning. These are just suggestions and your own schedule and personal interests will determine how you may wish to approach this problem.

Step 7: Avoid daytime napping - The reasoning behind this rule is straightforward: basically, the longer you stay awake during the day, the easier sleep should come at night. Studies have shown that the amount of time people spend awake during the day can predict how long it will take people to fall asleep, and how long they will stay asleep. For example, someone who is active for 15 hours of the day will take less time to fall asleep at night than if they were up for only 10 hours.

In addition to prolonging the onset of sleep, a nap can also rob your night's sleep of precious restorative slow-wave sleep. This is because when you nap, especially in the afternoon, your sleep resembles the first part of the sleep cycle which is highly concentrated in slow-wave sleep activity. Your body can only produce so much slow-wave sleep every 24-hour period and using it up in an afternoon nap means less deep sleep at night.

If you must nap, consider doing it in the morning. A morning nap is more of a continuation of the previous night's sleep and therefore it is less likely to interfere with the coming night. On the other hand, having an afternoon nap is like starting your sleep period early. Napping and then waking up only serves to fragment your night's sleep, when you want to strive for concentrating your sleep into a continuous nighttime period.

Tips. Avoiding daytime napping is another hard procedure to follow for many people with chronic pain, especially in the early part of the program. They report that as the day wears on, their pain and fatigue increase with activity, making a nap in the afternoon seem necessary. However, there are strategies, such as pacing (e.g., spreading out activities into manageable chunks), that can be used to prevent a build-up of pain and fatigue caused by too much activity at one time.

Another strategy is to find alternative activities to napping. For example, when you feel the urge to nap, go for a walk. Always choose an activity that takes you out of the house. Being in the house close to your bedroom or the couch may be too great a temptation.

The napping rule should be applied with a little common sense. For example, an occasional nap is not harmful, but regular napping will be counter-productive to your progress in the program. Furthermore, you should never drive a motor vehicle or operate hazardous equipment if you are feeling tired; in such cases, by all means take a nap!

TABLE 3.1

EIGHT STEPS TO TAKE CONTROL OF YOUR SLEEP PROBLEMS

-
- (1) **Go to bed only when you are sleepy**
- Why? There is no reason to go to bed if you are not tired. Going to bed when you are not sleepy only prolongs the time you will spend in bed trying to get to sleep.*
- (2) **Establish a set of regular presleep routines to signal that bedtime approaches. Do these activities in the same order every night. Allow yourself at least an hour before bedtime to unwind.**
- Why? Establish a pattern to make every day seem more the same. Make going to bed a habit. Eventually, you will associate your presleep routine with feeling sleepy.*
- (4) **When you get into bed, turn out the lights with the intention of going right to sleep. If you cannot fall asleep within a reasonable time (about 20 minutes), get up and go into another room; engage in some quiet, non-stimulating, activity until you begin to feel ready to sleep.**
- Why? To break the vicious cycle of trying to get to sleep with no success. The frustration and anxiety over not getting to sleep leads you to be ever more aroused, making sleep even less likely. Breaking the cycle will reduce this frustration and make sleep come easier.*
- (5) **If you still do not fall asleep within a brief time, repeat the previous step. Repeat this process as often as it is necessary throughout the night. Use this same procedure if you awaken in the middle of the night and do not return to sleep within about 20 minutes.**
- Why? Same as above.*
- (6) **Do not use your bed or bedroom for anything other than sleep and sex.**
- Why? To build up the association between your bedroom and sleeping.*
- (7) **Get up at the same time in the morning regardless of how much you slept.**
- Why? To establish a strong and regular sleep and waking schedule*
- (8) **Avoid daytime napping, especially after 3:00 p.m.**
- Why? Reserve your sleeping for nighttime only. Sleeping in the afternoon is like starting your nighttime sleep period early; doing so will result in your nighttime sleep being shorter and more fragmented.*
-

Table 3.2

The Ten Most Boring Things to Do While Awake*

(1)	<p>Reading - Ten Boring Classics:</p> <ol style="list-style-type: none"> 1. <i>Pilgram's Progress</i>, by John Bunyan 2. <i>Moby Dick</i>, By Herman Melville 3. <i>Paradise Lost</i>, John Milton 4. <i>The Faerie Queene</i>, by Edmund Spenser 5. <i>Life of Samuel Johnson</i>, by James Boswell 	<ol style="list-style-type: none"> 6. <i>Pamela</i>, by Samuel Richardson 7. <i>War and Peace</i>, by Leo Tolstoy 8. <i>Ivanhoe</i>, by Sir Walter Scott 9. <i>Don Quixote</i>, by Miguel de Cervantes 10. <i>Faust</i>, by J. W. von Goethe
(2)	<p>Viewing - Ten Boring Movies:</p> <ol style="list-style-type: none"> 1. The Appaloosa 2. Changes 3. Endless Love 4. Executive Action 5. The Island 	<ol style="list-style-type: none"> 6. Quintet 7. A Separate Peace 8. Superman III 9. Howard's End 10. Day of the Dolphin
(3)	Collect, cut and organize coupons	
(4)	Organize your recipe box	
(5)	Remove your name from junk mail lists	
(6)	Organize your address book	
(7)	Update your photo albums	
(8)	Take a warm bath. Luxuriate in it.	
(9)	Listen to soothing music	
(10)	Make your own list of boring things to do	

* Reproduced from *Getting to Sleep* by E. M. Catalano (1990).

More Tips for Applying Stimulus Control Procedures

1. The eight stimulus control rules are summarized in Table 3.1. You can remove this page and display it in a visible place (e.g., fridge door) to serve as a reminder.
2. It is important that you follow most of the rules. Especially important are the rules about getting and staying out of bed when you can't sleep after a reasonable time period. These rules are the heart of stimulus control.
3. When trying to gauge if you are ready to go to bed, don't confuse feeling fatigued with feeling sleepy. Getting out of bed at 3:00 a.m. may leave you feeling run down or sluggish, but this doesn't always translate into feeling sleepy. Remember that sleep is an activity of the mind as much as it is an activity of the body.
4. Choose non-stimulating activities that can be finished easily or stopped after 25 minutes. For example, read a short story, magazine, or do a crossword puzzle. Avoid engaging in activities like playing computer/video games, or watching a suspenseful movie, etc.
5. Elicit the help and support of your spouse or partner. Show them the list of guidelines so that they are aware of what you are doing. Some people feel guilty about getting out of bed when they can't sleep, for fear of waking up their sleeping partner. To alleviate such feelings, make sure your partner is aware of your reasons. Your partner probably finds your tossing and turning to be more disruptive than simply getting in and out of bed once or twice.
6. Avoid clock-watching. Set your alarm for your regular wake-up time but turn the face of the clock away from your bed.
7. Be sure to adjust your pre-bedtime routine to coincide with your practice of sleep restriction. That is, start your pre-bedtime routine in the one hour period prior to your new bedtime according to the sleep restriction schedule you are on.

- 8. Schedule some pleasurable activities in the evening. Try to break the monotony of watching TV after dinner and waiting for your bedtime. Simply passing time until it is time to go to bed just gives you more opportunity to worry about your sleep. Find activities that take you out of your house or apartment. Suggestions are:**
- ▶ Go to a movie on a night you don't normally go
 - ▶ Take in a concert or evening sports event
 - ▶ Go for a walk with your spouse or a friend
 - ▶ Arrange a night with friends to play cards
 - ▶ Eat out in a restaurant

It may take some planning and using your pacing skills to arrange these activities. However, it will be worth the effort if it distracts you from worrying about your sleep problems for 2 or 3 hours.

Chapter 4

In this chapter you will:

- ◆ **Learn about sleep medications and how they work**
- ◆ **Find out the right way to reduce sleep medications**

Goals for the chapter:

- 1) **Develop a personalized program for reducing sleep medications**

SLEEP MEDICATIONS

Many people with chronic pain take medications to help them sleep. There are a variety of medications made specifically for sleep. These medications are called "sedative hypnotics" (hypnotics for short). "Sedative" means that they have a calming or tranquilizing quality, while "hypnotic" means that they promote a change in consciousness toward feeling drowsy. There are many other medications commonly taken by persons with chronic pain that also affect sleep. These include antidepressants, muscle relaxants, and some analgesics. Sometimes these medications are taken more for their sleep-inducing properties than for their original use.

The purpose of this section is to inform you about the effects of sleep medications and some of the risks involved in taking them on a long-term basis. Most of the information in this section will focus on the hypnotics (sleeping pills). However, some discussion will also be devoted to the other medications that affect sleep. Issues related to reducing or eliminating sleep medications will be discussed, along with some guidelines and a sample program for medication withdrawal.

Types of Sleep Medications

Most sleeping pills prescribed today belong to a class of drugs called the "benzodiazepines." There are other sleeping pills that are not benzodiazepines such as the barbiturates and chloral hydrate. These are not used as much as the benzodiazepines because they tend to have more side-effects, and the risk for tolerance is greater. In addition, barbiturates have been known to increase pain.

Commonly prescribed benzodiazepines are flurazepam (Dalmane), nitrazepam (Mogadon), and temazepam (Restoril). These drugs differ primarily in their duration of action. For example, there are short, medium, and long-acting sleeping pills. Medications that are short-acting are mostly broken down by the body before you wake up. In contrast, the active chemicals in long-acting sleeping pills such as Dalmane accumulate with repeated usage. Long-acting medications often lead you to wake up feeling drowsy and confused. One benefit, therefore, of a shorter-acting sleeping pill is that such "hangover" effects are greatly reduced. The medium-acting medication Restoril is considered an all-purpose hypnotic because its duration of action is sufficient to cover the whole sleep period with minimal side-effects.

Because short-acting sleeping pills are mostly used up half-way through the night, they do little to help with awakenings in the latter part of your sleep. A long-acting pill will probably keep you sleeping until morning but at the expense of waking up with a hangover.

There is a new drug on the market called Immovane (zopiclone) which is not a benzodiazepine but is similar in its action and side effects. At present, this drug seems to have fewer side-effects and, thus, may be better for long-term use. Immovane is not as strong as most benzodiazepines. As well, it is a short-acting drug, so it may not help as much with mid-sleep awakenings.

How Do Sleeping Pills Work?

Hypnotic drugs are in the same class as the anti-anxiety medications, such as Valium (diazepam), Xanax (alprazolam), and Ativan (lorazepam). Therefore, one of the ways in which sleeping pills work is to reduce the anxiety of not being able to get to sleep. In some ways, insomnia has a lot in common with anxiety conditions. The stress of worrying about whether or not you will get to sleep makes you aroused and keeps you awake. We know that having a relaxed mind is an important condition for getting to sleep. Taking a sleeping pill is a quick but 'artificial' way of achieving a state of mental relaxation.

Of course, sleeping pills do more than just reduce anxiety. They also cause extreme drowsiness that helps you fall asleep. The medication keeps you in a state of sleep for several hours, so it may increase the number of hours you sleep through the night. However, the sleep that you get is not normal sleep. Most sleeping pills increase the amount of light sleep (stages 1 and 2) you get, while decreasing the amount of deep sleep and REM sleep.³ The end result is that you sleep more and your sleep efficiency increases, but at the expense of losing deep sleep, which is the most restorative for your body. In addition, you may still feel tired the next day. The tiredness is your body's way of saying it didn't get enough slow-wave sleep. If you took a nap, it would probably be highly concentrated sleep with mostly deep

³ An exception to this is the drug Immovane (zopiclone) which does not seem to change the sleep stages (i.e., it does not decrease deep sleep).

sleep.

Long-Term Use of Sleeping Pills

Like many medications, sleeping pills were designed to be used on a short-term basis only—i.e., less than 2 weeks. In fact, there is little research on the long-term use of sleeping pills because even the drug companies don't endorse their long-term use. Nevertheless, many people take sleeping pills for months or even years. They may not use them every night but they rely on them as their only way of coping with insomnia.

There is research to show that sleeping pills are not as effective as a self-management approach in the long-term management of chronic sleep problems. These studies have found that people given sleeping pills improve faster, but the initial benefits wear off over time. People who follow a self-management program (like this one) show a slower improvement that is better maintained over time. In short, the benefits of self-management last longer because people are shown how to improve their sleep *on their own*.

Taking sleeping pills can put your health at risk for other problems. For example, it can be dangerous to combine them with other drugs such as alcohol, muscle relaxants, narcotic analgesics (e.g., Tylenol with codeine), and some antidepressants. Most sleeping pills may also cause you to feel tired and less alert during the daytime. Your ability to function in everyday activities may become impaired. This can put you at risk for accidents. Recent studies indicate that sleeping pills can also cause memory problems; specifically, your ability to remember new information can be impaired.

There is also the risk that you could develop a tolerance to a sleeping pill so that you have to keep increasing the dose to get the same effect. This happens because most sleeping pills lose their potency with repeated usage. The degree of tolerance that develops depends on a number of factors: the specific medication, pattern of usage, and the individual. For example, someone taking flurazepam (Dalmane) every night is more likely to develop tolerance than someone taking it once or twice per week.

Other Medications That Affect Sleep

Some persons with chronic pain take narcotic analgesics to help alleviate their pain. For example, many individuals regularly take narcotic analgesic compounds such as Tylenol #3, which is a combination of acetaminophen and codeine. Codeine causes drowsiness which, at regular dosages, makes it a mild sleep aid. At high dosages, it acts as a powerful sedative. However, Tylenol #3 also contains caffeine, a stimulant, which can impair sleep. Caffeine is also a diuretic which means it may make you have to get up and go to the bathroom in the middle of the night.

Muscle relaxants can cause a certain amount of drowsiness. Taken in large enough quantities, these medications can also act as a powerful sedative. The primary impact on your sleep is that you they help you to fall asleep faster. In most cases, any sleep-enhancing effects wear off in a few hours. As such, they generally do not help with mid-sleep awakenings unless you take much higher-than-recommended dosages. However, any gains in sleep would be offset by the increase in side-effects and risk to your health.

Tricyclic antidepressants are taken by many persons with chronic pain because they seem to reduce pain as well as enhance sleep. Common tricyclic antidepressants include amitriptyline (Elavil), doxepin (Sinequan), imipramine (Tofranil), and clomipramine (Anafranil). These medications need to be taken as bedtime to help with an insomnia problem. The most common side-effects of the tricyclic antidepressants include dry mouth, daytime drowsiness, and weight gain. Rarer side-effects include hypotension (low blood pressure), blurred vision, constipation, and nightmares. Overall, the side-effects seem to be tolerated well by most persons with chronic pain making the tricyclic antidepressants safer for long-term use than the benzodiazepines. Even so, many people find that when their confidence increases in using a self-management approach to handle their sleep problems, they can gradually wean themselves off all medications.

Table 4.1

Drawbacks and Health Risks Associated with Taking Sleep Medications¹

-
- * "Hangover" effects the next day
 - * Increase stage 2 (light) sleep at the expense of decreased slow-wave (restorative) sleep
 - * Impairs daytime functioning (sedation, reduced alertness and attention span, reaction time decreased) increasing your risk for accidents and injuries
 - * Increased risks if combined with other depressants such as alcohol
 - * Tolerance builds with prolonged use (after as little as two weeks)
 - * Mild to moderate memory impairment
 - * Rebound insomnia with sudden discontinuation of pills
-

¹ Applies to sedative hypnotic medications, but most also apply to pain medications that affect sleep.

What to Do If You Want to Reduce or Eliminate Your Sleep Medications

There are important considerations if you want to reduce or eliminate your sleep medications:

1. You should **gradually reduce** your use of any sleep medication. You should never stop taking sleep medication suddenly (go 'cold turkey') because this can result in "rebound insomnia" and other withdrawal symptoms. Rebound insomnia is when you experience sleep problems even worse than before you started taking the medication. It happens because your body gets used to taking the sleeping pills so much that when they are removed suddenly, your body doesn't know how to sleep without them.

In addition to rebound insomnia, sudden discontinuation of sleeping pills can make you feel anxious. Some people also experience dizziness, nausea, vomiting, tremors, and cold spells. The severity of withdrawal symptoms depends on the individual person and on the type of medication, the dosage and pattern of usage (e.g., every night or 2-3 times per week).

2. Establish a **personalized** withdrawal schedule with weekly goals. This is best done in collaboration with your physician or pharmacist. You should be careful about changing medications on your own, without their knowledge or advice. The schedule should take into consideration the specific medication, dosage currently being taken, and your pattern of usage.
3. Make sure you are using the strategies in this manual on a regular basis before you cut back on your sleep medication. When you first begin reducing your sleep medications, your sleep may seem to get worse, and you may be tempted to increase your medication again to compensate. However, instead of doing this, try relaxation exercises to help you get to sleep. The important thing is that you have at your disposal other strategies. One of the main reasons why many people continue to take sleep medications is that they don't have any other strategies to help them with their sleep problem.

Step-by-Step Instructions for Designing a Personalized Sleep Medication Withdrawal Schedule

If you take sleep medication only occasionally (less than 3 times per week for example) then there is no need to use a structured withdrawal schedule. Just try to keep from taking the medication the next time you feel the need. You should use the following guidelines if you have been taking a sleep medication more than 3 nights per week for more than 2 weeks.

Important Note: This schedule only applies to sleep medications (benzodiazepines and other hypnotics) and not antidepressant medications, even if you are taking them primarily for sleep.

- Step 1: Determine your usual pattern of usage.** For a 2 week "baseline" period, record on the Daily Sleep Diary the nights that you took medication and the dosage that you take. If you have been keeping these records since you began this program, you can simply review your Daily Sleep Diary forms for the past 3 weeks to determine your pattern of usage. A blank medication withdrawal form is provided in Table 4.2 to record this information.
- Step 2: Stabilize on the lowest nightly dosage of the drug you are taking.** Over a two week period, change your pattern of medication use so that you are taking the lowest available dosage of your medication every night.

For example, if you are taking 30 mg of Dalmane at night 4 nights per week, change this to 15 mg (the lowest available dosage of this medication) 7 nights per week. Notice that you will be taking the drug on nights that you might not feel you need it. This is important.

Step 3: Introduce 1 to 2 drug free nights during the week. Set these nights in advance. For example, make Sunday and Tuesday your drug-free nights no matter how bad your sleep is on those nights.

Step 4: Each successive week, increase the number of drug-free nights. On nights that you continue to take the medication, take it at a preselected time (e.g., 11:00 p.m.). Continue this for several weeks until you are down to taking the medication on only one night. Then, cut this night out as well.

Table 4.3 shows an example withdrawal schedule for the long-acting drug Dalmane (flurazepam). The minimum dosage (i.e., smallest size pill) of Dalmane is 15 mg. Therefore, the stabilization dosage is 15 mg taken every night. Notice that this withdrawal protocol takes 10 weeks to complete. This is not uncommon; it is better to reduce gradually to minimize any withdrawal effects and rebound insomnia.

Table 4.2

Sleep Medication Withdrawal Schedule Form

Sleep medication name: _____

Week	Dosage	No. of Nights	Total amount taken	% Dosage reduction from baseline
Usual pattern of usage				
Week 1	_____ mg		_____ mg	-
Week 2	_____ mg		_____ mg	-
Stabilize on minimum dosage every night				
Week 3	_____ mg		_____ mg	30%
Week 4	_____ mg		_____ mg	30%
Introduce 1-2 drug free nights each week				
Week 5	_____ mg		_____ mg	50%
Week 6	_____ mg		_____ mg	50%
Week 7	_____ mg		_____ mg	60%
Week 8	_____ mg		_____ mg	70%
Week 9	_____ mg		_____ mg	90%
Week 10	_____ mg		_____ mg	100%

Table 4.3

An Example of a Withdrawal Schedule for the Drug Dalmane

Week	Dosage	No. of Nights	Total amount taken	% Dosage reduction from baseline
Usual pattern of usage				
Week 1	30 mg	5	150 mg	-
Week 2	30 mg	4	120 mg	-
Stabilize on minimum dosage every night				
Week 3	15 mg	7	105 mg	30%
Week 4	15 mg	7	105 mg	30%
Introduce 1-2 drug free nights each week				
Week 5	15 mg	5	75 mg	50%
Week 6	15 mg	4	75 mg	50%
Week 7	15 mg	4	60 mg	60%
Week 8	15 mg	3	45 mg	70%
Week 9	15 mg	1	15 mg	90%
Week 10	15 mg	0	0	100%

Chapter 5

In this chapter you will:

- ◆ **Ensure mastery of sleep restriction and stimulus control procedures before proceeding to cognitive skills training**
- ◆ **Be introduced to imagery as a technique for reducing stressful thoughts at bedtime and getting to sleep**

Goals for the chapter:

- 1) **Master the skill of imagery as a relaxation technique**

Introduction

If you have had chronic pain for some time, then you have probably heard about relaxation training. There are many forms of relaxation: progressive muscle relaxation (PMR), autogenics, hypnosis, meditation, to name a few. Imagery relaxation, also known as visualization, is a special form of relaxation therapy which has proven especially helpful for people who have difficulty sleeping. It differs from overall body relaxation methods in that it uses cognitive, or thought-focused, relaxation cues. You may argue that relaxation of the body's muscles is necessary to achieve sleep. This is true; however relaxation of the body is not sufficient for sleep to occur. As you must be aware, you can feel physically fatigued yet still not be able to get to sleep. For example, people with chronic pain often feel tired much of the time but are still unable to get to sleep. This is because it is possible for your body to be relaxed but your mind is still wide awake, and your thoughts are racing a mile a minute keeping you awake.

Imagery works by helping your mind get to sleep along with your body. Your mind controls your thoughts, feelings, as well as necessary bodily functions such as sleeping. Most of the available research now suggests that a state of mental relaxation is necessary for getting to sleep. In short, you have to turn your mind off, or at least put it into a state of relaxation where your thoughts are free of anxiety-provoking images.

Please remember that imagery is not simply daydreaming or fantasizing. It is an active relaxation procedure that happens to involve your mind more than your muscles. With imagery, you take an active role in generating and manipulating your images, unlike daydreaming which is a passive activity. It is a skill that should be practiced.

In this chapter, you will first learn the imagery method of relaxation and then apply the technique specifically to help you get to sleep. You can also use imagery to cope with mid-sleep awakenings. Please note that if you have achieved mastery with another relaxation method such as PMR you should by no means stop using it, especially if you have been successful in using it to help you get to sleep. However, consider trying the imagery technique and then decide for yourself which is the most effective for you.

If you have a bed partner, you might want to explain to him or her what your needs are when trying to practice the skill of imagery. You should stress the importance of having a quiet bedroom environment. If they insist on watching TV or reading in bed, you may have to be assertive and ask them to hold off from these activities or go to another room.

A Few Words of Caution

For the majority of people, practicing imagery is a pleasant and relaxing experience. However, a small number of people may have a negative experience using the technique. In rare cases, for example, the images generated can bring out negative or stressful emotions, or can result in the recalling a traumatic event. You can decrease the likelihood of these experiences happening to you by using the following guidelines:

1. If you start to feel very uncomfortable or anxious when using imagery, stop right away. If this happens on several occasions, stop using the technique altogether. Find another relaxation technique to use before sleeping. Report these experiences to the therapist who supplied you with this manual.
2. When generating your own images involving personal events, always visualize yourself in a place that you feel safe and happy. Try to keep the location somewhere that is current and familiar to you (e.g., recent vacation spot) rather than a place from your distant past.
3. Avoid using childhood memories to generate your images.
4. If you have recurring images of violence or death, stop using the technique. Report these to the therapist who supplied you with this manual.
5. Avoid images with any sexual content.

Preparation – Clearing a Space to Relax

Before doing any relaxation exercise, you should clear a space for yourself. Think of this as your preparation time, similar to what athletes do before starting a practice or competing, or what musicians do to get ready for a performance. Preparation means clearing both a physical and mental space. Clearing a physical space can be as simple as creating a bedroom environment that is quiet and free from distraction. If necessary, clear up any clutter in your bedroom if you think an untidy room would bother you. Turn off the TV, radio, and any other noise-making appliances. You should not use imagery with music in the background, even if you find the music soothing. The music will distract you from your goal of trying to focus on the images in your mind. You want to be able to achieve relaxation without the aid of any devices.

Now, clear a mental space for yourself. You may be used to going over all your problems when trying to get to sleep at night. By doing this, however, you sink deeper into your problems without solving them, and make yourself

more anxious in the process. The act of worrying can be like a snowball rolling down a hill—the further down it goes, the more snow it picks up and the bigger it gets. Anxiety can be like that too—the more you worry about your problems, the more anxious you get, not only about the problems themselves, but about the process of worrying as well. Being anxious in itself is anxiety-provoking!

Reduce your anxiety by trying to distance yourself from your problems, at least temporarily. Don't confuse this with running away from problems or ignoring them. This wouldn't be helpful either. Rather, stand back from your problems for the period of time you are doing imagery. Remember, you can't solve your problems while lying in bed (if you can, then by all means get up and solve them). So what will it hurt if you just get a little distance from them? Try to imagine yourself literally standing 5 metres from your problems, which you could picture as stack of papers on the ground. Or, imagine yourself setting down that heavy burden you carry on your shoulders all the time (picture a large uncomfortable sack that you put on the ground next to you). Give yourself permission to feel good and take a rest. Remember, you're not avoiding your problems or responsibilities, but just taking a mini-vacation from them.

Practice Imagery Exercises

Below are two brief but poignant imagery scenes. Get into a comfortable position and read each scene slowly. Then close your eyes and try to imagine the scene as vividly as possible. Focus on the physical and emotional sensations that you experience. Repeat this procedure several times for each scene until you feel as though you are actually in the scene. When you have achieved this, move onto the step-by-step instructions for the full imagery technique.

Imagery scene 1. Imagine a black circle on a white background. Picture the circle as perfectly round and completely black. Focus on the contrast of black on the white background. Now imagine the circle is an oval. Picture that the oval as being taller than it is wide. Now change the colour of the oval from black to blue. Change the shape and colour several more times before finishing with this image.

Imagery scene 2. Imagine you are standing next to a running stream. It is springtime and the ice has just melted through to the water. The water is deep and swift. It looks cool and refreshing. You can see to the rocks at the bottom of the stream. Now imagine any negative thoughts you have as objects floating down the stream. They float by you and away from you quickly down the stream until they are out of your sight completely. If a distracting thought surfaces again, let the water take it again. Keep doing this for any negative thoughts that enter your mind.

Step-by-Step Instructions for Imagery

- Step 1:** Lie in bed and get into a comfortable position. Keep your arms and legs uncrossed. Close your eyes and lie quietly for a few seconds. Clear your mind of all stressful thoughts and images.
- Step 2:** Try to relax all the muscles of your body. If necessary, relax the muscles in your body in groups (feet, legs, thighs, buttocks, abdomen, chest, arms, shoulders, neck, forehead). Avoid tensing your muscles to experience relaxation. Focus on your lower body first, relaxing the legs, hips and buttocks. Move up to your upper body and relax your stomach, back, arms and neck. Take a minute to experience the feelings of relaxation and calmness in your body. Focus on the feelings of warmth and heaviness.
- Step 3:** Do some deep breathing. Take several slow deep cleansing breaths. Fill your lungs to capacity with air each time. Wait until you're feeling as relaxed as you can before proceeding. Give yourself praise for getting to this point. Use positive self-statements such as: "I feel very relaxed;" "I've put away my problems and plans for now;" "I feel calm;" "I won't let any distracting thoughts enter my mind;" "I'm going to sleep well tonight;" "I deserve this to feel good."
- Step 4:** Conjure up a pleasant image that is particularly clear for you. Make sure that the image has scenes that are calming and are associated with positive emotions. Imagine, for example, a place where you feel safe and comfortable. You can use any image of your own creation. Counting sheep is O.K., but I'm sure there are more pleasant images you can choose from. Just make sure that any image you create contains sufficient details to keep you occupied for 10 to 15 minutes.
- If you are having trouble creating a positive image, go ahead and use the one described on the next page. Read the description several times and commit it to memory before getting into bed. Note that each series of dots (. . .) indicates a pause of 10 to 20 seconds you should inject into a scene. This is to give you a moment to enjoy the image. Remember, don't rush!
- Step 5:** Try to *passively* concentrate. In other words, don't force yourself to concentrate. Let the images come as naturally as possible. Try not to get frustrated if the image is not as vivid as you initially hoped. Remember, imagery is a skill that must be practiced. In time, your images will become more vivid, more detailed and will conjure up more positive experiences.
- Step 6:** Be creative in your use of adjectives when conjuring up details of the image. Images with vivid colours, sounds and physical sensations are the most powerful. If you use the same image a number of times, try to experience new details of the image.
- Step 7:** Keep the image in your mind for at least 15 minutes. Estimate the passage of time in your head; don't clock-watch. In fact, you should not open your eyes at all. At times, intrusive thoughts may come into your mind. You should try not to focus on them or let them go beyond the awareness level. Rather, let them pass and continue to focus on your image. If you like, you can use a counter-image to cope with negative thoughts.
- Step 8:** As you begin to feel tired, let the image slowly drift from your mind. When this happens, the details of the image will lose their clarity. This is alright, because your goal is to allow your mind to be taken over by a state of sleepiness.

Beach Scene

It is summer. You are walking a beach alone . . . You are the only person for miles. It is almost dusk and the sun is setting. The sky, which was a deep blue only an hour ago, is now slowly turning yellow and orange. . . There are still clouds in the sky. They are billowy and soft like a pillow. You remember how hot the day was earlier. The temperature is still warm. . . You feel calm and pleasant inside. The sand feels cool beneath your bare feet. Each foot sinks a little into the soft sand as you walk along the beach. You take a minute to stand still and feel the cool sand between your toes. You wiggle your toes to savour the softness of the sand. . .

Turning toward the ocean, you can smell the salt water. The clean salt breeze blows gently against your face. . . warms your nose . . . It feels cool and refreshing. . . You look out toward the sea and spy a lone sailboat on the horizon. Its red sail is fully raised. The sailboat is moving east slowly. You see the wake it leaves in the water as it moves along.

Looking at the sky, the setting sun looks like a bright orange ball. It colours the sky with shades of orange and yellow... Your eyes follow the sky down until it meets the horizon. You notice the rippling reflection of the orange and yellow in the water. It looks like the water is a giant mirror reflection everything above.

You walk up to water shore and let the tide rush over your toes. The water feels cool and refreshing. As you walk, your feet sink into the wet sand. All is quiet, calm and peaceful. The only sounds you hear are the waves of the ocean as they roll against the shore. You notice the rhythm of the waves as they wash up on the beach. The sound is soothing and relaxing. . . Your whole body is calm and relaxed.

You feel warm inside. You sit down on the beach in the warm sand . . . The warmth cradles your body as you settle in . . . Closing your eyes, you tune out all your thoughts and focus on the sounds and smells of the ocean surf. You feel warmer and heavier. . . The place you have made for yourself in the sand is cosy and comfy. You lie back and rest your head in a pillow of soft white sand. . . The soft breeze blows around your head . . . You can think of no other place in the world you would rather be right now—no other way you would rather feel . . . You are absolutely calm and comfortable . . . The gentle rhythm of the surf carries you deeper into relaxation . . . Your whole body is relaxed and your mind is calm and clear. . . Sleep is coming on—you can feel it overtake your body. . . Slowly you begin to drift off

Common Problems Encountered During Imagery Relaxation

Lack of confidence in producing mental images. You don't have to have a 'great imagination' to practice this skill. Creativity is also not a requirement. Anyone can do imagery training. All that is required is motivation and a little patience. In fact, people who are anxious and worry about their problems a lot are often very good at imagery! This is because they have lots of practice imagining all their problems and their negative consequences. What people have difficulty with is focusing on positive relaxing images. You may be used to having a lot of negative or stress-provoking images occupy your thoughts, especially when trying to get to sleep at night. If this is the case, you should practice with simple, short, positive images before proceeding to longer detailed ones. Use this practice to build up your confidence with using the procedure.

Frustration and increased anxiety. You may have difficulty learning this skill at first. Don't allow yourself to get frustrated as this will only serve to increase your tension and arousal level. If you feel yourself getting frustrated, stop working on the present image and switch to a simpler one.

Concentration. You may get distracted by pain and negative thoughts. However, think of imagery as a way of pushing thoughts and feelings out of the way. If you are still having difficulty, try focusing on your breathing for a while. Breathe slowly and deeply. Count each inhale and exhale: "inhale one... exhale two... inhale three...exhale four."

Focusing on the outcome and not enjoying the experience. Don't fall into the trap of focusing on falling asleep so much that you keep yourself awake in the process. Imagery should be pleasurable no matter what the end result. The more you think about trying to fall asleep, the more aroused you will get. Just try to put those thoughts aside and give yourself permission to relax with some pleasant images.

Tips for Using Imagery

1. Imagery has many other useful applications such as pain control and stress management. You are free to explore these other uses of imagery to expand your range of pain management techniques. As a suggestion, however, you may find it helpful to reserve your use of imagery to cope with sleep problems as a means of focusing and simplifying your self-management program. There are other advantages to this. You will find it easier to develop specific skills for specific purposes. Thus, if you are using PMR as a relaxation technique to reduce pain and cope with stress during the day, then you should continue developing this skill. It might get confusing to use one relaxation method for several different purposes.
2. Another reason to keep your relaxation techniques separate is that it would be beneficial to build a strong association between your use of imagery and getting to sleep. That is, you want to reach the point in your program where the mere process of using the technique will make you sleepy. This is why it is important to use imagery every night until you have mastered the technique. You should use it on nights even if you feel don't need it. In fact, these nights are the most important nights to use it. For one, you want to build up the association between imagery and the onset of sleep. Another reason is that during training, your goal is to build confidence in using imagery to get to sleep. You have to allow yourself to have successes when learning any skill. Having a series of nights when it is easy to get to sleep is a great way to build confidence.
3. Although some people choose to tape-record relaxation instructions, this is not advised when using imagery to get to sleep, for several reasons. For one, it is important that you generate the images in your mind rather than listening to them coming from a tape, even if it is your own voice. The art of imagining is being able to put yourself in the situation being imagined, as if you were really there. Imagining should not be as though you are watching a movie, which is the effect you may get if you listen to the instructions on a tape. Second, the mechanical sound of a tape recorder may distract you from experiencing the images. As well, the sound of the tape recorder shutting off when the end of the tape is reached may wake you up. Lastly, the use of a tape recorder runs contrary to the philosophy of this program, which is self-management. Although a tape recorder is a simple aid, the fact is that you should not become reliant on any mechanical devices for relaxation.
4. You can intensify sense impressions using the following techniques (from Patrick Fanning's book on imagery, *Visualization for Change*, 1988).

Add details. Start with the general and move to the specific. For example, if you imagine an apple, picture more than a simple round apple. Think of the irregular shape most apples have. Imagine the contours on the skin of the apple, and the change in colour across its surface.

Add colours. Change the colours of your images. Move beyond using the primary colours (red, green, blue) and experiment with more interesting colours (e.g., fuschia, lime-green, turquoise)

Add movement. Who says your images have to be motionless? Make them move or make yourself move if you are imagining a scene with you in it.

Add depth. Create a foreground, middle ground, and background to add depth.

Chapter 6

In this chapter you will:

- ◆ **Explore how your thoughts and feelings affect your sleep**
- ◆ **Examine your attitudes and beliefs about sleep**

Goal for the chapter:

- 1) **Be able to identify and challenge your negative self-talk about sleep**

MIND OVER MATTER: YOUR THOUGHTS AND SLEEP

Author Note: Much of the material in this chapter was drawn from the work of Dr. Charles Morin, a renowned psychologist and expert in the field of sleep disorders. His book *Insomnia: Psychological Assessment and Management (1993)* provided many of the examples in this chapter.

Introduction

In this section, you will explore how your thoughts, attitudes and beliefs, affect the quality of your sleep. Although we will focus on negative or stress-related thoughts about sleep itself, the techniques described in this chapter can be used with any negative or stress-related thoughts.

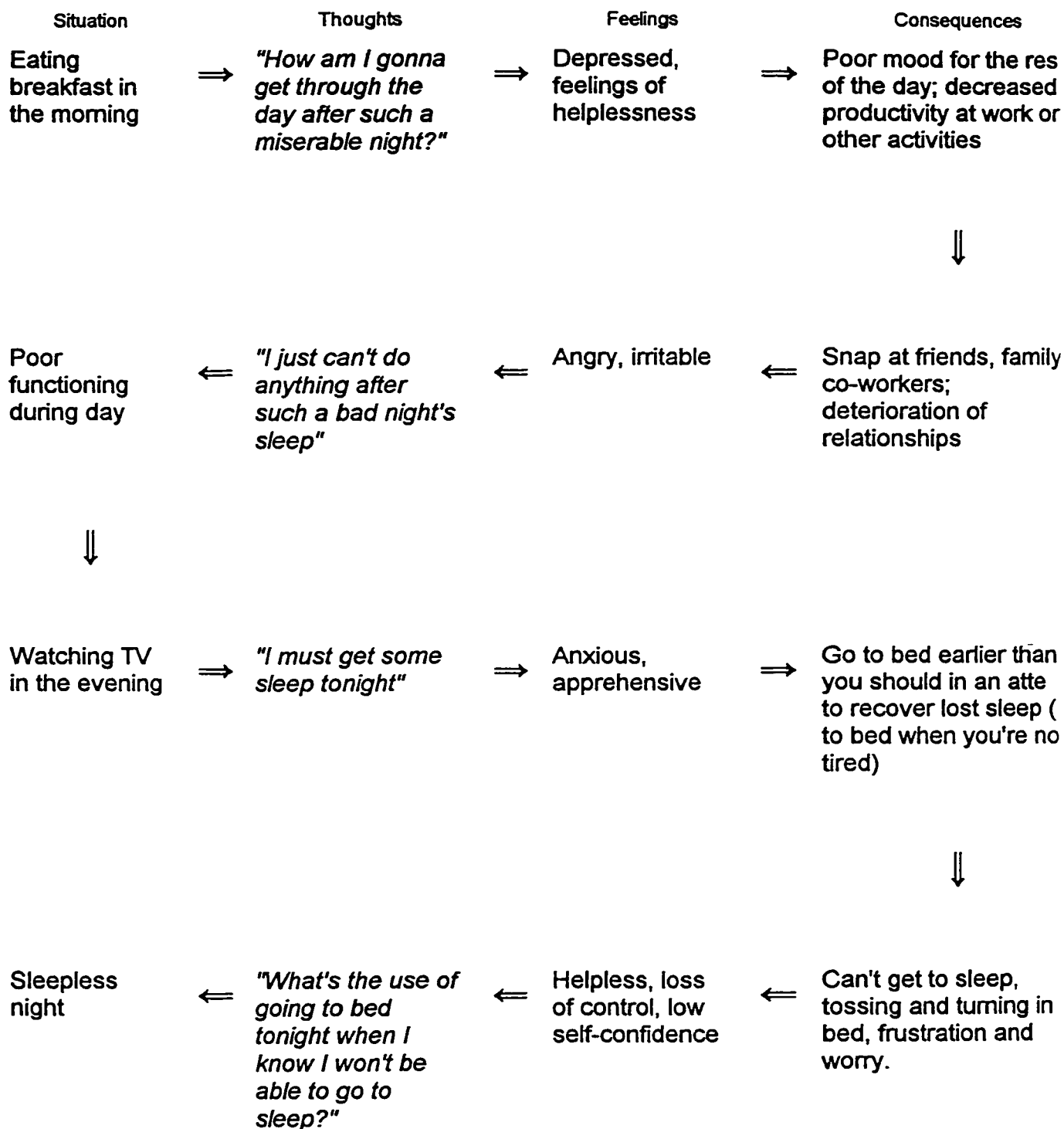
Lying in bed at night is a time when many negative thoughts can come to us. Since there are no activities to distract us, it is the time of day when we are completely alone with our thoughts. It is also a time when we use our thoughts to talk to our selves ('self-talk'). Living with chronic sleep problems can lead one to develop many ideas and assumptions about their nature and cause. As well, you have experienced first hand the consequences of having chronic insomnia. It is understandable if you have stressful thoughts about the situation.

Stressful thoughts about sleep can lead to painful emotions and can increase your arousal level. We know that when under stress the body reacts with increases in muscle tension, heart rate and blood pressure. The overall effect is one of physical and mental arousal, making sleep even less likely. When under stress people often make use of ineffective coping strategies to deal with a problem (e.g., staying in bed and trying to force oneself to get to sleep). Because of these factors, it is easy for a vicious cycle of negative emotions, bad sleep habits and continued poor sleep quality to develop (see next page).

People sometimes engage in this pattern of negative 'self-talk' without being aware of it. For example, out of habit they may consistently focus on the negative aspects of a situation, or belittle their accomplishments. Focusing on the negative all the time is a little like wearing blinders—you neglect to see the positive aspects of situations, or fail to recognize solutions when they present themselves. The challenge is to find ways of breaking this pattern and to engage in a more positive self-talk.

The first step to breaking the pattern is to spend some time monitoring your negative 'self-talk' about sleep. You can start by reflecting on your present attitudes toward sleep. Your attitudes toward sleep can influence how you act on your sleep disturbances, however, and they can create uncomfortable emotional states such as anxiety and depression. Keeping an open mind and adopting healthier attitudes toward sleep can help you become a better sleeper.

**Vicious Cycles of Self-Defeating Thoughts,
Bad Feelings, and Poor Sleep Behaviours**



Step-by-Step Instructions for Identifying and Challenging Negative Self-Talk and Self-Defeating Attitudes Toward Sleep

You will be introduced to a step-by-step process for recognizing and then changing your negative or self-defeating sleep thoughts. You will learn, for example, how to replace unhealthy sleep thoughts with more positive attitudes toward sleep.

Of course, changing the way you think about your sleep disturbances, or any problem for that matter, will not occur overnight. It is a long process that will take time, commitment, and personal reflection. The step-by-step instructions are designed as a quick introduction to the process of monitoring and "re-thinking" some of your self-talk about sleep. Your short-term goal should be to become more aware of your negative self-talk and the importance of being challenging assumptions that underly your self-talk.

Briefly, the steps used in changing negative attitudes and beliefs toward sleep are as follows:

- Step 1:** Identify your attitudes and beliefs that are sleep-incompatible. Identify your use of any thinking 'biases' that are driving your beliefs.
- Step 2:** Examine the consequences of holding on to such attitudes
- Step 3:** Challenge the truthfulness of the underlying belief system. Determine if the belief is realistic or one based on negative ways of thinking.
- Step 4:** Replace negative self-talk with more accurate thinking ("thinking straight"). This may be as simple as giving yourself permission to consider different interpretations of your problem, without necessarily coming up with the "correct" one.

Steps 1 & 2 –Becoming Aware of Your Negative Self-Talk About Sleep

Negative self-talk about sleep can be grouped into five general categories. We will look at examples and examine the assumptions behind each of them. Your attitudes may not fit into all five categories, so go through them and find the ones that apply to you. Don't get too caught up in labelling your attitudes, however. Rather, use the opportunity to examine what your belief system is in relation to your attitudes, and how they affect your sleep.

At the core of each self-statement is an underlying belief, or assumption, that defines the thinking behind the attitude. Beliefs can also be thought of as expectations or predictions of the events defined by the attitude. As an example, consider the statement "there's a sucker born every minute." At the core of this statement is the *assumption* that there are always gullible people available to be taken advantage of by others. There is also the *expectation* that there are unethical people in the world who will take advantages of the "suckers".

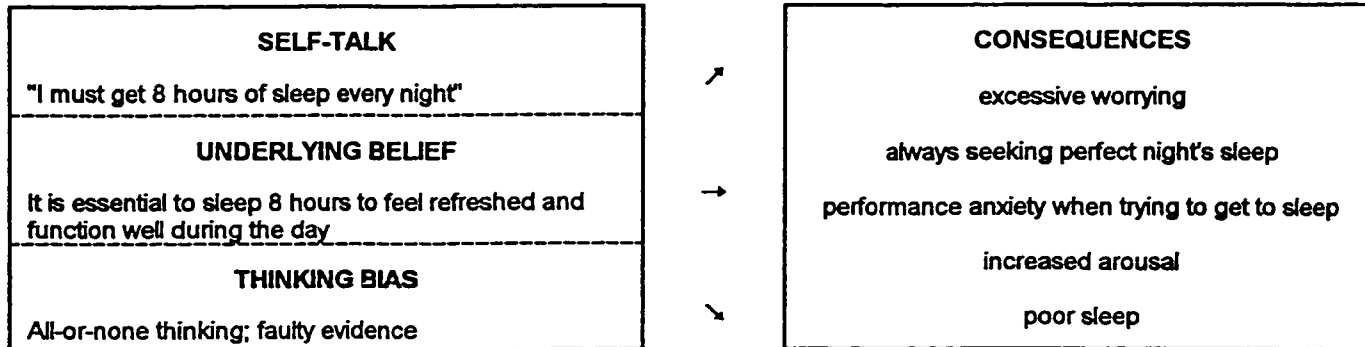
Underlying some of your attitudes and beliefs may be various "cognitive distortions". A cognitive distortion is simply a tendency to view events in a biased or unrealistic way. In a sense, they 'distort' the way in which you look at things, sometimes keeping you from seeing to see alternative ways of looking at your sleep problem. A list of common cognitive distortions is shown in Table 5.2.

Signs that your self-talk may be negative or self-defeating. You may feel that your self-talk is not negative or self-defeating. Many of the things we say to ourselves seem to appear immediately and automatically when in certain situations. Thoughts may pop into our minds so quickly that we don't have time to consider them. You don't want to have to second guess every thought that comes into your mind. So, here are some guidelines you can use to help tell when your self-talk is negative and self-defeating.

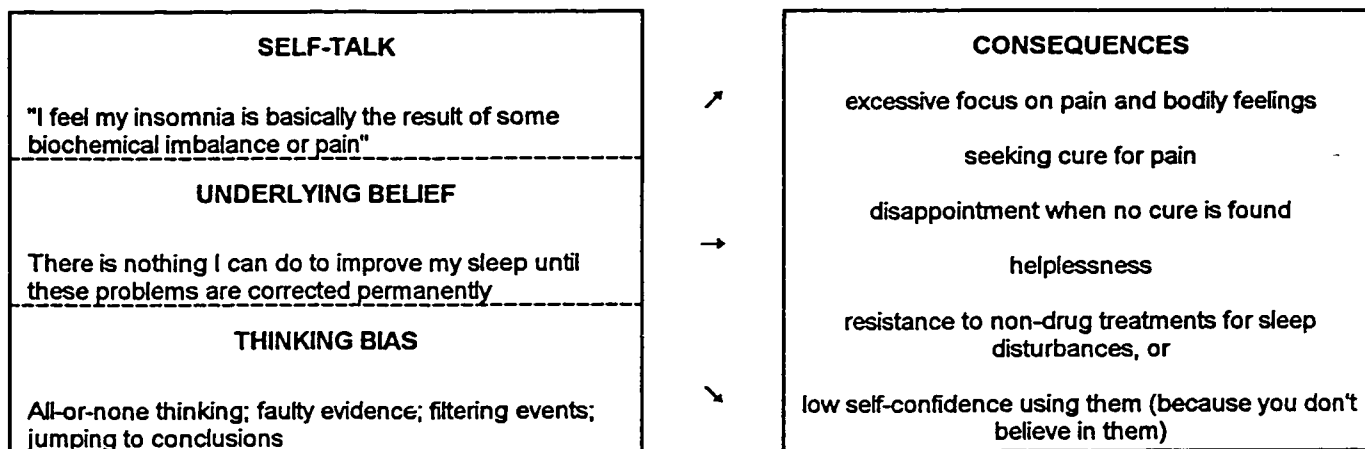
1. Do an 'emotion check.' Monitor your emotional state when you have thoughts you're unsure of. A strong sign of negative thoughts is that they bring out unpleasant emotional reactions such as feelings of emotional pain, depression, anxiety, distress, anger, guilt, helplessness, irritability, etc.
2. Physiological arousal is another sign of negative self-talk. Attend to your physical symptoms of stress such as increased heart rate, temperature changes (cold hands), and increased muscle tension (e.g., forehead, back, neck, etc.).
3. Conflict with friends and family can be a sign that negative self-talk is affecting how you are interacting with others. Monitor your automatic thoughts about various individuals in your life. (What is the first thing you think of when you see ____?).
4. What does it mean when your predictions about future events don't come true? For example, when you always predict that the worst will happen but it seldom does?
5. Self-talk is self-defeating when you are much harder on yourself than you would be on others. Are you probably your own worst enemy? Do you expect more from yourself than you expect from others?

The five categories of negative self-talk about sleep are:

Unrealistic Expectations about Sleep. Check your responses to the Attitudes and Beliefs About Sleep Scale. Did you answer 'true' to questions 1, 2, or 13? At the core of these attitudes is the belief that people need a full 8 hours of sleep every night to function normally. There is also the assumption that all people need the same amount of sleep every night.



Misunderstanding the cause of disturbed sleep. Did you answer 'true' to questions 14, or 24, or 'false' to questions 3 or 28? This indicates that you are blaming your insomnia on purely physical factors. Unfortunately, by doing this you are ignoring the role that bad sleep habits and other psychological/behavioural factors have in maintaining your poor sleep quality.



Magnifying negative consequences of sleep problems. Did you answer 'true' to questions 4, 8, 10, 15, 17, 18, 21, 23, or 25, or 'false' to questions 5, 12, or 25? If so, you may have a tendency to exaggerate the consequences of your sleep problems on your daytime functioning and piece of mind. By doing this, you may be maintaining the vicious cycle of bad feelings and poor sleep shown in Table 5.1.

SELF-TALK
"When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before"
UNDERLYING BELIEF
"All my daytime problems occur because I didn't sleep well"
THINKING BIAS
All-or-none thinking; faulty evidence; overgeneralization; catastrophizing



CONSEQUENCES
preoccupation with feelings of fatigue
blaming everything on sleep
interferes with other coping efforts, or
use poor coping strategies (excessive use of coffee and stimulants to stay awake)
go to bed too early and spend too much time in bed
poor sleep quality

Feeling no control over your sleep. Answering 'true' to questions 16, 22 or 29, or 'false' to questions 19, or 20 suggest that you are feeling as though you have no control over your sleep and sleep problems. The underlying belief is that you see your sleep as being externally controlled and that you are a victim of poor sleep. Unfortunately, holding this belief can sustain your feelings of helplessness and powerless suffering.

SELF-TALK
"I can't ever predict whether I'll have a good or poor night's sleep"
UNDERLYING BELIEF
"Sleep is out of my control; it doesn't matter what I do, I can't change my sleep"
THINKING BIAS
Faulty evidence; feeling externally controlled; overgeneralization; belittling accomplishments



CONSEQUENCES
feeling helpless and hopeless
relying on external aids for sleeping (e.g., sedatives)
ignoring the control you do have over your sleep
maintaining poor sleep habits

Giving in to myths about good sleep practices. If you answered 'true' to questions # 6, 9, 11, or 27, or 'false' to questions 9 or 26, you are holding on to faulty beliefs about sleep-promoting activities. Consequently you may be engaging in ineffective coping strategies such as staying in bed even when you can't get to sleep.

SELF-TALK
"Staying in bed is the best thing to do when you can't get to sleep"
UNDERLYING BELIEF
I should be sleeping at this time of night; I can't stay up all night
THINKING BIAS
Faulty evidence; "should" statements



CONSEQUENCES
stay in bed getting more frustrated and anxious
focusing on sleeplessness
become more aroused and tense making sleep even less likely
engage in a passive coping strategy (e.g., take a sleeping pill)

Step 3 – Challenging Negative Self-talk

The best way to change negative self-talk is to examine the truthfulness or reality of the underlying belief. By challenging underlying beliefs, you open the door for other attitudes to emerge. You also disrupt the vicious cycle of bad

thoughts, emotions and poor sleep.

To challenge your negative self-talk, you first examine the accuracy of the evidence supporting the belief. When possible, try to dispute the evidence in favour of more realistic evidence. You can use the following dispute statements to help you:

- "Do I know for certain that _____ will happen?"*
- "Am I 100% sure of these consequences?"*
- "What evidence do I have that _____ will happen?"*
- "Can I predict the future all the time?"*
- "What is the worst that could happen?"*
- "Could there be any other explanations?"*
- "Is _____ really so important?"*

You should be able to feel some of the tension and discomfort go away when you adopt more positive and realistic attitudes and beliefs.

Table 5.3 goes through the five categories of negative self-talk about sleep and shows ways in which you can challenge the evidence the underlying beliefs are based on. Since there are so many attitudes and beliefs toward sleep, we'll focus on the common ones.

Step 4 – Thinking Straight

By challenging some of your negative self-talk you can start to look at alternative interpretations of your situation. It is not important that you always find the correct solution or 'the answer' to your problems. What is important is that you allow yourself to look at things in a different way when you feel stuck. One of the most damaging aspects of negative self-talk is not the thoughts themselves, or whether or not they are true, but the emotional response they bring out in you. One sign of negative self-talk is that it usually feels bad, and that can be draining. The unfortunate thing is that, after a while, these feelings start to become a routine thing, sometimes to the point when you can't remember ever feeling any other way. This is one of the reasons why changing negative self-talk can be a challenge.

Replacing negative thoughts with positive self-talk is not always easy but it is possible. Initially, you should strive to find as many alternative ways of looking at your problem as possible. You don't have to do all the work on your own. Ask your spouse or a friend for their opinions. Try to test the validity of your assumptions with personal 'experiments.' For example, test your assumption that you need to nap everyday in the afternoon by avoiding napping for a while and seeing how you feel.

When you start coming up with new interpretations of your problem, phrase them in the form of a positive self-statement and say it back to yourself. Then say it out loud to yourself and to others. Do an emotion check while doing this. Simply ask yourself how you are feeling when you say these things. Table 5.3 provides some examples of positive self-statements you can use.

To help you shift from a self-defeating statement to a positive one, use a transitional statement. This is simply a phrase you say to yourself to remind you that you are engaging in negative self-talk. For example, say "Stop!", "Shift!", "That's enough," or "Cut it out!" to yourself when a negative thought comes into your mind that you want to change.

What Positive Self-Talk is Not. Please remember that positive self-talk is not to be confused with the 'power of positive thinking' or mindless happy thoughts (e.g., "The world is a wonderful place with no bad people in it"). You don't want to delude yourself and ignore your problems. Rather, the goal is to have accurate, realistic and open-minded self-talk. Be just as critical of your positive self-talk as your negative thoughts.

Table 6.1

Ten Biased Ways of Thinking about Sleep

<i>All-or-none Thinking</i>	<p>You see things in black and white categories. If your performance falls short of perfect, you see yourself as a total failure.</p> <p><u>Sleep Example:</u> I must have 8 hours of sleep to function well the next day; if I get less than that, I know I'll feel too tired to do anything.</p>
<i>Overgeneralization</i>	<p>You see a single event as a never-ending pattern of defeat.</p> <p><u>Sleep Example:</u> I tried relaxation to get to sleep but it didn't work; nothing will help me.</p>
<i>Filtering Events</i>	<p>You pick out a single negative detail and dwell on it exclusively so that you perceive the whole situation as negative.</p> <p><u>Sleep Example:</u> I woke up twice last night and had difficulty getting back to sleep each time. My whole night's sleep was ruined.</p>
<i>Ignoring the Positive and Belittling your Accomplishments</i>	<p>You take neutral or even positive experiences and turn them into negative ones.</p> <p><u>Sleep Example:</u> I had a few nights of pretty good sleep, but I still don't sleep as well as my husband.</p>
<i>Jumping to Conclusions</i>	<p>You make a negative interpretation even though there are no definitive facts to support your conclusion. For example, you engage in fortune telling by predicting that things will turn out badly.</p> <p><u>Sleep Example:</u> What's the point in trying? I know my sleep never get any better.</p>
<i>Blowing Things out of Proportion (Catastrophizing)</i>	<p>You exaggerate the importance of a negative event or mistake. You predict the absolute worst will happen (catastrophize).</p> <p><u>Sleep Example:</u> I was sleeping well for over 2 weeks but then I had a night of complete sleeplessness. My progress is ruined; all my hard work was for nothing.</p>
<i>Emotional Reasoning</i>	<p>Taking your emotions as evidence for the truth. Assuming that if you feel something, then it must be true, or, that just because you think about a negative event, it is going to happen.</p> <p><u>Sleep Example:</u> I try to get to sleep but I feel tense and nervous. I must have an anxiety disorder.</p>
<i>"Should" Statements</i>	<p>You try to motivate yourself with "shoulds" and "should nots". The emotional consequence is guilt.</p> <p><u>Sleep Example:</u> I shouldn't be getting out of bed so often at night. It will wake up my wife and kids.</p>
<i>Labelling and Mislabelling</i>	<p>An extreme form of overgeneralization. Instead of describing your error, you attach a negative label to yourself. For example, saying "I'm a loser".</p> <p><u>Sleep Example:</u> I'm addicted to sleeping pills. There's nothing I can do because I need them to sleep.</p>
<i>Feeling Externally Controlled</i>	<p>You see yourself as a victim, suffering from your problem with no control. You feel helpless.</p> <p><u>Sleep Example:</u> There's nothing I can do about my sleep disturbances. They are caused completely by pain and I can't make that go away.</p>

Table 6.2
Thinking Straight About Your Sleep Problems

Category of Negative Self-Talk	Actual Evidence & Alternative Explanations	Positive Self-Statements You Can Use Instead
<i>Unrealistic Expectations about Sleep</i> - "I need 8 hours of sleep every night"	People differ in the amount of sleep they need; the range is from 4 to 10 hours in the general population	"Just because my husband needs hours of sleep, doesn't mean I do"
	The amount of slow-wave (deep) sleep is more important than the total amount of sleep	"It's not how much I sleep that is important; it is the quality of my sleep"
	Some very productive people are short sleepers (Thomas Edison only slept 4-5 hours per night)	"I used to get by on less sleep before my pain began"
<i>Misunderstanding the cause of disturbed sleep</i> - "Pain wakes me up"	Most people with chronic pain have only mild problems sleeping. And then there are some people with chronic pain who don't have any sleep disturbances	"Sleep disturbances are not an all-or-none event with pain"
	Most people do have good nights of sleeping that are not related to changes in pain level	"Just because I have chronic pain, doesn't mean I have to suffer from poor sleep every night"
	Regardless of the medical reason, there are always psychological and behavioural factors that affect sleep quality	"Maybe I can't stop the pain, but I can modify and even eliminate the other factors contributing to my sleep problems"
<i>Magnifying the negative consequences of sleep disturbances</i> - "After a night of poor sleep, I can't do anything the next day"	Do you always function poorly after a bad night of sleep?	"What is the worst that can happen may feel a little tired but if I keep busy probably won't notice it"
Category of Negative Self-Talk	Actual Evidence & Alternative Explanations	Positive Self-Statements You Can Use Instead
<i>Magnifying the negative consequences of sleep disturbances</i>	Research has found most people experience only mild impairment in their physical and mental functioning after being completely deprived of sleep. After sleep loss, people's performance goes down slightly on simple boring tasks (e.g., adding numbers) but they do fine on more complex activities.	"I know that if I do something boring I'll start to feel tired and want to have a nap. Therefore, I'm going to find activities that will keep my mind active and interested."
	The biggest effect of sleep loss is on mood.	"Sleep loss tends to make me grouchy and irritable but I can change that. I will make an effort to watch my negative mood and try to be more cheerful instead"
	You can achieve most of your restorative sleep in 3-4 hours.	"It's more important to get 3-4 hours of continuous rather than 8 hours of fragmented sleep"

<i>Giving in to myths about Good Sleep Practices - "I didn't sleep well last night; I will have to take a nap today to catch up on my lost sleep"</i>	Taking a nap will likely interfere with your sleep at night since it is like starting your sleep period early. If you prolong your nap until you go to bed, you'll go to bed sleepy and sleep more that night	"Do I know for certain that I need a nap? I've made it through other days without a nap" "Is having a 60 minute nap so important to my well-being?"
<i>Feeling no control over your sleep - "I can never predict if I will have a good or bad night of sleep"</i>	Trying to control your sleep, you only get frustrated and more anxious and tense (you tend to focus on feelings of sleeplessness rather than sleepiness). This can be more harmful than the actual loss of sleep.	"So I can't always control my sleep. I'm not going to let this get me stressed. I can't control my body temperature and that doesn't bother me"
Category of Negative Self-Talk & Representative Statement	Actual Evidence & Alternative Explanations	Positive Self-Statements You Can Use Instead
<i>Feeling no control over your sleep</i>	You nighttime sleep is affected by daytime activities, thoughts and feelings. Learn to recognize these relationships and focus your attention on those factors that you can control. As a suggestion, try to isolate one daytime factor that really affects your sleep (e.g., mood)	[In the morning] "Today, I will try to let things upset me so that I will be calm today when I go to bed"

General Techniques for Managing Stress

There are other coping techniques you can use throughout the day to help you deal with stressful thoughts. One thing you should recognize is that it is not always possible to solve a problem right away. Some problems require time to resolve. Other problems can't be solved by you directly. However, just because you can't solve a problem right away, does not mean you can't manage the problem. Every problem can be managed so that the amount of stress it causes you is minimized. The ability to effectively managing problems is a skill that can be learned. The following are some general techniques for managing stress:

Concentrate on one problem at a time. When thinking about problems, many people increase worry and anxiety by constantly shifting from one problem to the next. This makes it seem like you have twice as many problems, or that you are going in circles all the time trying to solve them. You can not resolve a problem by only thinking about it for a few seconds or minutes at a time.

Focus on one problem at a time. Start with either the one that is giving you the most distress, or the problem that you think you can resolve. Concentrate on that problem only to the exclusion of all other problems. Sort out as many details and issues as possible concerning the problem.

Worrying time. If you are going to worry, you might as well make it a productive time. Therefore, rather than worry about your problems in bed when you can not do anything about them, set a specific time and place (e.g., 2:30 p.m., at home in the living room) during the day to do your worrying. Designate a 30 minute worry period. Focus on only one problem at a time and try to make the time productive by coming up with some options for dealing with the problem. Next time you can not get to sleep because you are thinking about your problems, remind yourself that you have set some time out the next day to worry.

As a suggestion, make your worrying time the time you normally nap. Don't sleep, however, and don't lie in bed; rather, sit up and do your worrying. This will help you curtail your napping.

Thinking the worst (catastrophizing) and developing a plan to deal with it. Sometimes it is the fear of the unknown that can be troublesome and anxiety-provoking. When faced with a big problem, we don't always like to think about the consequences or the 'worst possible scenario.' It seems enough to know that something bad will happen without thinking about the details. This is an example of emotional thinking, since we assume that the consequences will

be as bad as the feelings we assign to them. By not thinking about the details of the 'worst', however, you deny yourself the opportunity to develop a plan to deal with it. When you avoid thinking the worst, you also sell yourself short by assuming that you are not strong enough to deal with the consequences.

Imagine the worst possible outcome to your problem. In your mind, map out the sequence of events that would occur and the consequences of each. Engulf yourself in as much detail as you can stand. Do this several times until you are practically 'bored' with problem. Now, develop your plan for dealing with the consequences. Although going through it will not be pleasant, remind yourself that the consequences will likely be short-lived and under your control. Remind yourself that you have probably got through worse times before.

After this is done, one of two things will happen: (1) the worst doesn't happen, in which case you will be relieved, or (2) the worst does happen, in which case you have your plan prepared in advance to minimize the impact. It will still be difficult, but not as difficult as if you had not prepared.

Stay up all night worrying. If you tried the above strategies and failed, then try this: purposely stay up all night worrying. In other words, don't try to distract yourself from your problems in bed, rather give them your undivided attention for the entire night. It is possible that nighttime is your best time to worry. Try as best you can to sort out all of your problems. Do this several nights in a row until you feel like you have made some headway in solving your problems.

Do your worrying on paper and not in your head. By always keeping them in your mind, it is difficult to get any distance from them. So, write out all of the problem(s) that are significant stressors in your life. When you list them down on paper they may look a little more manageable. Identify the pros and cons of each problem in separate columns.

Try your best to manage your problems on paper. Write out the possible solutions and 'brainstorm' alternatives. Work at them for an hour, and then when you are done gather up the papers and put them away. Do this every time you want to work on your problems. Do your thinking on paper and not in your head. One advantage of this is that you have a written record of your thinking. When worrying, people tend to ruminate, or go over and over problems, sometimes thinking of a possible solution but then dismissing it. Sometimes, people think of the same solution over and over again. By doing the thinking on paper, you can review your records and see what ideas you have considered and what ideas you have not. You may have already thought of a solution and you forgot about it.

Chapter 7

In this chapter you will:

- ◆ Learn how to use problem solving to cope with sleep disturbances
- ◆ Learn about 'sleep hygiene' and how lifestyle and environmental factors can affect your sleep quality
- ◆ Explore ways in which you can change your diet, exercise habits, and bedroom environment to be more sleep-friendly
- ◆ Find out how you can maintain your progress well into the future

Goals for the chapter:

- 1) Identify and correct the lifestyle and environmental factors that can interfere with your sleep
- 2) Develop a plan for dealing with relapses when they occur

The Five-Step Problem Solving Technique

The following is a brief summary of the five-step problem solving technique (S.O.L.V.E.) developed by psychologists Thomas D'Zuriella and Marvin Goldfried. This technique has been used with many different problems so you may be familiar with it already. In this section, the technique will be applied specifically to sleep problems.

A "problem" is defined as a failure to find an effective response. In other words, it is not the situation, but what you make of it, that determines whether a problem exists. For example, your car not starting one morning when you have to get to work is not necessarily a problem. A problem emerges when you cannot find an alternative way of getting to work on time. A problem can also occur if you employ a response that ends up making the situation worse. For example, trying to fix the car yourself may make the car worse in addition to wasting time and causing you to be late for work.

The five-step problem solving technique is also known as the S.O.L.V.E. technique which stands for:

- State your problem
- Outline your response
- List your alternatives
- View the consequences
- Evaluate your results

Step-by-Step Instructions

For this technique, you will need some paper and a pen. You can use the problem solving work sheet in Table 6.1.

Step 1: State your problem - Write out your problem on paper. Make sure you phrase it in a way that conforms with the definition of a problem as a failure to find an effective response.

e.g. Doug has a problem with daytime napping

Doug's *incorrect* statement of problem: "I can't help but nap in the afternoon and this interferes with my sleep at night."

Doug's *correct* statement of the problem: "I haven't found the best way to curb my napping habit".

Step 2: Outline your response - Describe your usual response to the problem (that is, what you do or don't do). You can use the following outline to define in more detail your response. Be sure to include the persons and events that are usually involved.

Example: Doug's daytime napping

Who is involved? (the other people)	Doug: "I'm the only one involved"
What happens? (what is done or not done that bothers you)	I take a nap when I know I shouldn't
When it happens? (time of day, how often, how long it lasts)	Mid-afternoon every day of the week for about 1-1/2 hours
Where it happens? (location)	I nap in my bed
How it happens? (sequence of events, your mood at the time)	After lunch, I start to feel tired because I didn't sleep well the night before. Eventually I lie down and fall asleep
Why it happens? (the reasons you or others give for the problem)	I need to sleep. I need to catch up the sleep I lost the previous night. If I don't nap, I'll feel terrible.

Step 3: List alternative solutions to the problem. Do some "brainstorming" and generate a list of alternative strategies or approaches to your problem. Brainstorming means thinking of anything, no matter how crazy or unbelievable it sounds, that could be a possible solution to your problem. A few guidelines for brainstorming are:

- ◆ Don't be critical of any idea at first. Just write it down. Later, you can sort out ideas that are practical and those that are not.
- ◆ The crazier the better. Don't be constrained by normal logic. Open your mind to new things.
- ◆ *The more ideas, the better.* In this case, quantity is better than quality, at least at first. The more ideas you have to start with, the greater your chances of finding one or two good ones. Therefore, make a long list—a minimum of ten ideas is suggested.
- ◆ *Worry about the details later.* The mechanics of how each idea is supposed to work are not important. Don't waste time with details until you have narrowed your list down.

Back to our napping example. Remember that we defined this problem as Doug's inability to find effective ways of coping with the sleepiness that occurs in the daytime. From the outline of Doug's usual response to this problem we see that his naps usually occur in the mid-afternoon and he naps in bed. His interpretation of why it happens is that he feels sleepy and can't resist lying down.

We now want to generate a list of alternative strategies to taking a nap in the afternoon.

Doug's Brainstorming for Alternatives to Napping

1. Go lawn bowling instead of napping
2. Get wife or roommate to throw cold water in face to stay awake
3. Drink a pot of coffee or a case of Coke
4. Plan on doing housework in mid-afternoon
5. Get a volunteer job that starts at 2:00 p.m. and goes to 5:00 p.m. every day
6. Make your nap time your 'worrying time' instead. Spend this time period focusing exclusively on your most distressing personal problem. Problem solve for solutions or ways of managing the problem
7. Arrange to meet a friend every afternoon to go for a walk
8. Replace your bed with a sofa bed that has a time lock that keeps closed all day
9. Put a sign on your front door that says "Solicitors welcome, especially in the afternoon"
10. Move next to the airport and leave your windows open all day
11. Have a friend call every day in the afternoon to talk about sports and politics
12. Wear a rubber band on your wrist. Every time you start to feel sleepy and get the urge to nap, snap the rubber band and yell the word "STOP!" to yourself.

Step 4: View the consequences. Now, go over the list of alternatives and pick out the ones that seem the most promising or appealing. You'll notice that the list contains some ideas that seem outrageous or impractical. On the other hand, they would be solutions to the problem—having water thrown in your face would keep you from taking a nap! Besides, some outrageous ideas contain elements of practicality. Take the water throwing example. Although using water is outrageous, the idea of involving a spouse or friend to help you is not. This one outrageous alternative helped generate a few more alternatives that solicit the support of others in coping with this problem (#6 and 7).

Put a line through all the ideas that are too unrealistic. Look at the remaining ideas. If you wish, you can combine one or more strategies based on common elements. For example, what #4, 5, 6, and 7 all share is the idea that Doug should plan a regular activity every day in the afternoon when he normally takes a nap. Since it might be impractical or tedious to do the same activity every afternoon, he should construct a weekly schedule with a variety of different activities planned for afternoons.

After combining ideas, you should be down to two or three possibilities. Now you have to think about the consequences of putting each idea into action. In other words, you should consider the pros and cons of each idea. Things to consider are: (1) how it would make you feel (relieved? more anxious?);

(2) what personal needs would be satisfied by making the change?; (3) how would it affect those around you (spouse, children, friends, etc.); (4) how easy would it be to make the change long-term?.

Write out the pros and cons for each strategy. Decide how much importance you would assign each pro and con. When deciding which strategy to use, you should take into consideration not only the total number of pros and cons for each, but how important they are. Ultimately, you should choose the strategy whose pros outweigh the cons either in number or in importance.

Step 5: Evaluate the results. Now it is time to act on your choice(s). Put your plan into place and observe the consequences. Were they what you were expecting? Any surprises? Are you satisfied with the outcome? If not, you go to the next option on your list of alternative strategies. One great thing about this method is that you don't have to limit yourself to just one strategy. Using the S.O.L.V.E. process, you are able to systematically and logically generate a list of strategies to manage your problem.

Some people criticize this method, arguing that they just end up dealing with their problem in the "same old way" or that they use the first strategy they came up with. Is it a waste of time then? The thing to ask yourself is how confident do you feel with the decision you made? How confident do you think you would have felt with that decision if you had not gone through the problem-solving method and assessed the pros and cons of every alternative.

Making a decision that you don't feel confident with can sometimes create more anxiety than the original problem, especially if you feel that you are making a hasty decision and missing some other possible strategy. By using the S.O.L.V.E. method, you should feel more confident with your decision because you know that you used a proven technique to arrive at the best possible choice given your alternatives.

Another advantage to this method is that you can do your problem-solving on paper rather than in your head. By always thinking about your problem, it is difficult to get any distance from it and look at it objectively. Problems tend to look a little more manageable when they are written out on paper. Therefore, do your thinking on paper and not in your head. This way you have a written record of your thinking. When worrying, people tend to ruminate, going over and over problems, sometimes thinking of a possible solution but then dismissing it. By doing problem-solving on paper, you can review your records and see what ideas you have considered and what ideas you have not.

Table 7.1

Problem Solving Work Sheet

State your problem: a. Background Info: _____ _____			
b. Detailed problem statement: _____ _____			
Outline your typical response	Where I do it? _____ When I do it? _____ How I do it? _____ How I feel _____ What I want (goal for solving problem) _____		
List your alternatives (brainstorming)	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____		
View the consequences (assess the pros and cons of each alternative)	Pros 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____	Cons _____ _____ _____ _____ _____ _____ _____ _____ _____	Potential effectiveness (1=least; 5 = Most) _____ _____ _____ _____ _____ _____ _____ _____ _____
Evaluate the results How confident do you feel with your decision? _____ (1 = not at all confident ; 5 = very confident)			

The term 'sleep hygiene' may be unfamiliar to you. When people hear the word 'hygiene' they usually think of personal grooming habits or dental hygiene. Actually, 'sleep hygiene' refers to as a whole group of health, lifestyle and environmental factors that can directly or indirectly affect the amount and quality of sleep you obtain. The goals of this chapter are to increase your awareness of how various lifestyle factors can negatively or positively impact on your sleep, and to provide you with some realistic guidelines on how to limit negative lifestyle practices.

Sleep hygiene is an integral part of this program. Although it is rare that a person's insomnia is caused purely by lifestyle factors, it is often the case that sleep disturbances can be made worse by engaging in several negative health behaviours at the same time. They can slow down a person's progress in a self-management program by not allowing their sleep to improve as much as it could. In many cases, the behavioural strategies introduced in previous chapters can be enhanced by changing other behaviours.

Lifestyle changes are always a matter of making choices. We recognize that making the decision to eliminate certain health behaviours (smoking, for example) is a big one. Of course, there are many other health-related reasons to quit smoking, but these are beyond the scope of this program. For now, we only ask that you at least attempt to modify negative health behaviours for a trial period and examine the effect it has on your sleep. For most health behaviours, the trial period should be at least one month to allow for any withdrawal effects (e.g., when quitting smoking or reducing caffeine use) to subside and to allow for the transition into new health practices. If at the end of the trial period, you decide you want to maintain these lifestyle changes, you should consider some additional assistance for helping you make the changes more permanent.

Caffeine

Caffeine is one of the most widely used drugs in the world, and it is generally considered by most consumers to be a relatively harmless substance. North Americans ingest an average of 200 mg of caffeine (approximately 2 1/2 cups of coffee) per day, primarily in the form of caffeinated beverages such as coffee, tea and cola drinks. The effects of caffeine on sleep are well known. Caffeine is a stimulant which acts to excite the central nervous system, leading one to feel more alert and awake. Caffeine disturbs sleep by increasing the amount of time it takes to fall asleep and by decreasing total sleep time. Generally, two or more cups of coffee, tea or cola before bedtime are sufficient to disrupt the normal sleeping process.

It takes, on average, between 3 to 7 hours for caffeine to be eliminated from the body. This means that the caffeine from a cup of coffee consumed after dinner at 7 p.m. can still be working in your body when you go to bed at 11 p.m. This is why it is recommended that you not take any caffeinated food or beverage item after 6 p.m. You should also restrict your coffee consumption during the day to a moderate level (no more than 2 or 3 cups of coffee per day).

Chocolate also contains caffeine, although in much smaller amounts than those found in caffeinated beverages. However, you should be careful of the additive effects of caffeine in various combinations of foods and beverages (e.g., having a 2 cups of coffee with some sort of chocolate dessert).

Many people are not aware that caffeine is also an ingredient in many prescription and non-prescription medications, especially over-the-counter pain medications. The amount of caffeine in each pill is small, but the total amount can add up when you are taking many pills per day. For someone who is not a regular coffee or tea drinker, this amount of caffeine can have quite a powerful stimulant effect. Caffeine is also a diuretic, which means it makes you have to urinate more. Thus, taking medication with caffeine as an ingredient before sleeping can lead to being awoken with the urge to go the bathroom.

Many people with insomnia get into the habit of coping with fatigue caused by a night of poor sleep by drinking excessive amounts of coffee during the day. If you are using high quantities of caffeine—more than 5 cups of coffee per day—you should cut-down *gradually*. If you don't, you may suffer caffeine withdrawal effects such as headaches and increased nervousness. To reduce gradually, eliminate one daily cup of coffee per week, or gradually switch one of your daily coffees to a decaffeinated brand. Thus, if you are a regular drinker of 6 cups of coffee per day and you wish to cut this amount down to 3 cups per day, you should do it gradually over a 2 to 3 week period (eliminate 1 daily cup of coffee per week). If you do drink coffee in the evening, be sure to reduce that gradually as well.

With regard to reducing caffeine-containing medications, you should do so under the supervision of your physician. It is likely that there are equivalent caffeine-free medications.

Nicotine

Nicotine is also a stimulant that can disrupt sleep. Although many people use smoking as a way of coping with stress, it is a common folly among smokers that smoking is relaxing. In fact, the 'relaxing' effects of a cigarette are derived from the acute suppression of the withdrawal symptoms. Although psychologically relaxing, nicotine causes physiological arousal in the form of increased heart rate, blood pressure, and stimulation of the central nervous system. Long-term cigarette use impairs respiratory functioning (breathing), which can also disrupt sleep. Studies have demonstrated that individuals smoking more than one pack per day have shallower and more fragmented sleep than non-smokers. They take longer to get to sleep and have lower sleep efficiency. Smokers also tend to awaken during the night craving a cigarette. It is not uncommon for this to become a habit, and individuals sometimes get up in the middle of the night to smoke.

The stimulating effects of caffeine and nicotine are additive. Thus, smoking and drinking coffee can be doubly harmful to your sleep. Unfortunately, many people who smoke also tend to drink a lot of coffee. It is also unfortunate that both habits are quite difficult to break. Suffice it to say, however, that most individuals are more successful in reducing coffee consumption than cutting down or quitting cigarettes. Trying to quit smoking is a major endeavour. Many people try and fail several times before succeeding. If you are one of those people with many failed attempts, you may consider seeking some professional assistance (e.g., a doctor-prescribed nicotine patch).

If, on the other hand, you feel you are not fully motivated to consider completely quitting at this time, you should consider reducing your cigarette consumption for the sake of better sleep hygiene. Just as it is important to restrict coffee in the evening, you should also refrain from smoking 3 to 4 hours before bedtime. You may also consider switching to a brand with less nicotine to cut down on the amount of stimulant getting into your body.

Alcohol

It is a common misconception that alcohol improves sleep. It is true that as a central nervous system depressant, alcohol can induce sleep if a sufficient quantity is consumed. However, its overall effect is to increase fragmentation of your sleep. This is because you can experience alcohol withdrawal in the middle of the night as the alcohol is broken down by your body. Moreover, alcohol alters the pattern of sleep stage changes leading to the disruption of the normal sleep cycle. Drinking also increases the frequency of urination. For someone whose sleep is already disrupted and fragmented by chronic pain, the consumption of alcohol only makes it worse.

Infrequent or 'social' drinking does not pose a serious risk to your sleep problem. Just be sensitive to the fact that because of having chronic pain, moderate or even light alcohol consumption can affect your sleep more than someone without pain. Chronic heavy use of alcohol leads to, among other health complications, chronically poor sleep. Alcohol and substance abuse problems account for more complaints of poor sleep in the general population than do medical disorders such as chronic back pain. Thus, having back pain and consuming alcohol regularly is doubly harmful for your sleep. Generally, heavy alcohol use does not occur in isolation, and most individuals who abuse alcohol do so as a means of coping with life stressors. In this light, simply abstaining from alcohol may be insufficient as treatment strategy and it is likely that counselling may also be required.

Diet

"I had the worst nightmare last night! It must have been those two chilli dogs I ate"

Despite popular myth, there is no scientific evidence linking chilli dogs, pepperoni, or any other spicy food to nightmares. On the other hand, it is likely that eating any large meal before bedtime, especially a meal that may be taxing on the digestive system (e.g., chilli dogs!), will lead to disruptions in the normal sleep cycle. Eating any large quantity of food will result in stimulating your digestive system. Regarding nightmares then, it is likely that awakening from a bad dream may be a function of the disruption in your sleep cycle caused by your digestive system. Since you can only remember dreams that you awaken from, you may associate the bad dream to your poor food choice before bed.

Having a light snack before bed may promote sleep especially if you incorporate this habit into your pre-bedtime routine. A light combination of carbohydrates and protein, such as cheese and crackers is good. The sleep-promoting aspects of this snack are likely more psychological than biological. In essence, your pre-bedtime snack can serve as part of your presleep routine that serves as a cue for drowsiness. There is little biological basis for feeling tired or sleepy after a meal. Another popular myth is that the sleepiness felt by many people in the afternoon is caused by food intake at lunch. In actuality, drowsiness after lunch is more associated with the drop in body temperature that occurs because of the circadian rhythm (recall, a similar drop in temperature occurs during sleep at night).

Some chemical compounds found in certain food types are thought to have mild sleep-inducing properties. Tryptophan, an amino acid found in milk, is a substance used in the body's natural process of sleeping. Thus, it is thought that ingesting tryptophan-laden food items before bedtime may promote sleepiness. This hypothesis lends some credence the popular myth of drinking warm milk as a sleep aid. Research has not been unanimous in demonstrating that tryptophan has clear sedative effects. However, most studies are conducted with good sleepers who have little

room for improvement. Therefore, if having a glass of warm milk before bedtime is sleep-inducing for you, then you should continue doing it.

Exercise

There are many health benefits to regular physical activity. Exercise can serve as a protective factor against the development of chronic illnesses such as heart disease. Physical activity can also be a buffer for the harmful effects of stress. For example, many people use physical activity as a method of coping with life stressors (e.g., going for a brisk walk after having a stressful argument with your spouse or friend). Research has also shown that people who exercise on a regular basis are less likely to suffer from the long-term harmful physical and emotional effects of chronic stress. In laboratory situations, physically fit individuals show less physiological arousal in terms of heart rate, blood pressure and muscle tension under conditions of mental stress than people who never exercise.

There is also an abundance of research showing that regular physical activity has positive effects on sleep. The reasons for this appear to be related to sleep's suspected function as a restorative mechanism for the body (recall Chapter 2 discussion). In essence, it is thought that the more active a person is, the more energy he or she will have to recover during sleep. Slow-wave sleep is particularly affected by physical activity. Studies have shown that physically active individuals spend more time in slow-wave sleep than inactive individuals. They also take less time to fall asleep and have fewer awakenings. Paradoxically, physically fit persons sleep fewer hours during the night, although this is probably because their sleep is more concentrated and less fragmented.

It is a common misconception that you have to be an athlete to reap the benefits of exercise. In reality, it is more important to engage in regular mild to moderate exercise. Walking is a good example, and now heart specialists advise regular walking as a preventive measure against heart disease. Irregular bursts of strenuous exercise can do more harm than good. For example, they can be painful and this may scare you off from future exercise. In contrast, most people find it easy to incorporate a daily walk into their routine.

Many people with chronic pain find that they can not do some forms of moderate exercise because they find it physically uncomfortable. This is especially true for activities that involve repeated strain on the back or a lot of bending. Thus, it can be a challenge to find the type of physical activity that you can both enjoy and find comfortable. Swimming is an exercise that many people with chronic back pain enjoy because it doesn't strain the back muscles. Here's a few tips for selecting and planning a regular regime of physical activity:

- ◆ Before doing any exercise, do some stretching exercises to loosen up any stiff muscles— this will reduce any pain and discomfort that may occur afterwards.
- ◆ Always use your pacing skills for planning how much and how often you are going to exercise.
- ◆ Find activities to do in a group or with a friend. Here are some examples: walking, swimming, cycling, dancing. Having someone to share the experience with can make it more enjoyable and something to look forward to instead of another chore. You can also give each other support and praise.
- ◆ DON'T do any heavy exercise just before bedtime. This can produce a stress effect in the form of increased arousal (elevated heart rate, blood pressure, temperature) which can impair your ability to get to sleep. The best time to exercise is in the afternoon or early evening. The rebound cooling that occurs will be conducive to sleeping later. Another strategy is to plan a mild pleasurable activity, such as walking, for first thing when you get up in the morning; this will give you an incentive for arising at a regular hour.
- ◆ Choose an activity that you can do on a regular basis regardless of the season. Again, walking is the prime example. It can be done in virtually any weather condition. Also, you can always find ways of making it interesting (e.g., walk with a new friend, change your route).

Environmental factors

Most people find it difficult to sleep in a really warm room. Hot summer nights can be terrible for sleeping, especially if you already have poor sleep. High temperatures (above 30° C) increase awakenings and reduce slow-wave sleep. Some people are more sensitive to room temperature and other environmental conditions than others. If you find that changes in room temperature interfere with your sleep, you would do well to maintain a constant temperature in your bedroom. Think of this as another strategy for making your bedroom environment a cue for sleeping. The precise temperature depends on you. Some people find a cooler room more favourable for sleeping. If you can't afford an air conditioner, try taking a hot shower before going to bed. The rebound cooling that occurs will help you get to sleep faster.

Another important environmental factor is noise. It is a misconception that people who live in noisy areas eventually adapt to the noise and learn to ignore it when sleeping. In fact, surveys have shown that on average people who live in particularly noisy areas (e.g., close to the airport or downtown) report more sleep problems than normal. If

you happen to live in one of these noisy areas, you should take steps to limit the amount of noise that reaches your bedroom (short of moving!). Keeping your windows closed can help. Having both blinds and drapes on your windows will filter out some of the noise (drapes and other heavy material absorb noises). You can also try to create a steady background noise ("white noise"), by using a fan or air conditioner to mask outside noises. On the other hand, the solution may be as simple as getting some ear plugs.⁴

Sensitivity to noise during sleep increases with age such that the older you get, the more likely you are to be awakened by sounds around you. Women are more sensitive to noise than men. People are more likely to be awakened by a noise that is meaningful for them, such as a baby crying or the person's name being called.

Mattress quality is another important environmental factor. Preference for mattress type and firmness differs from person to person. Among people with chronic back pain, however, there seems to be a consensus that the firmer the better—waterbeds should be avoided. The size of mattress can also affect your sleep quality, especially if you have a bed partner. When you sleep on a double mattress with another person, you actually have less room than a single mattress. Having extra room to move and shift positions without feeling as though you are disturbing your bed partner can be worth the expense of a larger mattress.

Table 7.2
Sleep Hygiene Summary

Practice	Effects on Sleep	Details	Recommendation
Caffeine	-	a central nervous system stimulant that enhances alertness; >2 cups coffee can increase time to fall asleep and cause more awakenings	Eliminate all caffeinated beverages after 6 p.m. Heavy daytime consumers should cut down
Nicotine	-	another stimulant >1 pack per day can increase sleep onset and cause awakenings	Cut-down to less than one pack per day, or quit altogether (professional assistance with smoking cessation is suggested)
Alcohol	-	A central nervous system depressant that causes sleep fragmentation and early morning awakenings	Avoid large amounts of alcohol before bedtime
Diet	-	A large meal before sleep activates the digestive system and may cause awakenings	Avoid large meals 3-4 hours before bed
	+	As part of your presleep routine, light snack before bedtime can promote sleep	Have a high carbohydrate snack (e.g., cheese and bread) before bedtime
Exercise	-	Heavy exercise within 2 hours of bedtime stimulates your body and interferes with sleep	Avoid any strenuous activities before bedtime
	+	Increases slow-wave sleep and decreases time to fall asleep and awakenings	20-30 minutes of mild to moderate exercise 3 times per week (e.g., walking)

- = Can impair sleep
+ = May enhance sleep

⁴ If you use ear plugs, make sure you can hear your smoke or fire detector when wearing them.

WHERE DO I GO FROM HERE? MAINTAINING TREATMENT GOALS

You should be proud of yourself for getting this far. This is not an easy program. It can be hard to change old habits. Our job was relatively easy—you did all the work. All we did was show you how to regulate your pattern of sleep and engage in more appropriate sleep behaviour and thinking about sleep. You are the one who put these skills into practice and learned how to take control of your sleep.

The program doesn't end here, however. Unlike many traditional medical treatments where you take a medication for fixed period of time and then stop, you should continue with the skills you have learned in this program. It is important that you apply the skills and techniques on a regular basis to help you maintain a regular and satisfying sleep pattern. Think of it as an overall lifestyle change similar to maintaining a healthy diet. All we did was to show you how to sleep the way most good sleepers do. Thus, if you want to continue sleeping better than you did before, you should continue to apply the skills from this program.

If you have not achieved the goals you set out at the beginning of this program, you should retrace your steps and see which procedures you used and which you didn't. If you didn't use all the techniques, especially the stimulus control guidelines, then you should consider going back and giving them a try. You won't know if they work unless you try them. Also remember that not everyone responds to the techniques at the same rate, so give it time.

If you skip on your regular practice of these strategies and your sleep quality is still unsatisfactory, you should justify to yourself why you chose not to do the work. Make sure you give yourself a good reason because ultimately you are in charge in your own self-management program. A common reason people give to themselves for not using a new skill is that it is too hard for them to change their present habits, or they are too busy with other activities to put the skill in to practice. If this is your reason, then ask yourself:

How important is quality sleep to me?
 How much longer can I go the ways things are going now?
 Are these other activities more important than my sleep quality? If yes, then devote your attention to those activities until you achieve the goal associated with them. If no, then ask yourself: why are these activities taking priority? What needs are being served by devoting your energy to those activities?

Ultimately, you are responsible for your continued success. You now have the skills to make your sleep better, so you should not feel like the passive victim of your sleep problem.

Motivating Yourself to Continue

Success in terms of sleeping better will probably be the best motivation you can find for continuing. However, you should not become consumed with the outcome of your efforts all the time. You can enhance your motivation by recognizing the rewards in just doing the techniques. Imagery, for example, should be a pleasurable experience regardless of whether you get to sleep any quicker. Look at it this way; even if it takes you the same amount of time to fall asleep, at least that time was spent engaged in pleasant imagery and relaxation, as opposed to frustration and anxiety.

If you ever start to doubt why you are doing these techniques, just remind yourself of your original goals for sleeping better. Ask yourself, "do I want to go back to sleeping the way I did?" It might also help to remind yourself of the successes you did have with this program. Success with one technique is a good sign that you will have success with others. Above all, compare your successes and failures to your personal (realistic) goals and not to some other standard for sleeping.

It may help to self-monitor your sleep periodically to remind yourself of how well you are sleeping. For example, every 6 months you could fill out the sleep diary for a 2-3 week period and then chart your progress. Use this as an opportunity to identify areas of drift in your sleep pattern that may have occurred since finishing the program. For example, are you still maintaining a regular rising time? Do you restrict your time in bed to no more than one hour greater than the total time you are sleeping?

Coping with Relapses

It is important to first be able to recognize when you are having a relapse. One or two nights of poor sleep is not a relapse since most people have occasional nights of insomnia. Of course, you are the best judge of whether you

are falling into a pattern of chronic insomnia again. You can use as your assessment guideline the sleep you had before starting the program. Therefore, if you start to have this poor sleep pattern again for at least 2 weeks, then you should take some steps to correct it.

You should make sure that any relapse in your sleep pattern is not related to a new stressor in your life or change in your health or lifestyle status. Some things to look for are:

Is there a new personal or financial stressor in your life now?(e.g., change in income, marriage/divorce/separation, loss of a loved one, moving or change in living arrangements)

Have you been feeling more depressed or anxious than usual?

Are you taking any new medications?

Are you drinking more than usual?

Are you smoking too much?

Are you having any new physical symptoms that would cause a change in your health status?

Disturbed sleep can be a symptom of any of the above, so you should rule them out as possible causal factors before proceeding with your relapse plan. To be on the safe side, report any sudden and dramatic change in your sleep to your physician. If it is related to a change in your health, you can still use your relapse plan to make your sleep better; just ensure that the primary problem is also being treated.

The first thing to remember with a relapse is not to panic. Relapses are normal and expected. Don't let yourself become overwhelmed with negative self-defeating thoughts. On the other hand, you shouldn't ignore a relapse and hope that it goes away. If anything, a relapse is just a reminder that your condition requires ongoing management.

One of the best ways to cope with a relapse is to have a plan prepared beforehand. The plan will be personal and depend on your preferences concerning techniques and coping strategies. You can make your work easier by knowing beforehand what your strengths and weaknesses are (e.g., coping with negative thoughts, using imagery). If your relapse is related to one of these weaknesses, then the first step may be to go back and read the relevant chapter. You don't have to read the whole manual again, just the chapters relevant to your relapse.

Make a list that will be your relapse plan. You can include any skill or set of skills from the manual. Put them in order of priority and expected effectiveness. An example of a plan for coping with a relapse is provided below. As a suggestion, the first three in this list should also be in your relapse plan, preferably at the top as well.

1. Follow all the stimulus control guidelines to the letter, not just the ones that worked for you.
2. Make sure your time in bed never exceeds your total time sleeping by more than one hour. Self-monitor using the sleep diary to monitor this.
3. Read Chapter 5 and complete the Attitudes and Beliefs about Sleep Scale again to remind you of the dangers of negative self-talk about sleep.
4. Don't cut back on any daytime activities, especially pleasurable activities (unless you are also having a pain flare-up, then reduce and pace your activities).
5. To avoid napping during the day, try to keep busy with mentally challenging activities; avoid boring or mentally passive activities such as watching TV.
6. Try to be more physically active during the day to increase your deep sleep at night .
7. Use positive reaffirming self-talk:
 "Insomnia will go away"
 "I coped with it before, I can cope with it again"
 "I have the skills now to help me get through this"
8. Tell your spouse/friends about your condition to elicit their support and understanding.

Appendix B
Coping with Chronic Pain Sleep Problems therapist guide

**COPING WITH CHRONIC PAIN
SLEEP PROBLEMS:
A Self-Management Approach**

Therapist Guide

**Shawn Currie, M.A.
Keith Wilson, Ph.D.**

Several overlapping themes form the basis for this group treatment

Small Group Theme

- Strengths:**
- 1) **Normalizes the experience of sleep problems for clients.** Demonstrates that they are not alone with their problem and dispels their sense of isolation. May instill some hope that their problem can be treated.
 - 2) **Mutual reinforcement and social support.** This may be more beneficial and therapeutic than reinforcement coming from therapist (he or she doesn't have the problem, therefore has no first-hand experience).
 - 3) **Mutual tolerance.** Attaining an outsider's perspective on their problem (seeing other people with the same problem) may instill some tolerance for their own problem. Indirect learning experience of tolerating the problems of other clients.
 - 4) **Vicarious learning.** Social-modelling—observing other group members using the skills effectively with positive benefits. Also, social inoculation—diffusion of information, tips, etc. through contact among group members both within and outside group.
 - 5) **Group therapy techniques.** Exercises and techniques only available to therapist working in group setting (e.g., buddy system, group discussion/exercises, brainstorming, group feedback).
 - 6) **Group norms.** Development of positive group norms (e.g., punctuality, open atmosphere, self-disclosure, mutual reinforcement) can be therapeutic as well as serve to control behaviour; enhances the credibility of the treatment.
 - 7) **Prosocial atmosphere/Learning through Helping Others.** The development of altruistic behaviour can become curative in itself; creates a therapeutic ambiance of change (Yalom, 1970).
 - 8) **Fostering of independence.** In comparison with individual therapy where there is a danger that the client becomes dependent on the therapist, clients are encouraged to rely on each other initially fostering inter-dependence. This is one step closer to complete self-reliance.

- Weaknesses:**
- 1) **Antitherapeutic group norms** —Group contagion with negative group behaviours.
 - 2) **Individual clients feeling isolated** or removed from prosocial atmosphere of group.
 - 3) **Failure of some clients to assimilate group process.**
 - 4) **Other client-specific factors.** For example, the inclusion of clients who are unable to cope with sharing therapist's time and attention with other members.

Problem-Solving Theme

- Leader-directed group problem-solving of individual client's problem
- Systematic problem-solving process; step-by-step instructions for all skills with emphasis on applying the rationale of each technique
- Problems are dealt with in the here and now

Goal-Oriented Theme

- Clients work toward individual and group goals
- Individual goals represent client-specific changes in targeted behaviours
- Group goals are usually therapist-defined and reflect some positive change in the group process over course of program (e.g., all members engage in self-disclosure, communication among members increases with less time spent talking to therapist).

Empirically-Based Techniques

- All the methods outlined in manual are well researched and have demonstrated efficacy in treating chronic sleep disturbances.
- Therapist is not to stray from methods, although substitutions are possible on a client-by-client basis (e.g., PMR for imagery relaxation)

Coping Skills Training Theme

- Treatment approach is a balance between the psychoeducational (information-giving) model and coping skills training model
- Utilizes psychoeducational teaching methods with emphasis on developing active *transferable* coping skills
- Some psychoeducational principles apply (a) unconscious (intrapsychic) cognitions as mediators of behaviour and emotion are not dealt with; (b) deal with generalities and not idiosyncratic cognitions of the individuals; (c) clients are screened to be sufficiently motivated to try this approach; clients with personality features that may interfere with their active participation are excluded.

- ▶ Not intended to be pure behaviour modification; heavy emphasis placed on understanding and assimilating rationale for procedures; program encourages thinking before acting and asking questions

Self-management Orientation

- ▶ Emphasis on clients accepting ownership of their problem and acquiring a sense of control in managing sleep disturbances
- ▶ Heavy emphasis on home practice, self-monitoring—transferring group skills to his/her natural environment
- ▶ Focus on active rather than passive coping skills

Multicomponent Theme

- ▶ The program is loosely organized into three main components: cognitive, behavioural, and educational. The term loosely is used because the program strives to integrate the three components as much as possible.
- ▶ In its current form, the treatment presents a package consisting of a variety of coping skills and techniques for improving sleep; this package has documented effectiveness with persons with chronic insomnia. On the other hand, there has been little research with persons suffering from insomnia secondary to chronic pain. It is for this reason that we are starting with the complete package to determine its overall effectiveness. Subsequent research will be directed toward determining the salient aspects components of the treatment for chronic pain (e.g., dismantling research strategy).
- ▶ Since many people with chronic pain suffer from more than one type of sleep disturbance, it makes sense to use a variety of approaches. This will increase their repertoire of coping skills at their disposal.

Characteristics that Define the Group

High Group Structure

- ▶ Because of the psychoeducational format, a high group structure is necessary, with a balance between didactic presentation and group discussion. It is important that discussion remain focused on the topic of sleep and related issues.
- ▶ Presentation of the material contained in the manual is necessary; what isn't covered is assigned as reading.
- ▶ An agenda is defined for each session. Therapist should stick to it as much as possible; structure is especially important at the beginning and end of each session.
- ▶ Every session is to begin on time and end on time
- ▶ Boundaries are imposed to guide group behaviour and facilitate the development of positive group norms

Active Participation by Group Members

- ▶ Active participation defined in terms of (a) within group involvement in sessions and (b) extra-group compliance with applying skills, self-monitoring.
- ▶ Therapist utilizes methods that encourage active participation by members within and outside group sessions; discourage passive avoidance strategies
- ▶ Heavy emphasis on personal discovery and client self-managing their condition; extra-group work via personal projects and skills application is the active element in the treatment's success.
- ▶ Within group sessions, participation in group activities and discussion should be encouraged but not forced; therapist should explain that their participation will facilitate and accelerate their acquisition of the skills.
- ▶ Therapist should monitor clients who don't participate often. He or she should be cognizant of the fact that these clients are likely to be the most in need of help; clients that participate regularly are the least likely to benefit from participation since they are probably highly motivated and functioning at a higher level.

Supportive Atmosphere

- ▶ Communication among members within and outside group is open, supportive, and empathic; members should feel comfortable talking within the group and able to disclose information, discuss their progress, etc.

Specific Factors Related to the Group Treatment of Sleep Disturbances

- ▶ Meta-analytic research has shown that group and individual treatment approaches with chronic insomnia are equally effective in terms of outcome (post-treatment and follow-up)
- ▶ Nonpharmacological interventions shown to be superior to pharmacotherapy treatment in producing long-term change
- ▶ Clients referred for treatment in a hospital or clinic setting are more likely to benefit than solicited volunteers
- ▶ Clients' beliefs and expectations regarding the credibility of the treatment and therapist is likely a predictor of outcome; for example, compliance is likely enhanced when clients have greater expectations that the treatment should work

- ▶ Thus, it is important for the therapist to present himself or herself and the treatment in a credible and professional manner; there should be little reference to this as an 'experimental' treatment
- ▶ Of the individual treatment components, stimulus control has consistently shown to be the most effective; therefore, therapists should emphasize this part of treatment
- ▶ Sleep is a highly personal behaviour; clients will vary in their use of coping strategies to deal with their sleep disturbances; clients should be encouraged to share these with other group members
- ▶ One or two clients who experience some success with applying techniques will be therapeutic for the rest of the group; therefore, when screening clients for the group the therapist should pre-select one or more clients who demonstrate potential for success in the group

Therapist Process

In cognitive-behavioral therapy, clients must feel the therapist is trusting, sensitive and approachable for the therapeutic alliance to be productive. Clients must also feel the therapist is competent and skilled in the approach that will be taken.

Principles of cognitive-behavioural group therapy:

- ▶ *Collaborative empiricism*- present cognitions and behaviours are examined and discussed by the client and therapist as a team.
- ▶ *Working in the here and now* - problems are dealt with in the present tense. The current state of the client's maladaptive thoughts and their significance and consequences are assessed; the therapist and client work together in the present to gain insight into the client's current functioning; focus of change is on the external reality outside the context of the group

Assumptions of the cognitive-behavioural perspective (Turk & Rudy, 1987):

- ▶ Individuals are active processors of information and not passive reactors
- ▶ Thoughts (e.g., appraisals, expectancies) can elicit or modulate mood, affect physiological processes, influence the environment and can serve as impetuses for behaviour; conversely, mood, physiology, environmental factors and behaviour can influence thought processes.
- ▶ Behaviour is reciprocally determined by the individual and environmental factors.
- ▶ Individuals can learn more adaptive ways of thinking, feeling, and behaving, and.
- ▶ Individuals are capable and should be involved as active agents in change of maladaptive thoughts, feelings, and behaviours.

Common therapist techniques:

- ▶ *Role-playing* - a common technique in which the therapist takes the role of the client in various situations.
- ▶ *Problem-solving skills* - clients are encouraged to be self-reliant and ultimately, self-responsible.
- ▶ *Socratic dialogue and guided discovery* - by posing a series of key questions toward the client, the therapist can help the client identify what his or her problems are and examine the thoughts and behaviours which seem to be most associated with the problem(s).; encourages clients to use words instead of behaviour and explain what they mean; encourages thinking before acting

Handling Missed Sessions

Unless you know otherwise, interpret missed sessions as signs of resistance or the client giving in to their ambivalence. Missed sessions may also be due to the client not wanting to report failure or lack of progress to the group. In some cases, a client may stop coming to sessions altogether because they feel as they have gotten enough out of the treatment.

It is important to find out the reason for a missed sessions. They should not be ignored. This may send the wrong signal to the client(s) such as (a) you don't care about them as individuals, or (b) it's appropriate behaviour when you said in the beginning it wasn't. Either way it serves to reinforce the client's passive avoidance coping.

Procedure: When a client fails to appear for a session, phone them the next day. In a non-confrontational manner, ask them the reason for the missed session. Express your concern that they missed an important session; reinforce the notion of the treatment as a complete package and that every session builds on the work of previous one.

It is important, both for clinical and record-taking purposes, to ascertain the precise reason why the client missed the session (ask them if it has anything to do with you as a therapist or one of the other members of the group). Remind them that what they tell you will remain confidential. If possible, meet with them on an individual basis before the next session to help them catch up on the missed material (don't let this become a habit, however).

General Format for Each Session

Length of each Session: 2 Hours (10-15 min. break after 1 hour)

General structure for each session

1. Review sleep diary and progress from last session

- ▶ This should always be the first item on the agenda to emphasize the importance of self-monitoring. Clients are expected to bring in their sleep diary and progress chart for every session.
- ▶ In a group discussion format, clients are invited to share their successes in the past week. Clients should be prompted to elaborate on what changes in their behaviour or thoughts were associated with the success (i.e., use this as an opportunity to reinforce client's sense of control over sleep problem and enhance their self-efficacy)

2. Identify problems encountered in home practice

- ▶ In group discussion, invite patients to share any problems in understanding or applying new techniques and skills (or problems completing the sleep diary); summarize the individual problems of clients into general categories and use this as the basis for providing corrective feedback.
- ▶ Clarify procedures and reiterate rationales if necessary; provide patients with new tips on applying skills
- ▶ Use this as an opportunity to assess client's compliance and motivation for procedures; enhance compliance if necessary.
- ▶ Get group involved in problem solving for particular client's problem (e.g., brainstorming for solutions; redirect feedback from other members to client; use this as an opportunity to get them communicating and cooperating)
- ▶ At the end, get the client to summarize in their own words their understanding of the technique and the solution

3. Design and negotiate strategies for better treatment adherence

- ▶ Useful techniques: 5-step problem-solving; identifying barriers and resistance; reframing; cognitive restructuring; tips for increased compliance

< Session Break >

4. Introduce new treatment component

- ▶ Begin by exploring clients' perception of the problem targeted by the new technique (Use open-ended questions in group discussion); summarize complaints of clients by writing them on a flip-chart.
- ▶ Use client example for illustrate purposes

5. Present didactic material

- ▶ Explain using step-by-step instructions as laid out in the client manual; circulate any handouts
- ▶ Validate the technique by explaining its effectiveness
- ▶ At the end, get a client to reflect back to you their understanding of the technique

6. Present the Personal Project for next week

- ▶ Explain the Personal Project in detail; members will not be checked on their completion of the 'homework' (except for the sleep diary); tell them the project is for their own benefit (reinforce the intrinsic rewards of the active coping and the opportunity for learning rather than punitive consequences of not completing it)
- ▶ Preview the next week's session

AGENDA

Outline:

- General orientation
- Introductions of members and therapist
- Review of group rules and expectations
- Review outline and format of rest of the program
- What causes insomnia?
- What are you doing now to cope with your sleep problems?
- Introduce self-management philosophy
- Review sleep diary (in remaining sessions this will be the first item on agenda)

Handouts/Materials Needed:

- 1. Extra copies of Daily Sleep Diary; blank Progress Chart
- 2. Schedule of sessions (should be mailed ahead of time)
- 3. Handout: What Causes Insomnia?
- 4. Flipchart
- 5. Copies (8) of chapter 1 from manual
- 6. Attendance sheet
- 7. Parking stubs

Because of the introductory nature of the first session, the format deviates from the general format to be used in the remaining sessions.

Goals for Therapist:

- 1) Establish an open, positive and supportive group climate; establish an atmosphere of sharing and acceptance of problems among group members
- 2) Establish your role as leader, group rules and structure; ensure members know what is expected of them and of each other
- 3) Orient members to the rationale of program, cognitive-behavioural approach and self-management philosophy
- 4) Ensure members are clear on the rationale of self-monitoring and ensure competence in completing Daily Sleep Diary

Group Process Goals:

- 1) Open communication among group members to encourage self-disclosure of problems
- 2) Participation of all members in group discussion (identify quiet members)
- 3) Foster group cohesion among the members by highlighting what they share and have in common rather than their differences

1. "Breaking the Ice" < 15 minutes >

Introduction of group members:

- Each member gives name, brief history of sleeping problems (before and after onset of pain), goals for program
- Therapist gives name, training, experience, own goals for group
- Therapist should draw attention to the fact that the present group will be together for the next seven weeks (patients who do not appear for first session are normally dropped from the group)

Therapist: Be sure to point out to clients their similarities and shared experiences. e.g. "One experience that you all seem to have in common is the sense of frustration over your sleep problems"; "One thing you all have in common is the desire to tackle this problem without relying on medication"

2. Group Rules < 10 minutes >

- Reaffirm expectation of punctuality, attendance to all sessions (call if can't attend), timing of breaks (max. 10

mins); explain that these rules are necessary to ensure that we get everything accomplished in time allotted so that clients get the full benefit of the program

- ▶ Confidentiality
 - ▶ Explanation of session format: balance of therapist speaking and clients speaking; encourage all members to participate (they may be called upon to speak but not forced to); may occasionally have to cut people off to give everyone a chance to contribute and be finished on time.
 - ▶ Material not covered in session may be assigned as reading
 - ▶ It's o.k. for members to get up and move around or stretch if you are feeling stiff from pain
3. **Format of program < 5 minutes >**
- ▶ There will be a balance of presentations and group discussion (therapist should encourage group discussion: "I like a lot of group discussion. You guys are the experts on your sleep problem. The more I hear from you, the more I can help you.")
 - ▶ Clients expected to do the readings outside the group time (Clients will get one chapter per week of the self-help manual)
 - ▶ Clients expected to do personal projects (homework); however, clients will not be checked on their homework (this is not school); the personal projects are for their own benefit and should push them further toward their goal
4. **Overview of treatment**

What Causes Insomnia? <Group Discussion>

Generate a group discussion on the topic of "What causes sleep problems/insomnia?" Write down the responses on the flipchart. Example responses:

Pain [Clients may get stuck on 'pain' being the sole cause of their insomnia; if they do, ask them "What makes your pain worse (or better)?"]
 Depression
 Caffeine/alcohol
 Nerves/anxious thoughts
 Irregular sleep pattern
 Low activity levels
 Medications

Use the information to fill in the cognitive-behavioural model of insomnia (Figure 1). Hand out copies of the model. Give clients a few minutes to look at it and make comments. Use the resulting discussion as a springboard for getting clients to recognize that there are factors other than pain that perpetuate or exacerbate their sleep disturbances. Ask each member to think about the part of the model that is the most relevant to them ("Ask yourself, what seems to cause you the most trouble in sleeping—intrusive thoughts, irregular sleep pattern, inability to find a relaxing position?).

Treatment Rationale

This program represents a consolidation of several different treatment strategies used in the treatment of insomnia. Each of these strategies have proven to be helpful for people with chronic sleep disturbances. These strategies target the factors we now know through research to perpetuate or worsen sleep problems.

The methods used in this treatment program are drawn from a well-established approach to behaviour change known as cognitive-behavioural therapy. Basically, this means the goals of treatment are to get you change some of the ways in you think about your sleep disturbances (this is the 'cognitive' part) and the ways in which you act on them (this is the 'behavioural' part). It is important for you to try all the strategies. The challenge for you will be to find the ones that work the best for you.

You should be aware that most people who complete this program do not necessarily become perfect sleepers. However, if you use the strategies and guidelines as outlined in the program you should experience a noticeable improvement in your sleep. The success rate for the program does suggest that your chances of improving your sleep are very good, and they are certainly much better than if you do nothing.

By continuing to use the skills you learn with this program, the improvements you make in your sleep can be maintained indefinitely. Research has shown that improvements made during the course of a self-management insomnia program are actually better than those obtained from the long-term use of sleeping pills.

- ▶ Encourage questions to satisfy client's curiosity and dispel any doubts about the program

- ▶ Don't make any false promises; reaffirm that clients are not expected to become perfect sleepers by the end of the program

< Session Break >

Introduction to Self-Management

Although we can show you a variety of techniques and teach you new skills to cope with your sleep disturbances, it is up to you to put them to use on a daily basis. In this program, we emphasize an active approach to coping. One way to think of the difference between active and passive coping is to think of the difference between moving forward and staying in one place. When you use passive coping strategies, you maintain the status quo; your condition may not be getting any worse, but it is also not getting any better. Active coping may involve a little more work on your part in the beginning, but the rewards will be long-term improvement.

An example of passive coping of insomnia is taking sleeping pills. Initially, they may make your sleep better but with continued use the effects start to wear off and you have to take more and more of the drug to get the same effect (this is called developing a "tolerance" to the drug).

- ▶ Emphasize the themes of control over sleep pattern, active coping and enhancing self-efficacy in managing insomnia

What are you doing now to cope with your insomnia? <Group Discussion>

Generate another group discussion on the topic of "What are you doing now to cope with your insomnia?" [Alternative question: "What rituals or habits do you use now?"] Find out "What works and what doesn't work?" On the flipchart, write down the current coping strategies used by members; therapist should be sure to point out the pros and cons of various techniques, supplementing patients' perceptions with information concerning the empirical validity of various strategies; contrast methods which represent passive versus active coping.

Examples:

___	Sleeping pills	___	Warm milk
___	Alcohol	___	Avoiding coffee
___	Relaxation methods	___	Napping
___	Pain medications	___	Changing mattresses
___	Over-the-counter sleep aids	___	Other drugs

Reinforce the Importance of Self-Monitoring

An integral part of this program involves monitoring your progress via the daily sleep diary. Self-monitoring your sleep is a necessary component for determining your success in this program since it provides the primary means for evaluating changes in your sleep that occur over the course of the treatment.

- ▶ Clients will have completed 2 weeks worth of the sleep diary as part of the assessment; use this opportunity to identify problems encountered in home use.

The sleep diary is also for your own personal use and interest. First, it provides you with the only means of formal feedback. When you learn any new set of skills, it is important to have some way of checking how well you are using them. For example, if you were on a diet, then you might monitor your progress by weighing yourself weekly and keeping a log of your eating habits.

- ▶ Emphasis to clients that the sleep log is for their benefit; they should use it as a learning tool for discovering more about night-to-night variations in their sleep pattern.
- ▶ Review the concept of sleep efficiency and how it is calculated from the diary. Emphasize that sleep efficiency, along with time to fall asleep, will be used as one of the primary indicators of progress throughout the treatment.

Clients in a previous group found it useful to monitor how their sleep changed in relation to their pain level. Take a look at your sleep diaries for the last 2 weeks and see how your nightly pain level changes in comparison with your sleep quality (SOL, SQL, TST, etc.). On nights that you are having more pain, do you take longer to fall asleep, have more awakenings, sleep less?

Most clients find that, generally, their pain level didn't predict how they slept that night— that is, there was no strong relationship between pain and insomnia. This is not to say that pain isn't a significant cause in their insomnia, only that there are other things that cause nightly changes in sleep problems.

[Therapist: Some clients may still insist that their pain level determines how well they will sleep that night. For these clients, find out what causes nightly changes in their pain level. The goal of this exercise is to get clients to recognize that there are factors under their control that affect their nightly sleep.]

Progress Charts

- ▶ Clients should be asked to bring in their sleep diaries each week so that we can update their progress charts (show a blank one). Periodically through the treatment, we will give them feedback on their progress. Clients are also free to maintain their own progress chart using the instructions provided in the chapter (in previous groups, few clients actually did this—they seemed to have enough to do with the other treatment activities).

Review of goal-setting

- ▶ Review the goal-setting criteria

Having realistic goals is very important. One of the reasons many people fail at making lifestyle changes is that they set goals for themselves that are unrealistic or in some cases completely unattainable. How many times have you made a New Year's resolution and failed to stick with it? It is probably because the resolution was made quickly with little forethought put into the magnitude of the change and the actions necessary to carrying it through.

- ▶ Ask a few willing clients to share with the group their goals for the program
6. **Personal Project for Next Week**
- A. Continue filling out sleep diary. Ask clients to start looking for trends in their sleep pattern: night-to-night variations, association between daytime events and night-time sleep, etc.
 - B. Read Chapter 1.

AGENDA

Outline:

Administrative business
 Review sleep diary & personal project from last week
 Identify problems encountered in home practice
 Design and negotiate strategies for better adherence
 Facts about sleep: biology of sleep, function of sleep
 Things that make sleep worse
 Sleep and chronic pain
 Rationale for behavioural strategies
 Sleep restriction procedure
 Personal project for next week

Handouts/Materials Needed:

1. Daily Sleep Diary
2. Flipchart
3. Copies (8) of chapter 2 from manual
4. EEG of normal sleep pattern and sleep architecture
5. Attendance sheet
6. Parking stubs

Session Goals:

- 1) Ensure adherence to maintaining sleep diary
 - 2) Facilitate group processes and encourage supportive atmosphere
 - 3) Basic facts about sleep are presented in a non-threatening manner for clients
 - 4) Introduce sleep restriction procedures
1. **Review sleep diary**
 - ▶ Review clients' daily sleep diary for the previous weeks.
 - ▶ Draw their attention to any trends in their sleep pattern. For example, do sleep problems persist through the entire week, or are there good and bad nights? Do the bad nights tend to cluster together around the same time of the week, weekends for example? Does your sleep pattern seem as bad as you thought it was?
 - ▶ Focus on the good nights now. Are clients doing anything different on those days compared with the bad nights.
 2. **Common problems encountered in home practice.**

Problem:	Filling sleep diary out incorrectly or incompletely (e.g., not completing all the items consistently; delaying in the morning before completing). To assess this, ask select clients to review their sleep diary for the past week; determine how many days were missed or times the diary was not completely filled out.
Solution:	It may be the case that the instructions were not clear in the first place and client was reluctant to ask for further clarifications. Reiterate instructions, reinforce importance of self-monitoring as a feedback strategy for clients.
Problem:	Low motivation to complete diary; poor compliance—this may be symptomatic of client resistant behaviour. To enhance motivation, ask clients to refer back to their original goals and reinforce the notion that the best way they monitor whether they achieve their goals is by using the sleep diary.
 3. **Design and negotiate strategies for better treatment adherence**
 - ▶ Useful techniques: 5-step problem-solving; identifying barriers and resistance; reframing; cognitive restructuring; tips for increased compliance
 4. **Introduction to Basic Facts about Sleep**
 - ▶ Provide the rationale for learning about the sleeping process; point out that this will not be an exhaustive 'lecture'

- ▶ on sleep, just the salient points that apply to chronic pain and sleep disturbances
 - ▶ Preface by stating that this will be one of the most didactic of the sessions; however, clients are not to be concerned about remembering all the material—it is all repeated in the handouts for today
 - ▶ Discourage note-taking!
- 5. a. Biology of sleep**
- ▶ Review material that is in self-help manual; organize material around dispelling myths about sleep (sleep is not a homogenous process, not as simple as sleep vs. awake, even normal sleepers experience awakenings)
 - ▶ Ask the group "How many times does an average healthy sleeper person wake up during the night?" (the answer is 5 to 15 times; spend some time on this issue; emphasize that it is normal for someone to wake up several times through the night; however, most people don't remember their awakenings but people with chronic pain do—why?)
 - ▶ Use audiovisual aids to illustrate normal sleep structure (stages, rhythm, slow-wave sleep etc.)
 - ▶ Keep discussion interesting by using everyday examples clients can relate to (why do you remember more dreams in the morning—because REM sleep is concentrated in the latter half of the night; deep sleep is when you cannot be woken up easily)
- b. Function of sleep**
- ▶ Stimulate interest by asking group "Why do you think sleep is important?" "Why do we need to sleep?" "What happens when you do not get enough sleep?"
 - ▶ Revisit the issue of awakenings. Ask the group: "What could be the function of regular awakenings throughout the night?" Keep the group's opinions on this issue. Point out that there are several adaptive functions to having cyclic awakenings: facilitates survival (it would be dangerous to be dead to the world for 7 hours straight—what if there was an emergency like a fire), parents need to hear their children's cries at night.
 - ▶ Organize material around client's responses to these questions; dispels the myth surrounding the need for 8 hours of sleep every night (throw in some historical examples: Thomas Edison slept less than 6 hours/night; Einstein reportedly needed 10 hours/night), and that sleep is an 'on-off' uninterrupted process (adaptive function on awakenings).
 - ▶ Point out that approx. 20% of the adult population sleep less than 6 hours/night.
 - ▶ Emphasize sleep as a restorative process with slow-wave sleep being the most important sleep stage for restoration

Factors that influence sleep quality <Group Discussion>

In open-ended format, ask group members for things that positively or negatively affect their sleep (excluding pain). Make a list on the flip chart—organize responses into controllable and uncontrollable factors. Generate some discussion on clients' personal experience with these factors. Use responses to present the factual material on the topic.

Add to the list if necessary: age, other medical conditions, depression, sleep routine, medications, exercise and diet, as well as:

- Keep an irregular sleep schedule (i.e., get up or go to bed at different times every day)
- Napping
- Spend excessive time in bed at night not sleeping
- Use the bed to relax or rest during the day as a means of coping with pain
- Use the bed or bedroom for activities other than sleep or sex (e.g., watch TV, read, eat, etc.)

d. Sleep and chronic pain

- ▶ Point out the high prevalence of insomnia among persons with chronic pain (44% to 90%, depending on survey); use this to demonstrate that clients are not alone—normalize their experience of insomnia
- ▶ The most common complaints among persons with chronic pain are: delayed time to fall asleep, reduced sleep time, repeated awakenings, and poor sleep quality. People may differ in how they experience these.
- ▶ Remind group that it is normal for them to have awakenings. Everybody has awakenings. The difference is that persons with chronic pain tend to remember their awakenings ("Why?" because they wake up in pain). Furthermore, because they wake up in pain, it can be more difficult for them to fall asleep.
- ▶ Draw attention to the fact that something can be done for each of these complaints (that is, we will give them strategies for coping with a disrupted sleep pattern, getting to sleep faster, how to cope with mid-sleep awakenings, improve sleep quality).
- ▶ Also point out that not everyone with chronic pain has insomnia. Furthermore, there is a continuum of severity both within an individual (a person can have good and bad nights), and across individuals. Having chronic pain doesn't guarantee that someone will have insomnia but it does increase their risk.

Now it is time for you learn some specific techniques you can use to make your sleep better. Keep in mind, we will be discussing a number of different strategies for coping with sleep disturbances, some of which will work well for some people and some of which will work for others. Therefore, don't get discouraged if you try a particular technique and find it does not work with complete success even with repeated practice. It is important, however, that you at least try all of them. You will eventually find the combination of techniques that works best for you.

Over the next couple of weeks we will introduce you to the following coping strategies for attaining better sleep:

1. ***Sleep restriction***
2. ***Stimulus control***

This part of the treatment will focus on the part of the model having to do with sleep habits [show insomnia model again]. These procedures have been validated through research and found to be effective with people suffering from similar chronic sleep problems. However, they are only effective when applied consistently.

These techniques are not meant to cure your sleep problems, but rather correct some of the factors that may be maintaining your insomnia. We'll start with the sleep restriction method.

5.2 Introduction to Sleep Restriction

The goal of sleep restriction is to gradually concentrate your sleep into a shorter period of time spent in bed. This will be done by getting you to curtail the amount of time you spend in bed, shortening it and bringing the value closer to the amount of time you actually spend asleep. The goal of sleep restriction is to increase your sleep efficiency by decreasing your time in bed.

By using sleep restriction, you should experience, after an initial period of adjustment, a deeper and more restful sleep. Furthermore, you will spend more time in bed sleeping and less time lying in bed getting frustrated, worrying about not sleeping.

- ▶ Ensure all clients have a solid understanding of the sleep measures time in bed, total sleep time, and sleep efficiency. If not, review the material on these measures.
- ▶ Review step-by-step procedures as outlined in manual; find a willing client and use them as an example to demonstrate the procedure. Using the flipchart, display the client's average time in bed, total sleep time and sleep efficiency from the DSD for one of their baseline weeks. Demonstrate how for the coming week the client is to restrict their time in bed to the average total sleep time recorded during the baseline period. This will make their sleep efficiency 100% for the coming week.
- ▶ Reinforce the importance of adhering to this procedure even though it seems hard at first. You can tell clients that this is one of the skills included in the treatment that clients in previous groups found very useful.
- ▶ Tell clients that "the first week is the hardest. You may even experience an increase in your pain. However, patients in previous groups reported that their pain did not increase to anything that they could not cope with." Also tell clients that their sleep may seem worse in the first week. "You may not like us (the therapists) for the first week, but please stick with it."
- ▶ Clients who are resistant should be asked to treat it like an experiment. What do they have to lose? However, they need to give it at least a couple of weeks to 'kick in.'

Tips for Applying Sleep Restriction Procedure (from manual)

- ▶ Don't reduce the time in bed to anything less than 4 hours no matter how poor your sleep efficiency is.
- ▶ Avoid changing your arising time in the morning. Decrease your time in bed by going to bed later. If you are now in the habit of arising a 6:00 a.m. every morning, stick to that. You may find that applying sleep restriction will force you to alter your regular arising time. For example, if you are in the habit of waking up at 4:00 a.m. and lying in bed until 6:00 a.m. before arising, then get out of bed earlier.

How does sleep restriction work?

The reason why this procedure works so well is that it actually concentrates your sleep into a shorter

Most clients find that, generally, their pain level didn't predict how they slept that night— that is, there was no strong relationship between pain and insomnia. This is not to say that pain isn't a significant cause in their insomnia, only that there are other things that cause nightly changes in sleep problems.

[Therapist: Some clients may still insist that their pain level determines how well they will sleep that night. For these clients, find out what causes nightly changes in their pain level. The goal of this exercise is to get clients to recognize that there are factors under their control that affect their nightly sleep.]

Progress Charts

- ▶ Clients should be asked to bring in their sleep diaries each week so that we can update their progress charts (show a blank one). Periodically through the treatment, we will give them feedback on their progress. Clients are also free to maintain their own progress chart using the instructions provided in the chapter (in previous groups, few clients actually did this—they seemed to have enough to do with the other treatment activities).

Review of goal-setting

- ▶ Review the goal-setting criteria

Having realistic goals is very important. One of the reasons many people fail at making lifestyle changes is that they set goals for themselves that are unrealistic or in some cases completely unattainable. How many times have you made a New Year's resolution and failed to stick with it? It is probably because the resolution was made quickly with little forethought put into the magnitude of the change and the actions necessary to carrying it through.

- ▶ Ask a few willing clients to share with the group their goals for the program

6. Personal Project for Next Week

- A. Continue filling out sleep diary. Ask clients to start looking for trends in their sleep pattern: night-to-night variations, association between daytime events and night-time sleep, etc.
- B. Read Chapter 1.

Determine your sleep window:

What was the average number of hours you spent sleeping each night for the past 7 days?
_____ hours. This is your **sleep window**.

Week 1	time in bed = _____ (sleep window)*	} sleep efficiency = <u>100%</u>
Week 2	time in bed = _____ (sleep window + 15 mins)	} sleep efficiency = _____
Week 3	time in bed = _____ (sleep window + 30 mins)	} sleep efficiency = _____
Week 4	time in bed = _____ (sleep window + 45 mins)	} sleep efficiency = _____
Week 5	time in bed = _____ (sleep window + 60 mins)	} sleep efficiency = _____
Week 6	time in bed = _____ (sleep window + 75 mins)	} sleep efficiency = _____
Week 7	time in bed = _____ (sleep window + 90 mins)	} sleep efficiency = _____

* For the first week, your time in bed will be equal to your sleep window making your sleep efficiency ratio 100%.

AGENDA

Outline:

Administrative business
Review sleep diary & personal project from last week
Identify problems encountered in home practice
Design and negotiate strategies for better adherence
Review rationale for stimulus control
Stimulus control procedures
Personal project for next week

Handouts/Materials Needed:

1. Daily Sleep Diaries
2. Flipchart
3. Copies (8) of chapter 3 from manual
4. Attendance sheet
5. Parking stubs

Session goals:

- 1) Clients are clear on the rationale for behavioural strategies
- 2) Clients understand stimulus control and begin applying the guidelines

1. Review sleep diary

- ▶ Review clients' daily sleep diary records and progress for the previous weeks. Have they noticed a change in their sleep with the sleep restriction procedure?
- ▶ Look for patterns and relationships in sleep: contrast sleep quality rating on different nights—what factors are associated with better quality sleep?

2. Identify problems encountered in home practice.

- Problem:** Sleep seems worse. Or fighting sleepiness in order to comply with sleep window.
Solution: Remember it takes several weeks to adjust to the new sleep schedule. A little short-term discomfort now is a small price to pay for long-term satisfaction. Reaffirm the proven benefits of this procedure. Also point out the irony of having to fight sleepiness before going to bed.
- Highlight the theme of control. By using this procedure, they are assuming control over their sleep pattern, rather than letting it control them.
- Problem:** Difficulty staying up later. Can't find things to do to stay awake.
Solution: Brainstorm with the group for ideas to stay awake. Ask other clients what they do late at night to stay awake. Turn it into a group problem-solving exercise. Make a list of activities to stay awake.
- Problem:** Client feels sleepy during the day and wants to nap.
Solution: Reaffirm the importance of avoiding napping during the day. This will disrupt the sleep rhythm you are trying to develop with the procedure and destroy any of its benefits. Ask clients to engage in another activity incompatible with napping when they get to urge to sleep during the day. This should be an out-of-home activity.
- Problem:** Client is concerned about impact of sleep loss on job, family responsibilities.
Solution: The body knows how to catch up on the good sleep (i.e., deep sleep). After a period of partial or total sleep deprivation, the body reacts by spending more time in deep sleep. Remind client that this happens automatically (don't need to do anything—it is a natural reaction to sleep loss).

Problem: Clients argue that it is hard to avoid lying in bed. They use their bed to rest and relax during the day when feeling pain.

Solution: Clients should be asked to think about the association between their bed and pain that is being created by this behaviour. Lying in bed while in heavy pain reinforces the role of their bed as a stimulus for discomfort. By using sleep restriction, you are breaking this association, and strengthening the role of your bed as the place to sleep.

Problem: Low confidence in the benefits of procedure.

Solution: Encourage self-exploration and reframe procedure as a "behavioural experiment." Work collaboratively with client to test the validity of their assumptions. Derive a hypothesis, stated in specific operational terms, to test empirically via a behaviour change.

Problem: Overall resistance

Solution: Use questioning techniques to get at the heart of their resistance. Examine the pros and cons of change:
Q: "What are the pros and cons to things staying the same?" ; "What do you have to lose from trying?"

Clients who are still resistant can be told that "you at least know now why spending excessive time in bed not sleeping is bad for their sleep pattern. Perhaps in the future you will find a way to curtail your time in bed."

3. Design and negotiate strategies for better treatment adherence

- ▶ See tips for sleep restriction and above

By this time, you will be into your second week of sleep restriction. Many people find this time very hard. You may be finding it difficult to adhere to the sleep restriction rules. You may feel more sleepy during the day than before you started. Understand that these are all natural reactions to using sleep restriction. Think of this procedure on a weekly basis and don't worry about whether the inconvenience will last forever because it won't.

- ▶ Validate and praise clients for getting this far. "This is not an easy technique. It's great that you were able to stick with it"

**** Remember this is the week to start increasing your sleep window by 15-30 minutes (assuming you have stuck with the sleep restriction every night). Starting with tonight, you can increase your time in bed by 15 minutes. This should make the coming week easier on you.**

- ▶ Deal with any resistance or non-compliance with sleep restriction before proceeding to stimulus control. Ensure that clients are committed to sticking with sleep restriction for at least another week.
- ▶ Encourage clients to elicit the support and help of others in applying sleep restriction. For example, ask spouse/roommate/family members to help them stay up later.

4. Introduce stimulus control procedures

- ▶ Many clients will have previous exposure to this information. Reframe the intent of stimulus control as being skills to augment or facilitate the sleep restriction.

Today we are going to review some techniques to help you in your application of the sleep restriction procedure.

- ▶ Link stimulus control and sleep restriction to the cognitive-behavioural model presented in Session 1.
- ▶ Many clients will have difficulty with the concept of stimulus control as it applies to the management of sleep problems. It may be helpful to use concrete examples that they can relate to. Trying to quit smoking and dieting are good examples to demonstrate stimulus control.

Ask: "Has anyone tried to quit smoking, or drinking, or lose weight" "How did you go about doing it?" ("What situations did you find the most tempting to smoke [or eat]?" "Why?")

Stimulus control procedures have one primary objective: to re-establish and strengthen the association between sleeping and your bed. Many of the habits people with chronic pain develop can be disruptive to maintaining a regular and satisfying sleep routine. In addition, the bed and bedroom are often become associated with activities other than sleeping (resting during the day). The goal of stimulus control is to get you to phase out or change as many of these practices as possible. Since

this may be difficult to do at first, we will as much as possible provide you with tips and alternative behaviours to help you achieve your goal.

The application of stimulus control is not guided by a formula. Rather, it is a set of guidelines and instructions on how to break certain habits which may work against good sleep, while at the same time reinforcing other sleep-friendly behaviours.

- ▶ Link the stimulus control guidelines to examples from quitting smoking or dieting. When demonstrating a particular principle, try to get the client to recognize the salient connection. This will be more therapeutic than just giving it to them.

e.g., "When you go to bed too early you end up lying in bed not sleeping and getting frustrated. What association is that creating? [the bed has become a cue or 'stimulus' for not sleeping, getting anxious, etc.]

5. Review individual stimulus control procedures

- ▶ Review each guideline in detail with group

Do not use the bed or bedroom for any activity other than sleep and sex.

- ▶ Adhering to this rule will help clients break the negative association between the bed and not sleeping, and reduce the feelings of frustration, anxiety, and of helplessness that may have plagued you.

Establish a set of presleep routines to signal the onset of sleep. Try to make the one hour period before going to bed a time to wind down.

- ▶ Clients should establish a ritual set of behaviours that clearly separates day and night.
- ▶ Reinforce the idea that practicing good sleep habits is not limited to what you do in bed, but applies to the entire 24-hour period.
- ▶ Emphasize that their presleep routine is an important part of their sleep pattern that they have control over.

Presleep routines <Group discussion>

Ask group about their current presleep routines. Point out the merits of any positive presleep activities, however, avoid labelling any presleep activities as wrong or 'maladaptive.' Do point out activities that may be interfering with client's sleep (e.g., (a) drinking a caffeinated beverage, (b) exercise, (c) reading stressful material). Examples of good pre-sleep activities to include in their routine would be: (a) taking a warm bath; (b) laying out clothes to wear for next day (or any other activity which makes it easier for you to get up in the morning; (c) practicing relaxation techniques (to be discussed in more detail in next chapter); (d) drinking warm milk; (e) reading a fiction novel, or (f) any pleasurable activity that takes their mind off of anxious thoughts (Ask each client to identify one thing they do in the evening that they find relaxing). If a client has no regular presleep routine, work with them to develop one.

Go to bed only when you are sleepy

- ▶ There is no reason to go to bed if you are not tired enough to fall asleep. Don't confuse feeling fatigued with feeling sleepy. Getting into bed prematurely will only prolong the time you will spend lying in bed awake, getting frustrated. Going to bed early only gives you more time to worry about tomorrow's events, think about unpleasant memories, and ruminate over your sleep problem.

Get out of bed if you can't get to sleep within a reasonable time period (20 mins)

&

Repeat the above procedure throughout the night every time you can't get to sleep within a reasonable time period

- ▶ These guidelines are at the core of SC and therefore the most important to follow.
- ▶ These are the most difficult rules to follow, however, adherence is essential. Some clients may claim to follow this guideline but in fact don't get out of bed. You need to ask:

"How long do you wait before getting out of bed?"

"Do you actually get out of bed?" "Do you go to another room?"

"What do you do when out of bed?"

"How long do you stay out of bed?"

Get up at the same time every morning. Plan a regular activity at the same fixed time in the morning to help with this.

- ▶ This is another challenging rule to follow; chronic insomniacs get into the habit of sleeping late when have the chance. They may be resistant to give this up.
- ▶ It may require clients applying the SC procedures in small steps to get them to recognize the benefits. For example, ask if they can try getting up at the same time every morning for one week. What do they have to lose?
- ▶ Persons not working may resist by claiming that they have no reason to get up at a specific time. Point out that this makes it even more important for them to follow this rule, since they are more susceptible to sleeping late. Problem-solve with them to find regular activity to engage in the morning (e.g., walking, do errands in the morning--no line-ups, waiting)

Avoid daytime napping

- ▶ The longer you stay awake during the day, the easier sleep should come at night. Studies have shown that the amount of time people spend awake during the day can predict how long it will take people to fall asleep, and how long they will stay asleep. For example, someone who is active for 15 hours of the day will take less time to fall asleep at night than if they were up for only 10 hours.
- ▶ Reaffirm PM skills such as pacing (e.g., spreading out activities into manageable chunks) as a strategy to prevent a build-up of pain and fatigue so clients feel the need to nap.
- ▶ Another strategy is to find alternative activities to napping. For example, when you feel the urge to nap, go for a walk. Always choose an activity that takes you out of the house. Being in the house close to your bedroom or the couch may be too great a temptation.
- ▶ Some clients may insist on the need to nap. Ask them to intentionally take a nap every day and monitor the effects on their sleep. This way, they can exert some control over their napping behaviour rather than feel as though they are being forced to nap because fatigue, sleep loss. It is important that the client takes responsibility for their actions (Have them say "I choose to nap", rather than "I need to nap"). Review the general guidelines for napping:
 - 1) Nap in the late morning or early afternoon. A late afternoon nap is like starting your sleep period early. You will rob yourself of that sleep at night.
 - 2) Don't nap for more than one hour. Research has indicated that a nap between 20 minutes and 1 hour is the most restorative. Naps longer than one hour can leave you feely groggy and unrefreshed (sleep inertia).

General tips for applying stimulus control

- ▶ Clients may feel overwhelmed by all the "rules" they are expected to follow. Clients who show signs of this can be asked to focus on make small gradual changes in their sleep habits by applying one or two of the SC guidelines for the first week. For example, a client can work on getting up at the same time every morning.
- ▶ Clients also need to recognize that, because they have chronic pain, sleep is a bigger challenge for them. They are not like normal sleepers. Their sleep is more sensitive and easily disrupted. Hence, they need to take greater care in establishing positive sleep routine and maintaining good sleep habits.

6. Personal Project for the Week

- A. Clients begin applying stimulus control and monitor effects on sleep. Clients are to think of strategies to facilitate their own adherence to the stimulus control guidelines and come prepared next week to share them with the group.
- B. Continue sleep restriction and self-monitoring

AGENDA

Outline:

Administrative business
 Review sleep diary & progress with sleep restriction/stimulus control
 Identify problems encountered in home practice
 Design and negotiate strategies for better adherence
 Group discussion on sleep medications
 Didactic material on sleep medications
 Personal project for next week

Handouts/Materials Needed:

1. Daily Sleep Diary/Progress chart
2. Flipchart
3. Copies (8) of chapter 4 from manual
4. Attendance sheet
5. Parking stubs

Goals for the session:

- 1) ensure mastery of sleep restriction and stimulus control procedures before proceeding to next module
- 2) ensure that clients understand educational material on sleep medication and guidelines for medication reduction

1. Review sleep diary

- Review clients' daily sleep diary records and progress for the previous weeks.
- Ensure clients are compliant with sleep restriction/stimulus control

2. Identify problems encountered in home practice.

Problem: Client has been trying sleep restriction for 2 weeks and still does not notice any improvement or deepening of sleep; client is more resistant to procedure

Solution: Reaffirm the benefits of procedure and the notion of long-term change in sleep vs. short-term discomfort. If client's resistance increases, always reply that it is their choice as to whether they wish to continue with the procedure (avoid the appearance that you are forcing the client to change—they must make the decision on their own and create their own motivation for sticking with it). Also remind group that this is not the only technique in the treatment. Over the next few weeks, they will be introduced to other coping skills so they shouldn't get discouraged.

3. Design and negotiate strategies for better treatment adherence

- same as Chapter 3

4. Introduction to Sleep Medication Information

Group Discussion on Sleep Medications

Ask the group "What are some of the medications taken for sleep?" Make a list on the flipchart (e.g., BZDs, muscle relaxants, amitriptyline, trazadone, over-the-counter sleep aids). Ask how much success they have gotten with these meds and what side effects they have experienced.

- The tone of this session should not be 'anti-medication', rather the intent is to provide clients with the information

to make their own informed decisions about medication use. Clients should come away knowing about how medications affect sleep, side-effects and health risks, and how to safely reduce or eliminate medications over time. Organize the remaining discussion around the following questions:

What are some of the advantages of taking sleeping medications?

- * Quick relief of sleeplessness
- * Alleviate anxiety built from several nights of sleeplessness
- * Easy to take; no work involved

What are some of the disadvantages of taking sleeping medications?

- * Pills change your sleep in an 'unnatural way' (decrease SWS, increase light sleep)
Sleeping pills don't improve your sleep, they inhibit your ability to stay awake.
- * Most sleep medications work by increasing stage 1-2 sleep at the expense of losing deep sleep (SWS). That is, you sleep more, but the sleep you get is shallower. This may be O.K. in the short term (i.e., 1-2 nights to a week). However, sleeping pills were not intended to be taken for long periods.
- * Some over-the-counter analgesics also reduce SWS (e.g., aspirin).
- * Side-effects: vary from drug to drug (e.g., daytime sleepiness, memory problems, etc.)
- * Health risk: dangerous to combine with other drugs and alcohol; risk to fetus
- * Expensive (\$\$)
- * Relying on external coping aid which may fail (run out of pills, doctor won't give another prescription, tolerance)
- * Long-term effects: unknown because most drugs are not meant to be taken chronically (drug companies will not fund research on long-term side-effects).

How well do sleep medications work for chronic pain sleep problems?

- * The experience has been that most patients taking medication to help them sleep still have insomnia—many have reported that going off their medication didn't make a difference.
- * Research finds that sleep medication is superior to other methods in the short-term (get bigger effects faster), but psychological treatment has better long-term benefits (*Why?*)
- * Variability in how patients respond to medications. For example, some benefit from amitriptyline, others find it doesn't work (because of this, many patients go through several medication trials, getting more frustrated each time one doesn't work).

- ▶ Use the discussion to assess the clients' attitudes toward medication use. If most are resolved to avoid medications, calibrate the discussion and information provided to reinforcing this attitude.
- ▶ Clients may have some specific questions on the effects of medications. Be honest if you don't know the answer. Tell them you will try to find out and get back to them next week (make this the first item on the agenda for the next week).

5. How to reduce or eliminate sleep medications

- ▶ Reinforce clients sense of self-efficacy in using the coping skills introduced up to now; validate progress achieved and praise clients for their efforts at coping with their sleep problems without the use of drugs.

What are the alternatives to using sleep medication?

- * There is a non-drug technique for achieving the same drug effect on sleep:
Getting to sleep faster – relaxation exercises/positive self-talk to reduce anxiety at sleep onset
- Deepening your sleep/reduce awakenings* – sleep restriction, increase activity levels to increase SWS, avoid napping, promote good sleep habits
- Achieve a more consistent sleep pattern*— fix a regular bed time and rising time; establish a regular presleep routine; use the bed only for sleeping

- ▶ For reduction of BZDs, use protocol in manual. Reinforce the main principals first (reduce gradually, develop a personalized withdrawal schedule and use the alternative techniques to cope with insomnia).
- ▶ Review the problem of rebound insomnia (reaction to not gradually reducing sleep medications) and how it can maintain someone's reliance on sleep medication (person continues taking to avoid withdrawal symptoms).

6. Personal Project for the Week

There is no specific homework for this week. Clients should continue with sleep restriction and stimulus control procedures.

AGENDA

Outline:

Administrative business
 Review sleep diary
 Review progress charts for sleep efficiency, sleep quality, and time to fall asleep.
 Identify problems encountered in home practice
 Design and negotiate strategies for better adherence
 Introduction to relaxation for sleep
 Preparing to relax
 Guide group through a relaxation exercise
 Personal project for next week

Handouts/Materials Needed:

1. Daily Sleep Diary/Progress chart
2. Flipchart
3. Copies (8) of chapter 5 from manual
4. Copies of Psychology Today article "The Power of Self-Talk"
4. Attendance sheet
5. Parking stubs

Goals for the session:

- 1) ensure mastery of sleep restriction and stimulus control procedures before proceeding to cognitive skills training
- 2) introduce imagery as a relaxation technique

1. Review Progress Charts

- ▶ Review progress charts for each group member. Explain to clients how to read the chart. Then show each clients' chart and comment on any improvements shown in their sleep. However, explain that "not everyone will show the same progress, or show progress in the same one. People differ in how their sleep changes in a program like this." Some clients may improve on variables not shown on the progress charts. For example, clients may reduce their reliance on sleep medication.
- ▶ An important thing to point out to clients is the close relationship between sleep quality (SQL) and sleep efficiency (SEF). On most progress charts, the lines for SEF and SQL clients will show a close, parallel relationship. It is important that clients recognize that the best way to improve their sleep quality is to increase sleep efficiency (hence, the rationale for sleep restriction and stimulus control rules).

Note: Review of the progress charts is very important. It is O.K. to spend the better part of the first half of the session on this. Clients like to get this kind of concrete feedback on their sleep improvements. They respond well to it and get motivated to continue.

2. Identify problems encountered in home practice.

- | | |
|-----------|--|
| Problem: | Low motivation with behavioural strategies—this may be symptomatic of client resistant behaviour. |
| Solution: | To enhance motivation, ask clients to refer back to their original goals and reinforce their desire to change their sleep |
| Problem: | Difficulty putting stimulus control and sleep restriction into practice; reasons given may be lifestyle factors, commitments, or sleep schedule determined by external factors (kids, husband, pain) |
| Solution: | Ask clients how long they will be able to continue the ways things are going without change. |

Problem: Client overwhelmed with changes to sleep schedule they are being asked to 197
Solution: Work with small goals. Ask client(s) what they think they would be able to change and get them to focus their energy on this for a week. For example, a client can work on the goal of getting up at the same time every morning.

Problem: Client focused on pain as determinant of sleep quality.
Solution: Have client attend to the association between pain and sleep quality or quantity on DSD. Highlight the lack of a strong association between the two, and reinforce the notion that pain is not the only determinant of how well they will sleep at night.

Point out the the likelihood that it is the client's focusing on their pain that is giving them trouble. Suggest that "if there's something you can do to relieve the pain, then get up and do it. If not, try to find a distracting mental activity, imagery for example."

3. Design and negotiate strategies for better treatment adherence

- ▶ Encourage discussion and sharing of experiences among group members
- ▶ Facilitate the group process in problem solving for a clients' problem or barrier; ask other group members if they have any ideas or comments on the problem.

4. Introduction to Imagery Relaxation

Why use relaxation exercises to get to sleep?

- ▶ Go back to the cognitive-behavioural model of insomnia (What Causes Insomnia? handout). You can explain that this is the part of the treatment where we focus on techniques to reduce stressful thoughts. Relaxation, particularly imagery, is an excellent way of relaxing both your mind and body.

Use this opportunity to reinforce the principles of the cognitive model: thoughts about a situation can determine our emotional response and physiological reaction (e.g., negative thoughts about sleep can create a state of anxiety and physiological arousal).

The cognitive model can are also work for us. With our thoughts, we can alter our physiological state—e.g., reduce blood pressure, heart rate, muscle tension (provide a few concrete examples).

Why is relaxation good for sleep?

- ▶ Physiological response to relaxation is conducive, in fact, required for sleep to occur
 - * heart rate, blood pressure, and muscle activity decreases
 - * body temperature increases slightly
 - these changes changes naturally occur when you fall asleep
- ▶ ** When you use relaxation, it is like giving your body a "push start" into a state of sleepiness.
- ▶ Cognitive (mental) response to relaxation
 - * distraction from pain (lying in bed at night is the time you are truly alone with your pain—you need something to take your mind off of it).
 - * refocussing your thoughts from the "mind chatter" you engage in at night
 - * evoke a more rhythmic brain wave activity (in the latter part of relaxation exercises there is a shift to slower brain waves)
- ▶ Emotional response to relaxation
 - * Evokes positive emotions (contentment, calm, happy) that are incompatible with negative emotional states.
- ▶ In essence, you can alter your physiological state: decrease, HR, EMG, BP, increase temp. (Reinforce cognitive-behavioural model of insomnia)
- ▶ Relaxation can be pleasant: it shouldn't just be work
- ▶ Taking advantage of your mind's natural imaging ability. 60% of your brain is visual, therefore with imagery you are using a powerful part of your mind (contrast with PMR which focuses on muscles and is not as good for sleeping).

Imagery works by helping your mind get to sleep along with your body. Your mind controls your thoughts, feelings, as well as necessary bodily functions such as sleeping. Available research now suggests that a state of mental relaxation is necessary for getting to sleep. In short, you have to turn your mind off, or at least put it into a state of relaxation where your thoughts are free of anxiety-provoking images. Imagery is like giving your body a 'push start' into sleep by decreasing BP, HR, etc.

What imagery relaxation is not: daydreaming
fantasizing
just a distraction

198

- these are passive activities; imagery is active

What sort of relaxing images do you make use of now?

- ▶ e.g., recent pleasant time, vacation spot, sex
- ▶ How do you evoke the image? How do you sustain it? (do you have difficulty holding the image in your mind for very long? does it fade or get pushed out by negative thoughts?)

You can improve your imaging powers by doing two things:

- 1) Practice
- 2) Put yourself in the scene rather than being a spectator; imagery is not like watching a movie (do an exercise to illustrate this point—have clients imagine 2 different scenes, one in which they are a passive observer, and the other in which they are an active participant).

How do you know if imagery is right for you?

- ▶ Ask clients: "Are you a worryer? If I asked you to think of a recent stressful event, would you have any problem visualizing it? Could you conjure up all the details of the event with little difficulty?"
- ▶ The ironic think is that people who worry a lot while lying in bed are natural imagers. You have lots of practice visualizing stressful events and thoughts. Now it is time to put those skills to use in visualizing pleasant images.

Preparation – Clearing a space to relax

Before doing any relaxation exercise, you should clear a space for yourself. Think of this as your preparation time. This means clearing both a physical and mental space. Clearing a physical space can be as simple creating a bedroom environment that is quiet and free from distraction. If necessary, clear up any clutter in your bedroom if you think an untidy room would bother you. Turn off the TV, radio, and any other noise-making appliances. You should not use imagery with music in the background, even if you find the music soothing. The music will distract you from your goal of trying to focus on the images in your mind. You want to be able to achieve relaxation without the aid of any devices.

Now, clear a mental space for yourself. You may be used to going over all your problems in you head when trying to get to sleep at night. By doing this, however, you sink deeper into your problems without solving them, and make yourself more anxious in the process. Being anxious in itself is anxiety-provoking!

"List" Exercise:

- 1) Make a list of everything that is keeping you awake at night.
- 2) Sort the list into 2 columns: A=What you can take care of right now, & B= What you can't do anything about right now before going to bed.
- 3) Go to the column A list and do those things before getting into bed
- 4) Try to forget about column B; remember you just decided that you could not do anything about these problems.

Practice imagery exercises

Imagery scene 1. Image a black circle on a white background. Picture the circle as perfectly round and completely black. Focus on the contrast of black on the white background. Now imagine the circle is an oval. Picture that the oval as being taller than it is wide. Now change the colour of the oval from black to blue. Change the shape and colour several more times before finishing with this image.

Imagery scene 2. Imagine you are standing next to a running stream. It is springtime and the ice has just melted through to the water. The water is deep and swift. It looks cool and refreshing. You can see to the rocks at the bottom of the stream. Now imagine any negative thoughts you have as objects floating down the stream. They float by you and away from you quickly down the stream until they are out of your sight completely. If a distracting thought surfaces again, let the water take it again. Keep doing this for any negative thoughts that enter your head.

Other practice images on next page.

Step-by-Step Instructions for ImageryBREATHING EXERCISE

1. Get into a comfortable position. Loosen any restrictive clothing and don't cross your legs. Close your eyes and try to clear your mind of any distracting or stressful thoughts.
2. Let your breathing shift into a calm, comfortable rhythm. Try to breathe in slowly through your nose, and breathe out slowly through your mouth. You might be easily distracted as your body first becomes quiet and peaceful. If this happens, remain patient. Try repeating a comfortable phrase to yourself, such as "I am relaxed." Or, focus your attention on the image of how your body is being nourished with oxygen each time you inhale, and cleansed each time you exhale.
3. Place one hand on your abdomen, and the other hand on your chest. Take a minute to check which area is moving the most as you inhale and exhale. The goal is to teach yourself to breathe from your abdomen, so that your lower hand is moving the most with each breath.
4. Each time you inhale, gently push your abdomen outward so that you are expanding the bottom area of your lungs. Each time you exhale, gently pull in your abdomen. This exercise is easier to do when you are breathing at a slow, comfortable rate. Remember, there should be less movement throughout your chest area.
5. Remind yourself that this is your special time to relax your body, your thoughts and emotions, and your behaviour. Enjoy the pleasant feelings which gradually spread throughout your body as you continue to relax. Enjoy the comfortable sensations, such as warmth or heaviness, which may become more noticeable throughout your feet, legs, abdomen, hands, arms, shoulders, and face.
6. When you are ready to complete this exercise, take a slow, deep breath in, hold it for about 4 seconds, and then exhale with a slow, deep sigh. Enjoy the release of any remaining tension. You can repeat this four more times. Afterward, shift your body around and gently stretch your legs and arms. Congratulate yourself for taking this time to enjoy this peaceful experience. You can now open your eyes.

GUIDED IMAGERY

7. Take the group through one of the images provided on the next few pages (beach scene, staircase)

It is summer. You are walking a beach alone . . . You are the only person for miles. It is almost dusk and the sun is setting. The sky, which was a deep blue only an hour ago, is now slowly turning yellow and orange. . . There are still clouds in the sky. They billowy and soft like a pillow. You remember how hot the day was earlier. The temperature is still warm. . . You feel calm and pleasant inside. The sand feels cool beneath your bare feet. Each foot sinks a little into the soft sand as you walk along the beach. You take a minute to stand still and feel the cool sand between your toes. You wiggle your toes to savour the softness of the sand. . .

Turning toward the ocean, you can smell the salt water. The clean salt breeze blows gently against your face. . . tickles your nose . . . It feels cool and refreshing. . . You look out toward the sea and spy a lone sailboat on the horizon. Its red sail is fully raised. The sailboat is slowly moving east. You see the wake it leaves in the water as it moves along.

Looking at the sky, the setting sun in the west looks like a bright orange glowing ball. It colours the sky with brighter shades of orange and yellow... Your eyes follow the sky down until it meets the horizon. You notice the rippling reflection of the orange and yellow in the water. It looks like the water is a giant mirror reflection everything above.

You walk up to water shore and let the tide rush over your toes. The water feels cool and refreshing. As you walk, your feet sink into the wet sand. All is quiet, calm and peaceful. The only sounds you hear are the waves of the ocean as they lick the shore. You notice the rhythm of the waves as they wash up on the shore. The sound is soothing and relaxed. . . Your whole body is calm and relaxed.

You feel warm inside. You sit down on the beach in the warm sand . . . The warmth cradles your body as you settle in . . . Closing your eyes, you tune out all your thoughts and focus on the sounds and smells of the ocean surf. You feel warmer and heavier.. . . The place you have made for yourself in the sand is cosy and comfy. You lie back and rest your head in a pillow of soft white sand. . . The soft breeze blows around your head . . . You can think of no other place in the world you would rather be right now—no other way you would rather feel . . . You are absolutely calm and comfortable . . . The gentle rhythm of the surf carries you deeper into relaxation . . . Your whole body is relaxed and your mind is calm and clear. . . Sleep is coming on—you can feel it overtake your body. . . Slowly you lose consciousness.

Common problems encountered during imagery relaxation

Lack of confidence in producing mental images. You don't have to have a 'great imagination' to practice this skill. Creativity is also not a requirement. Anyone can do imagery training. All that is required is motivation and a little patience. Experience has been that people who are anxious and worry about their problems a lot are predisposed to be good at imagery! This is because they have lots of practice imagining all their problems and their negatives consequences. What people have difficulty with is conjuring up positive relaxing images. You may be used to having a lot of negative or stress-provoking images occupy your thoughts, especially when trying to get to sleep at night. If this is the case, you should practice with simple short positive images before proceeding to longer detailed ones. Use these to build up your confidence with using the procedure.

Frustration and increased anxiety. You will likely have difficulty learning this skill initially. Don't allow yourself to get frustrated as this will only serve to increase your tension and arousal level. If you feel yourself getting frustrated, stop the working on the present image and switch to a simpler one.

Concentration. You may get distracted by pain and negative thoughts. However, think of imagery as a way of pushing thoughts and feelings out of you. If you're still having difficulty, try focusing on your breathing for awhile. Breathe slowly and deeply. Count each inhale and exhale: "Inhale one, exhale two, inhale three, exhale four."

Focusing on the outcome and not enjoying the experience. Don't focus on falling asleep so much that you keep yourself awake in the process. Imagery should be pleasurable no matter what the end result. The more you think about trying to fall asleep, the more aroused you'll get. Just try to put those thoughts aside and give yourself permission to relax with some pleasant images.

Tips for using imagery

1. **Reserve your use of imagery to cope with sleep disturbances** as a means of focusing and simplifying your self-management program. There are other advantages to this. You will find it easier to develop specific skills for specific purposes. Thus, if you are using PMR as a relaxation technique to reduce pain and cope with stress during the day, then you should continue developing this skill. It might get confusing to use one relaxation method for several very different purposes.
2. **Use imagery every night** until you have built a strong association between your use of imagery and getting to sleep. You should use it on nights even if you feel don't need it. In fact, these nights are the most important nights to use it. For one, you want to build up the association between imagery and the onset of sleep. Another reason is that during training, your goal is to build confidence in using imagery to get to sleep. You have to allow yourself to have successes when learning any skill. Having a series of nights when it is easy to get to sleep is a great way to build confidence.
3. **Do not use tape-recorded relaxation instructions.** For one, it is important that you generate the images in your mind rather than listening to them coming from a tape, even if it is your own voice. The art of imagining is being able to put yourself in the situation being imaged, as if you were really there. Imagining should not be as though you are watching a movie, which is the effect you may get if you listen to the instructions on a tape. Second, the mechanical sound of a tape recorder may distract you from fully experiencing the images. As well, the sound of the tape recorder shutting off when the end of the tape is reached may wake you up. Lastly, the use of tape recorder runs contrary to the philosophy of this program which is self-management. Although a tape recorder is a simple aid, the fact is that you should not become reliant on any mechanical devices for relaxation.
4. **Intensify sense impressions using the following techniques** (from Patrick Fanning's excellent book on imagery, *Visualization for Change* (1988)).

Add details. Start with the general and move to the specific. For example, if you imagine an apple, picture more than a simple round apple. Think of the irregular shape most apples have. Imagine the contours on the skin of the apple, and the change in colour across its surface.

Add colours. Change the colours of your images. Move beyond using the primary colours (red, green, blue) and experiment with more interesting colours (e.g., fuschia, lime-green, turquoise)

Add movement. Who says your images have to be motionless? Make them move or make yourself more if your imagining a scene with you in it.

Add depth. Create a foreground, middle ground, and background to add depth.

Switch among different senses and positive emotions. You don't have to stick with only visual images. You can also imagine sounds, smells, and the feel of your images. For example, imagine the crunching sound of biting into your apple, the taste of it, etc.

Create metaphors. If your feeling creative, try to generate images of abstract ideas such as love, pride, success, etc. (e.g., imagine love as a butterfly).

5. Always give yourself praise and use positive self-statements such as:
- | | |
|-----------------------------------|-------------------------------------|
| "I feel quiet" | "I will be asleep soon" |
| "I am able to feel relaxed" | "I doing good" |
| "I've succeeded with this before" | "I can do this, I'm doing this now" |

6. **Personal Project for the Week**

A. Clients should practice imagery exercises every night. Clients can use the images provided in the manual or during the session. They can also work on developing their own personally relevant images.

B. In preparation for next week's session, clients should read the *Psychology Today* article on Self-Talk.

AGENDA

Outline:

Adminstrative business
 Review sleep diary & progress
 Identify problems encountered in home practice
 Design and negotiate strategies for better adherence
 Cognitive therapy: Introduce rationale, the role of cognitive factors in insomnia (review cognitive model of insomnia again) and the utility of re-evaluating thoughts about sleep
 Review coping strategies for managing stressful thoughts at bedtime
 Clients complete adherence checklist before leaving

Handouts/Materials Needed:

1. Daily Sleep Diary/Progress chart
2. Flipchart
3. Copies (8) of chapter 6 from manual
4. Attendance sheet
5. Adherence checklist
6. Power of Self-Talk (*Psychology Today* article)
7. "What Causes Insomnia?" model

Goals for the session:

- 1) reinforce practice of all skills covered to date
 - 2) introduce cognitive skills training for coping with stressful thoughts at bedtime.
1. **Review sleep diary**
 - ▶ Review clients' daily sleep diary records and progress from the previous week.
 - ▶ Ask clients about their success with guided imagery exercise. Ask about barriers to relaxation.
 2. **Identify problems encountered in home practice.**
 < see previous chapters for common problems >
 3. **Design and negotiate strategies for better treatment adherence**
 < see previous chapters >
 4. **Introduce concepts of negative self-talk and automatic thoughts, and their relation to sleep problems**
 - ▶ The two main themes to emphasize in this session are: (1) the causal relationship between negative self-talk, emotions and lack of sleep (behavioural consequences), and (2) clients use of the bed as the place to problem-solve and worry (i.e., bed serving as a cue for worrying and anxiety).

Lying in bed at night is a time when many negative thoughts can come into our heads. It is the time of day when we are completely alone with our thoughts since there is little to distract us from them. It is time when we use our thoughts talk to our self ("self-talk"), perhaps going over the day's events and thinking about tomorrow.

Every one of us engage in this sort of "mind chatter" at times and have difficulty getting to sleep because of it. However, people with insomnia can get into the habit of doing it every night to the point when lying in their bed becomes a signal or cue to worry. This is particularly true of people with chronic pain. Consider that your sleep is already difficult because of pain. Lying in bed trying to fall asleep becomes an opportunity to worry and engage in negative self-talk, which becomes associated with insomnia.

- ▶ It is important that clients make the connection between their sleep problems and using their bed as the place to worry and ruminate about their problems. Ask: "By going to bed every night to worry and review your problems,

what relationship are you creating between your bed and stress? Is it possible that your bed and bedroom have become a cue or stimulus anxiety and worry?"

- ▶ Reinforce clients' use of sleep restriction as a strategy to limit the time they spend in bed worrying and getting anxious. Their practice of stimulus control has helped them to break the association between their bed and worrying time, and strengthen the association between their bed and sleeping.

Negative thoughts can also lead to painful emotions and can increase stress. When under stress, your body reacts with the "fight or flight" response: your muscles get tense, mouth dry, increased heart rate and breathing. The overall effect is that you become more aroused, making sleep even less likely. Feeling stressed can also lead to the use of ineffective coping strategies to deal with your insomnia (e.g., staying in bed and trying to force yourself to sleep) in an attempt to get to sleep. It is easy for a vicious cycle of negative emotions, bad sleep habits and continued poor sleep quality to develop.

What are the automatic thoughts that keep you awake at night? <group discussion>

Generate a group discussion on the negative self-talk that keeps clients awake at night (both at the beginning of their sleep period, and after awakenings). Give clients the opportunity to vent their anxieties while being supportive, empathic and validating. Find out exactly what their worries and fears are, and how they currently try to cope with them. Use the opportunity to highlight the different categories of dysfunctional cognitions about sleep. Identify the underlying assumption of each and any cognitive distortions (refer to Psychology Today article).

Some clients may deny having stressful thoughts at bedtime. Ask them what they do think about when they lie in bed trying to get to sleep. Switch the tone of the discussion by asking clients to share the positive self-talk they engage in at bedtime. What sorts of good things do they say to themselves, or about their accomplishments. Reinforce the importance of using their inner voice to elicit positive emotions.

Note: This discussion usually evolves into a venting session for the group. Members may see it as an opportunity for sharing the stressors in their lives. It is O.K. to let the group vent as long as you keep bringing the discussion back to cognitive model. Clients will provide plenty of examples of cognitive distortion and negative self-talk to work with.

Don't fall into the trap of trying to solve every client's problems in the session. It is more important that they grasp how their particular problem can be described in terms of the cognitive model, and how their negative thoughts can serve to perpetuate their sleep problems.

People can often engage in a pattern of negative 'self-talk' without being aware of it. Thoughts can occur automatically. For example, they may out of habit consistently focus on the negative aspects of any situation, or belittle their accomplishments. Focusing on the negative all the time is a little like wearing blinders—you neglect to see the positive aspects of situations, or fail to recognize solutions when they present themselves. The challenge is to find ways of breaking this pattern and to engage in a more positive self-talk.

- ▶ ***What Positive Self-Talk is Not.*** Positive self-talk is not to be confused with the 'power of positive thinking' or mindless happy thoughts (e.g., "The world is a wonderful place with no bad people in it"). Positive self-talk is accurate, realistic and open-minded self-talk. Be just as critical of your positive self-talk as your negative thoughts. When in doubt test the validity of the assumption underlying your positive self-talk with a personal experiment.

Signs of Negative Self-Talk and Distorted Thinking

Clients may challenge the notion that their self-talk is negative or 'damaging.' They may be resistant to change or even monitor their self-talk or thoughts on the grounds that they feel they are being realistic in worrying about their problems. Provide clients with some clear guidelines on how they can tell if their self-talk or automatic thoughts are harmful or self-defeating:

- 1) Do an 'emotion check.' They monitor their emotional state when having thoughts they are unsure of. A sign of negative thoughts is that they elicit unpleasant emotional reactions such as feels of emotional pain, depression, anxiety, distress, anger, guilt, helplessness, irritability, and others.
- 2) Physiological arousal is another sign of negative self-talk. Have clients attend to their physical symptoms such as heart rate, temperature, muscle tension (e.g., forehead, back, neck, etc.), blood pressure
- 3) Increased conflict with friends and family can be a sign that negative self-talk is affecting how the client is

interacting with others. Have clients monitor their automatic thoughts about various individuals in their life (What is the first thing you think of when you see _____).

- 4) When the client's predictions about events don't come true. For example, when they always predict the worst and worst never happens.
- 5) Point out that clients are probably harder on themselves than on others (we are our own worst enemy; we expect more from ourselves than we expect from others).

5. Coping Strategies for Managing Stress-Related Thoughts and Feelings at Bedtime

- ▶ Based on discussion generated from above, work with clients in helping them find the optimal strategies for managing their stress-related bedtime thoughts. Apply the appropriate strategy from below, tailoring to the specific problem of the client.

The difference between problem solving and problem management.

- ▶ Emphasize the difference between managing stressful problems and solving them. Sometimes it is not possible to solve a particular problem at the time. Some problems require time to resolve (e.g., getting over a loss of someone) or input/intervention from an external source (resolving a dispute with WCB). However, every problem can be managed such that the impact on your emotional and physical well-being is minimized. The ability to effectively managing problems is a skill that can be learned. Some available coping techniques are:

Concentrate on one problem at a time. Many people unintentionally heighten their sense of worry and anxiety by constantly shifting from one problem to the next when thinking. This makes it seem like you have twice as many problems as you actually do, or that you are going in circles all the time. Moreover, you never give yourself a chance to resolve a problem by only thinking about it a few seconds or minutes at a time. Focus on one problem at a time. Start with the either the one that is giving you the most distress, or the problem that you think you can resolve quickly. Concentrate on that problem only to the exclusion of all other problems. Sort out as many details and issues concerning the problem. If you are going to worry, you might as well make it productive worrying.

Worrying time. Rather than worry about your problems in bed at night, set a specific time and place (e.g., 2:30 p.m., at home in the living room) during the day to do your worrying. Define a 30 minute worrying period when you will sit down and do nothing except for worrying. Focus on only one problem at a time and try to make the time productive by coming up with some options for dealing with the problem. When trying to get to sleep at night and you feel yourself thinking about your problems, remind yourself that you have set some time out the next day to worry. As a suggestion, make your worrying time the time you normally nap.

Stay up all night worrying. If you tried the above strategies and failed, then try this: purposely stay up all night worrying. In other words, don't try to distract yourself from your problems in bed, rather give them your undivided attention for the entire night. It is possible that nighttime is your best time to worry. Try as best you can to sort out all of your problems. Do this several nights in a row until you feel like you have made some headway in solving your problems.

Thinking the worst (decatastrophizing) and then developing a contingency plan. Sometimes it is the fear of the unknown that can be troublesome and anxiety-provoking. When faced with a big problem, we don't always like to think about the consequences or the 'worst possible scenario.' It seems enough to know that something bad will happen and the details are not important. This is an example of emotional thinking, since we assume that the consequences will be as bad as the feelings we assign to them. By not thinking about the details of the 'worst', however, you deny yourself the opportunity to develop a plan and possibly minimize the damage.

Imagine the worst possible outcome to your problem. In your head, map out the sequence of events that would occur and the consequences of each. Engulf yourself in as much detail as you can stand. Do this several times until you are practically 'bored' with problem. Now, develop your contingency plan for dealing with the consequences. Although going through it will not be pleasant, remind yourself that the consequences will likely be time-limited and manageable. Remind yourself of you past coping efforts with the events and the fact that you got through it before.

After this is done, one of two scenarios will unfold: (1) the worst doesn't happen, in which case you will be relieved and even more happy than if you hadn't imagined the worst, or (2) the worst does happen, in which case you have your contingency plan prepared to minimize the impact. It will still be a difficult but not as difficult if you had not prepared. As well, by mentally imagining the event and the consequences over and over again, you have habituated or gotten used to the impact.

Do the work on paper and not in your head. Write out your problem(s). By always thinking about, it is difficult to

get any distance from it and objectively look at it. Describe honest facts of the problem in neutral terms. Write out all the problems that are significant stressors in your life. Sometimes, it seems as though we are overwhelmed with problems but when you list them they look a little more manageable. Identify the pros and cons of each problem in separate columns.

Try your best to manage your problems on paper. Write out the possible solutions and 'brainstorm' alternatives. Work at them for an hour, and then when you are done gather up the papers and put them away. Do this every time you want to work on your problems. Do your thinking on paper and not in your head. One advantage of this is that you have a written record of your thinking. When worrying, people tend to ruminate, or go over and over problems, sometimes thinking of a possible solution but then dismissing it. Sometimes, people think of the same solution over and over again. By doing the thinking on paper, you can review your records and see what ideas you have considered and what ideas you have not.

Distraction. Imagery is a good method of distracting oneself from stressful thoughts. Try images that help you get some distance from your worries.

Imagine yourself walking through a desert carrying a big pack on your shoulder. In the pack are all your problems; they all weigh differently (pain=20lbs, finances=15 lbs., etc.). You have been walking for miles with this pack; it is heavy and hurts your shoulder and back. You decide to put the pack down and take a break from your problems.

5b. Guided Imagery

Reserve the last 30 minutes of session to take group through another imagery exercise.

6. Personal Project for the Week

A. Clients should complete the adherence checklist before leaving today. They can do this at the break or at the end of the session.

B. Monitoring Negative Self-Talk at Bedtime. Clients should spend some time monitoring their negative self-talk. Three things to monitor: (a) what are the recurring thoughts at bedtime; (b) what are the common underlying beliefs (i.e., cognitive distortions); (c) what is the language used in your self-talk (i.e., use of self-defeating phrase such as "I'll never be able to ...", "It's hopeless", "I can never...").

Clients should come next week prepared to share some of their negative self-talk.

AGENDA

Outline:

Administrative business
 Review sleep diary & progress
 Identify problems encountered in home practice
 Design and negotiate strategies for better adherence
 Cognitive therapy: review any material not covered last week
 Problem-solving for insomnia
 Sleep hygiene: lifestyle factors and sleep
 Planning for the future: Maintaining treatment goals
 Schedule post-treatment assessments with all clients
 Handout post-treatment questionnaire and DSD packages

Handouts/Materials Needed:

1. Daily Sleep Diary/Progress chart
2. Flipchart
3. Copies (8) of chapter 7 from manual
4. Attendance sheet
5. Post-Tx questionnaire and DSD packages (including adherence checklist)

Goals for the session:

- 1) reinforce use of cognitive restructuring for negative self-talk
 - 2) ensure clients are clear on the problem-solving method and lifestyle factors in insomnia
1. **Review sleep diary**
 - ▶ Review the most recent updated progress chart for each group member.
 2. **Identify problems encountered in home practice.**
 - ▶ Follow-up on the homework assignment. Ask group about their monitoring of self-talk at bedtime.
 - ▶ Use this time to complete any unfinished business from last week. Review the principles of the cognitive model of sleep disturbances again.
 - ▶ It is O.K. to spend the first half of the session review the cognitive therapy material. You can skip the problem-solving material if necessary (it is in the chapter anyway).
 3. **Design and negotiate strategies for better treatment adherence**
< see previous chapters >
 4. **Introduce problem-solving for sleep problems (time-permitting)**
 - ▶ Review material from chapter. The best way to do this is to find a willing client and work through a problem using the S.O.L.V.E.. Reinforce this technique as another tool for coping with stressful thoughts at bedtime.
 - ▶ Point out the fact that even if you arrive at the most obvious solution with S.O.L.V.E., at least you have evaluated all of the alternatives in a systematic way. Typically, the most stressful thing about ruminating and worrying is not the inability to find the right answer, but the constant second-guessing and being convinced that there is a better solution. Unless you do your problem-solving in a structured way, all your left with is the anxiety and worry.
 - ▶ Review other stress management techniques (worrying time, problem-solving on paper, etc.) that were not covered in last session.

- Review material from chapter. Adapt to the current group membership; omit material as needed (e.g., skip material on nicotine and sleep if no one in the group smokes).

Caffeine

- Highlight the fact that caffeine is present in other foods and beverages other than coffee. Also highlight that caffeine is present in many medications (e.g., Tylenol #3).
- Reinforce the additive potential of caffeine and other stimulants (e.g., chocolate, other medications)

Diet

- Ask group if they avoid any particular foods because they impair sleep. Ask about foods that they find help them sleep better. Make a point of highlighting the individual nature of diet choices and their effects on people. People differ in their sensitivity for various foods.

Exercise

- Reinforce the positive benefits of physical activity for sleep. Activity of any kind is known to increase SWS and therefore deepen sleep.

The variety of physical activities <group discussion>

Generate a group discussion on the kinds of physical activities group members do to keep active. Encourage sharing among the group members of specific activity routines and how clients are able to motivate themselves. Use the resulting discussion to dispell myths surrounding the amount, intensity, and type of exercise that is necessary to stay healthy and improve sleep.

- It is not necessary to engage in intense exercise (running); regular mild to moderate is better
- There are a variety of activities to choose from; walking, biking, swimming, skiing, softball, etc. are the ones most people think of first. However, also consider: painting, crafts, photography, dancing, canoeing, yoga, Tai Chi, curling.

- Integrate physical activity into sleep self-management program. e.g., plan activity in morning as an incentive to get up, or in the afternoon when you might be tempted to nap.

Planning for the future: Relapse Prevention and Where do I go from here?

- Go around the group asking "What's going to be the hardest skill for you to stick?" (e.g., stimulus control, sleep restriction, relaxation, positive self-talk)
- Use their responses as an opportunity to evoke the cognitive model as a means of coping with negative self-talk. For example, two months from now, clients' motivation for regular practice of skills may start to wane. How can they use the cognitive coping skills from Chapter 6 to enhance their motivation.
- Use progress charts to validate individual client's success with treatment. Try to motivate them to continue with this progress.

Questioning Your Reasons for not Adhering to Skills

- When clients stop the regular practice of skills, it is important to look at the reasons given. Typical reasons are "It's too much work," "I can't fit it into my lifestyle." It is important for clients to take responsibility for their decisions rather than pretend to be a passive victim of circumstances. A more accurate excuse would be: "I could practice these skills, but I choose not to," "I could use relaxation to help me sleep, but I would rather not."
- Reinforce the notion that clients need to assume control over their behaviour. This also applies to non-adherence. When a client does not practice the skills, this is a choice he or she is making.

6. Personal Project for the Week

A. Clients should complete the second adherence checklist before leaving today. They can do this at the break or at the end of the session.

B. Give out the post-treatment assessment packages and arrange individual post interviews with each client.

Appendix C
Manuscript of pilot study results

Running Head: TREATMENT OF INSOMNIA IN CHRONIC PAIN PATIENTS

Development of a Cognitive-Behavioural Treatment

Program for Insomnia in Chronic Pain Patients

Shawn R. Currie

Keith G. Wilson

Abstract

Although there can be problems with the long-term use of medications to aid sleep, there is limited research into nonpharmacological treatments for insomnia secondary to chronically painful medical conditions. The intent of this study was to develop and pilot-test a cognitive-behavioural intervention for longstanding insomnia secondary to chronic pain. Three subjects with severe sleep disturbances associated with chronic back pain participated in a six-week group treatment that is targeted specifically for people with chronic pain. Treatment components included stimulus control, sleep restriction, cognitive therapy, relaxation training, and sleep hygiene education. Two subjects displayed improvements in their sleep pattern, including robust increases in sleep efficiency and decreases in wake time after sleep onset. Sleep quality and sleep onset latency also improved. These preliminary findings suggest that psychological treatments may be a viable and effective alternative to long-term pharmacological management of insomnia secondary to chronic pain.

KEYWORDS: Insomnia, cognitive-behaviour therapy, chronic pain

Introduction

Pain is a leading cause of insomnia among people with chronic medical problems. Converging evidence indicates that many individuals with chronic benign pain develop severe long-term sleep disturbances (Atkinson, Ancoli-Israel, Slater, Garfin, & Gillin, 1988; Currie, Wilson, & Gauthier, 1995; Pilowsky, Crettenden, & Townley, 1985; Wittig, Zorick, Blumer, Heilbronn, & Roth, 1982), characterized by delayed onset of sleep, frequent awakenings, and poor sleep quality. Although pharmacotherapy is the most common treatment for these patients (Aronoff & Evans, 1992; Aronoff, Wagner, & Spangler, 1986), it is also recognized that pharmacotherapy is contraindicated for chronic sleep disturbances because prolonged use of sleep medication may carry health risks, as well as lead to iatrogenic effects that can result in a continuing sleep problem (Lacks, 1987; National Institutes of Health, 1984). Moreover, research indicates that pain patients using sleep-promoting medication (e.g., sedative hypnotics and tricyclic antidepressants) experience the same degree of sleep disturbances as non-users (King & Strain, 1990).

Substantial empirical literature is now available attesting to the validity of psychologically-based treatments for insomnia, with sound evidence that these approaches are both safe and effective (Lacks, & Morin, 1992; Morin, Culbert, & Schwartz, 1994; Murtagh & Greenwood, 1995; NIH Technology Assessment Panel, 1996). Nevertheless, clinical trials of nonpharmacological treatments have historically excluded persons with insomnia secondary to medical conditions, on the assumption that these patients would be better served by treating the primary medical pathology. This becomes problematic, however, for persons with chronic pain conditions who have exhausted their options for obtaining relief from conventional medical treatments. Furthermore, there are a few uncontrolled studies which suggest that persons with chronic pain can benefit from psychological treatment approaches for insomnia. For example, relaxation-based and behavioural treatments have been used successfully to alleviate sleep disturbances associated with cancer and hemophilia pain (Cannici, Malcolm, & Peek, 1983; Stam & Bultz, 1986; Varni, 1980). In addition, Morin and colleagues (1989) found that three patients with sleep disturbances secondary to chronic back pain were shown to benefit from a behavioural treatment developed for primary insomnia. More recently, Morin (1993) reported summary data on 13 persons with insomnia secondary to medical disorders (several of which involved significant pain) who were treated successfully with a multicomponent approach that included both cognitive and behavioural interventions. Hence, the small body of available evidence points to the potential value of nonpharmacological approaches to the management of insomnia secondary to chronic pain, although no protocols have yet been developed that are tailored specifically for this group.

This study describes the development and pilot-testing of a new multicomponent cognitive-behavioural intervention for insomnia secondary to chronic benign pain. It extends previous research in this area by incorporating validated interventions for insomnia in the form of a patient-oriented manual, which addresses the unique problems and concerns of patients with chronic pain. We also report preliminary findings demonstrating the effectiveness of the treatment on a small group of subjects using standard insomnia outcome measures of sleep onset latency, sleep efficiency, sleep quality, and nighttime awakenings.

Methods

Development of the Treatment Protocol

The treatment protocol was adapted specifically for chronic pain patients using the protocol of Morin (1993) and others as a general framework. The treatment model is based on a cognitive-behavioural conceptualization of insomnia. Within this model, psychological and behavioural factors suspected to perpetuate insomnia were targeted for change using a self-management approach. An important issue in developing the protocol was the nature and etiology of the sleep problems associated with this patient group. Common complaints of individuals with chronic pain are that their pain prevents them being comfortable in bed, thereby increasing sleep onset latency, and also wakes them up during the night. One of the goals of treatment, however, was to encourage patients to recognize other psychological and behavioural factors that may be contributing to their insomnia problem, rather than attribute their disturbed sleep entirely to the experience of pain.

Patients with chronic pain tend to report both sleep onset and sleep maintenance difficulties, suggesting that a multicomponent treatment approach, which combines several empirically validated interventions, would be appropriate to their needs. To this end, a patient-oriented treatment manual, Coping with Chronic Pain Sleep Problems, was developed that included several interventions addressing different aspects of patients' insomnia complaints. The manual was used to structure a six-session group therapy intervention. Each two-hour group session followed a general format in which the first hour was devoted to reviewing the sleep diaries and progress achieved to date. The therapist allotted time in each session for group discussion to allow members to share experiences and provide mutual support in the application of techniques. Any problems encountered in the home practice were addressed by the therapist, and strategies for improving adherence were devised collaboratively with the subject. The second hour of the session was devoted to presenting new educational material and coping skills. The specific content of the six sessions is described below.

Sessions 1 & 2 - Introduction and basic facts about sleep. The first session served to introduce patients to the self-

management philosophy, and reinforce the use of the sleep diary for self-monitoring. The nature and causes of chronic insomnia were reviewed using the cognitive-behavioural model. Through group discussion, patients were encouraged to reevaluate the relative contributions of pain versus other psychological/behavioural factors in the maintenance of their sleep disturbances. In session 2, basic facts about the nature and function of sleep were presented. Key concepts such as the nature of slow-wave (deep) sleep, sleep efficiency, and their relationship to sleep quality, were introduced.

Sessions 2 & 3 - Stimulus control & sleep restriction. These two interventions, which target problems with sleep maintenance and sleep onset, constituted the behavioural treatment component. The goals of these interventions were to reestablish the bed as the dominant cue for sleep, regulate sleep/wake schedules, and consolidate sleep over a shorter period of time. Stimulus control, considered the mainstay of behavioural treatments for insomnia, consisted of a set of guidelines designed to help patients strengthen the association between their beds and sleeping. These included instructing the patients to avoid napping, use the bedroom only for sleep and sex, and to get out of bed whenever they were unable to fall asleep within 20 minutes.

Stimulus control was combined with another intervention, sleep restriction, which has demonstrated efficacy in the treatment of chronic insomnia (Spielman, Saskin, & Thorpy, 1987). Following Spielman's original protocol, patients were required to reduce their time in bed to their self-reported total sleep time recorded during the baseline (referred to as the "sleep window"). In subsequent weeks, each patient was permitted to increase his or her sleep window gradually until sleep efficiency stabilized at approximately 85% (i.e., 85% of the time in bed should be spent sleeping).

Session 4 - Imagery relaxation training. Relaxation training was provided to help patients cope with problems getting to sleep. This intervention is intended to limit cognitive arousal associated with rumination and worry that may play a role in sleep onset difficulties. Guided imagery helps to inhibit intrusive cognitions by distracting patients and refocusing their attention on pleasant scenes that evoke more positive emotions.

Sessions 4 & 5 - Cognitive therapy. Two sessions were devoted to teaching coping skills designed to help patients minimize the impact of negative thoughts on sleep. The focus of this component was on exploring and challenging self-defeating attitudes and beliefs about sleep, the relative contributions of pain versus other factors in the maintenance of insomnia, and the impact of sleep loss on well being and behaviour.

Session 6 - Sleep hygiene education. The sleep hygiene component was designed to increase patients' awareness of the impact of lifestyle and environmental factors on sleep quality, and to promote better sleep hygiene practices. The focus

was on health practices that are known to affect sleep directly, including the use of caffeine, alcohol, smoking, diet, and exercise.

Pilot Subjects

Three subjects with chronic back pain (two women and one man, aged 34, 34, and 59 years, respectively) were recruited from the patient population of a multidisciplinary pain clinic. Although they had some familiarity with pain-management techniques, all three subjects continued to experience pain-related insomnia after multidisciplinary treatment. Apart from the use of mild doses of nonnarcotic analgesics, they did not engage in any other form of treatment for their pain condition or insomnia during their participation in the pilot study. None of the subjects were currently taking prescription sleep medications or antidepressants.

Assessment Protocol.

Each subject underwent a comprehensive evaluation of the nature and severity of sleep disturbances using the Structured Interview for Sleep Disorders for DSM-III-R (SIS-D; Scramm et al., 1993; Appendix F). Originally developed for DSM-III-R criteria (American Psychiatric Association, 1987), the interview schedule was modified slightly to incorporate DSM-IV revisions (American Psychiatric Association, 1994). To be considered eligible for the study, subjects were required to meet full diagnostic criteria for insomnia disorder secondary to the general medical condition of chronic pain. Secondary insomnia shares all the same diagnostic features as primary insomnia in that the patient must have a predominant complaint of difficulty initiating or maintaining sleep, or of nonrestorative sleep, for at least one month, and the sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. Any subject meeting full criteria for narcolepsy, sleep-wake schedule disorder, dream anxiety disorder, sleep terrors, sleepwalking disorder, or insomnia secondary to psychoactive substance abuse was excluded.

Subjects were also administered the Structured Clinical Interview for DSM-III-R (SCID-Nonpatient edition; Spitzer et al., 1990) to rule out the presence of current major depression, anxiety disorders, and psychoactive substance use disorders, all of which are known to affect sleep adversely (Walsh & Sugarman, 1989).

Self-monitoring. The subjects self-monitored their sleep using a Daily Sleep Diary (DSD; Haythornthwaite, Hegel, & Kerns, 1991) for a baseline period of two weeks (one week in the case of subject 3). The DSD was completed each morning in relation to the previous night's sleep, and included entries for recording of bedtime, arising time, hours slept, sleep onset latency (SOL), number of awakenings, and sleep quality. From the diary data, it was possible to calculate wake

time after sleep onset (WASO) and sleep efficiency (SEF; the ratio of total sleep time to time in bed). The DSD has been shown to have good concurrent validity and acceptable test-retest reliability with coefficients ranging from a low of .69 for SOL to .74 for sleep quality over a consecutive four-day period (Haythornthwaite et al., 1991). Subjects also monitored their use of medication throughout the treatment.

Multidimensional Pain Inventory - Pain Severity Scale (MPI-PS; Kerns, Turk, & Rudy, 1985). This 3-item scale assesses a patient's overall level of pain severity. The MPI-PS has demonstrated good internal consistency (Cronbach's $\alpha = .72$) and temporal stability (test-retest reliability = .82) on patients with chronic pain.

Treatment Procedures

The three subjects participated as a group in six weekly outpatient therapy sessions. Each session was two hours in duration and employed didactic presentations, group discussion, and weekly home assignments. Therapy was structured by the use of the treatment manual, which the subjects received at a rate of one chapter per week. Subjects were also given various homework tasks to complete between sessions. Throughout the treatment, subjects monitored their individual progress via daily completion of the DSD. The beginning of each session was devoted to reviewing the DSD and identifying any problems encountered in the home practice. Subjects received individualized feedback on their progress via weekly progress charts.

Post-treatment and Follow-up Assessments

At the end of treatment, each subject underwent a second clinical interview to review individual progress, determine the extent of symptom reduction, and to obtain feedback on the program. A six-month follow-up assessment was also conducted. For the follow-up, each subject was administered a brief telephone interview, and was mailed one week's worth of sleep diaries and the MPI-PS to complete and return.

Results

Assessment

Prior to treatment, all three subjects described a highly fragmented and unsatisfactory sleep pattern. All subjects reported that their sleep disturbances began following the onset of their pain condition (which occurred, on average, 4.5 years previously) and that they had remembered being good sleepers before this.

Sleep Parameters Following Treatment

All three subjects completed the program and participated in the post-treatment and follow-up assessments. The

changes in sleep diary measures for each subject are shown graphically in Figure 1. As is evident from the figure, Subjects 1 and 2 displayed observable improvements in their sleep pattern by the end of treatment. The two sleep parameters that showed the most change were minutes wake after sleep onset and sleep efficiency. Wake time after sleep onset decreased substantially from the baseline to the last week of treatment (decreases of 88% and 61% for Subjects 1 and 2, respectively), while sleep efficiency increased (increases of 73% and 27%, respectively). The remaining parameters demonstrated smaller but noticeable improvements in both these patients, including increased sleep quality (58% and 37%), and decreases in sleep onset latency (26% and 33%) and number of nocturnal awakenings (25% and 33%). Final values for sleep efficiency for Subjects 1 and 2 were 82.5% and 78.2%, respectively; post-treatment values for sleep onset latency were 37 minutes and 45 minutes, respectively. These values still fall short of the normative cut off values (>85% and <30 minutes for sleep efficiency and SOL, respectively) that are often used to distinguish 'good' from 'poor' sleepers (Lacks & Morin, 1992), although they approached these limits during the final weeks of treatment. Subject 3 did not demonstrate a robust change in her sleep pattern; she reported having difficulty in adhering fully to stimulus control and sleep restriction procedures due to episodes of severe pain and reduced function.

The use of pain medication remained stable from the baseline to post-treatment for all three subjects. Scores on the pain severity scale did not change across the three assessment phases.

Treatment gains in Subjects 1 and 2 were generally maintained at the six-month follow-up assessment period. Subject 1 displayed some marginal worsening in sleep onset latency and number of awakenings; however, the values were still improved compared to pre-treatment levels. Subject 2 showed good maintenance of all improvements. Furthermore, this subject eliminated her use of acetaminophen for control of her pain. The use of pain medication for subjects 1 and 3 remained the same at the follow up assessment.

Discussion

Disturbed sleep is a common problem for people with chronic pain conditions. With some musculoskeletal pain syndromes, such as fibromyalgia, the attendant sleep disruption may actually be of primary significance in the course of the disorder (Moldofsky, 1986). For other conditions, insomnia is a secondary, albeit debilitating, consequence of chronic pain. However, standard medication treatments for insomnia are contraindicated for chronic use, or of uncertain long-term value. For this reason, the development and validation of appropriate nonpharmacological self-management interventions for this patient group is an important direction for research.

For this study, we developed a multicomponent cognitive-behavioural treatment for insomnia that is adapted to the specific needs of people whose sleep disturbances are secondary to chronic pain. The intervention is based on the assumption that even though the major source of the insomnia may be the experience of pain that disrupts sleep, people with insomnia from whatever cause often develop behavioural habits that serve to exacerbate and maintain the problem. If so, then promoting better sleep habits would be expected to enhance the quality of sleep in persons with chronic pain, even though the experience of pain *per se* is not the target of intervention.

Our initial results with three subjects generally support this hypothesis. With two subjects, robust improvements were observed in sleep diary measures of sleep efficiency and wake time after sleep onset. Moderate improvements in sleep onset latency, sleep quality, and frequency of nocturnal awakenings also occurred. These gains were comparable in magnitude to those usually reported for intervention studies of primary insomnia, and they were evident within four weeks of beginning treatment. Although neither subject improved to the extent that their various sleep parameters fell within the normative range for "good sleepers," they approached these limits in the final weeks of treatment. Moreover, their improvements were reasonably well-maintained at follow-up, indicating the potential for a sustained long-term enhancement of sleep with appropriate skills training. The fact that patients were able to effect positive changes in their sleep patterns without an observable change in pain levels further suggests that pain, while making a significant contribution to the etiology of patients' sleep difficulties, is not the sole cause of chronic insomnia in this patient population. Rather, insomnia secondary to chronic pain is a heterogenous, biopsychosocial disorder with many perpetuating factors including pain, but also maladaptive sleep habits, cognitive arousal, and lifestyle factors. Although the reality may be that "perfect sleep" is not attainable by most patients with debilitating chronic pain, we have demonstrated that there is merit to improving sleep patterns by means other than long-term medication.

In summary, there is growing recognition that the extension of nonpharmacological treatments to insomnia secondary to painful medical conditions is an important area for future research. Our preliminary findings, along with those of other investigators (Morin, Kowatch, & Wade, 1989; Morin, Stone, McDonald, & Jones, 1994) offer promise that insomnia secondary to chronic pain may be well-suited to a self-management approach. Nevertheless, appropriately controlled randomized trials are required to verify these findings and to identify the role of possible moderating variables in determining the response to treatment.

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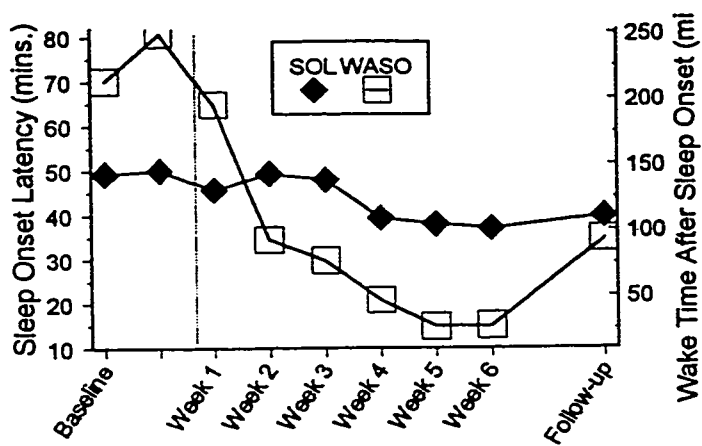
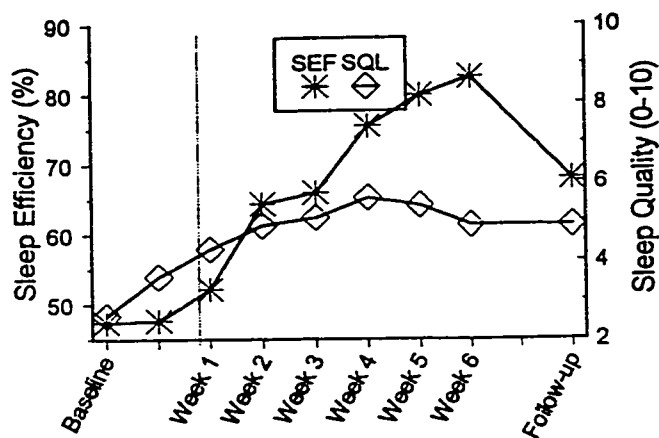
Footnote

1. The manual is available from the primary investigator upon request.

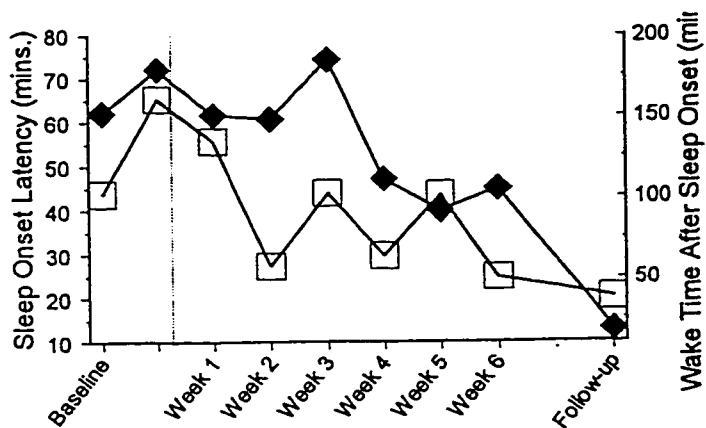
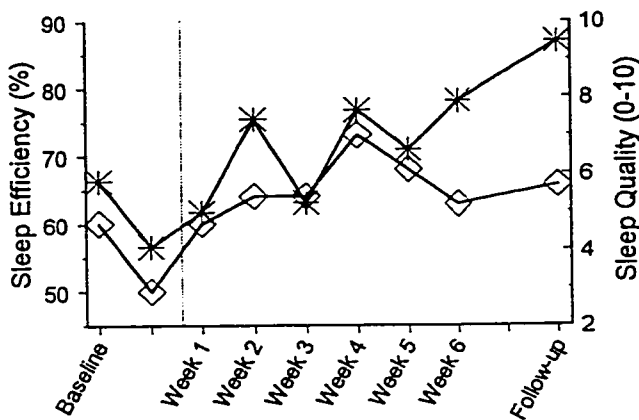
Figure Legend

Figure 1. Weekly mean changes from baseline (pre-treatment) to end of week 6 (post-treatment) in sleep diary measures for sleep efficiency (SEF), sleep quality (SQL), sleep onset latency (SOL), and wake time after sleep onset (WASO) for subjects 1, 2, and 3. Results of six-month follow-up also depicted.

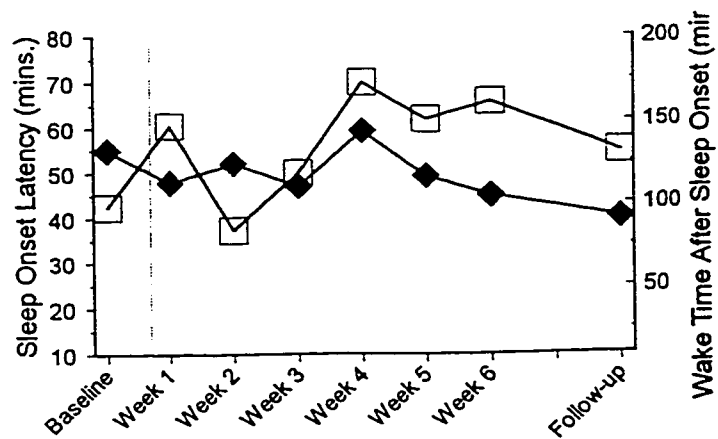
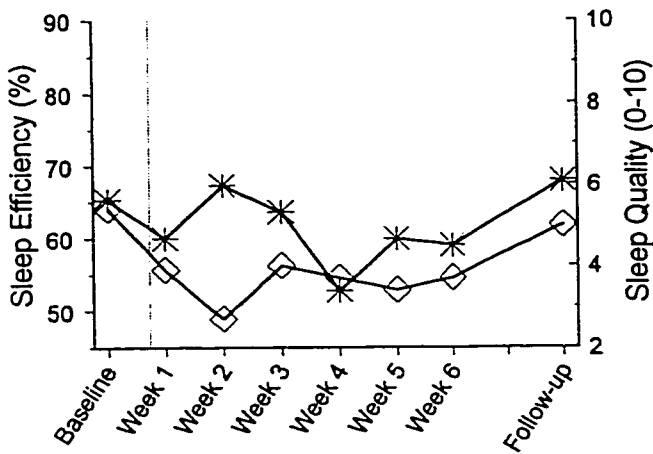
Subject 1



Subject 2



Subject 3



Appendix D
Cover letter for patients

Information Letter for Patients

Research Project: Coping with Chronic Pain Sleep Problems
Investigators: Shawn Currie, M.A., Ph.D Candidate
Keith Wilson, Ph.D., Psychologist

Dear Sir or Madam:

You may be interested in a research study that is being conducted by The Rehabilitation Centre on the treatment of sleep problems that often bother people with chronic pain. The purpose of the study is to evaluate a new treatment for insomnia in persons with chronic pain. The treatment is a seven-week outpatient group treatment that does not involve any drugs or special diets. Please note that if you are currently taking medication to help you sleep, you are still eligible to participate.

The treatment is free to those who take part in the study. In addition, your parking expenses for all visits to the hospital for this study will be covered by The Rehabilitation Centre. Although the investigators can not promise that this treatment will eliminate your sleep disturbances, you should know that many people with chronic insomnia who undergo this kind of treatment do show noticeable improvements in their sleep. You can withdraw from the study at any time you choose, and your treatment at The Rehabilitation Centre will not be affected in any way. Personal information collected as part of this study will be kept confidential and it will not be shared with anyone outside the research team.

If you agree to take part in the study, you will be asked to come to The Rehabilitation Centre for an initial assessment of your sleep problems. The first visit will last approximately one and a half hours. At the end of this assessment, you will be randomly assigned to one of the treatment conditions.

Please think about taking part in this research. If you would like to participate, or want more information, please complete the attached form. You can also contact:

Shawn Currie
The Rehabilitation Centre
505 Smyth Road, Ottawa
Phone: 737-7350, Extension. 5668.

Appendix E
Exclusion criteria

Detailed Explanation of Exclusion Criteria

Fibromyalgia. Fibromyalgia can present as a primary or secondary pain condition. Many persons with chronic pain can later manifest with symptoms of fibromyalgia, such as widespread pain complaints and nonrestorative sleep. In the case of primary fibromyalgia, the attendant sleep disturbance can become of primary significance in the course of the disorder. Therefore, patients will be excluded if fibromyalgia is their primary pain condition. Patients with chronic pain who have a secondary diagnosis of fibromyalgia will be included. The distinction between primary and secondary fibromyalgia will be based on the time of onset of the disorder in relation to their primary pain condition.

Other sleep disorders. Patients were screened for sleep disorders other than insomnia secondary to chronic pain including: sleep-wake schedule disorders, hypersomnia, and parasomnias (e.g., sleepwalking, dream anxiety disorder).

Major depression or other psychiatric illness. As emotional distress is a frequent reaction to chronic pain, it is expected most patients will present with mild to moderate depression. Given the high prevalence of depressive symptomatology among patients with chronic pain, it was deemed necessary to include individuals with milder presentations of depression (i.e., dysthymia, minor depression, major depression in partial remission) in the trial. However, patients who met full DSM-IV criteria for major depression, or otherwise were found to be in a state of crisis, were.

Over 60 years of age. It is well known that sleep patterns can begin to change after the age of 25 with a more pronounced change in the 40's and 50's (Morin, 1993). However, restricting the sample to only younger patients would not reflect clinical reality. Therefore, to prevent having an age outlier assigned in one of the groups, no one over 60 years of age was recruited.

Appendix F
Consent form

Informed Consent Form

Project: Coping with Chronic Pain Sleep Problems
Investigators: Shawn Currie, M.A., Ph.D Candidate
 Keith Wilson, Ph.D., Staff Psychologist, The Rehabilitation Centre

We are conducting a study on the treatment of sleep problems that often bother people with chronic pain. The purpose of the study is to evaluate the effectiveness of a new treatment for insomnia in persons with chronic pain. This treatment is seven weeks in length and is targeted at helping people cope with sleep disturbances without the aid of drugs.

If you agree to take part in the study, you are asked to come to The Rehabilitation Centre for an initial assessment of your sleep problems. This first visit will last approximately one and a half hours and it will be to assess your sleep problems. You will have an interview with a research assistant who will ask you about your sleep disturbances and how they have affected you and your family. Please note that this interview will be audio-taped. This is being done for research purposes only, and the tape will be erased at the end of your involvement in the study. We will give you some questionnaires that inquire about your sleep and mood. In addition, you are asked to wear a device on your wrist for two days and nights. This device, which is no bigger than a wristwatch, measures when you are awake and when you are asleep based on the amount of movement it detects. You should just try to ignore the unit and go about your daily business and sleeping schedule as you would any other day. At the end of this assessment, you will be randomly assigned to one of two treatment conditions: cognitive-behavioural group treatment, or waiting-list control.

If you are assigned to the cognitive-behavioural treatment, your next seven visits will be to The Rehabilitation Centre for group sessions. We will cover your parking expenses. You will attend sessions with a group of 7 other people who are having similar problems sleeping. The sessions will be 2 hours in length and will be held once a week for seven weeks. In the program, you will learn about sleep disturbances related to chronic pain. The program will try to provide you with new skills designed to help you make a positive and long-lasting change in your sleep pattern. Throughout the treatment you will keep a log of your sleep habits so that you can track your progress. The log is provided on a standard form and it only takes about three minutes to complete each morning.

At the end of this treatment you will come to The Centre for another interview to assess your sleep. This is an important interview because we want to find out how well the treatment worked you. You will be given the same questionnaires to fill out again and you will be asked to wear the wrist device for another two nights. About three months after this we will ask you to come in again for another assessment. We will give you the same questionnaires along with a stamped self-addressed envelope for you to return them in.

If you are assigned to the waiting-list control condition, you will be asked to keep a log of your sleep habits for seven weeks. The log is provided on a standard form and it only takes about three minutes to complete each morning. You will be contacted by a therapist on a weekly basis by phone to discuss your use of the log. At the end of this period you will come to The Centre for another interview to assess your sleep. About three months after this we will ask you to come in again for another assessment. At the end of this waiting period, you will be offered the group treatment.

Your participation in the project is voluntary. We cannot promise you that this treatment will eliminate your sleep disturbances, but you should know that many people with chronic insomnia who undergo these kind of treatment do show improvements in their sleep. You can withdraw from the study at any time you choose, and your treatment at The Rehabilitation Centre will not be affected in any way. Personal information collected as part of this study will be kept confidential and it will not be shared with anyone outside the research team.

If you have any questions about this study please contact Shawn Currie, at The Rehabilitation Centre (737-7350, Ext. 5321), or Dr. Daniel DeForge Chairperson of the Ethics Committee at The Rehabilitation Centre.

DECLARATION OF INFORMED CONSENT

I agree to participate in this study with the understanding that information will be collected and used for research purposes only and will be treated as confidential. I have been informed about the purpose of this study and realize that I am under no obligation to participate and may withdraw at any time. Refusal to participate or withdraw from the study will in no way affect my present and/or future treatment at The Rehabilitation Centre.

Appendix G
Personal Information Form

**COPING WITH CHRONIC PAIN SLEEP PROBLEMS
PERSONAL INFORMATION FORM**

1. What is your name? _____
2. What is your address? _____ (street)
 _____ (City, Province)
 _____ (Postal Code)
3. What is your phone number? _____
4. What is today's date? _____
 (Day/Month/Year)
5. What is your date of birth? _____
 (Day/Month/Year)
6. What is your current marital status? (circle the appropriate response)
- | | |
|----|-----------------------|
| 1. | Married |
| 2. | Never married |
| 3. | Common-law |
| 4. | Separated or divorced |
| 5. | Widowed |
7. Are you employed now? (circle the appropriate response)
- | | |
|--|--|
| 1 = Yes, full-time | 5 = Yes, part-time with restrictions |
| 2 = Yes, full-time with restrictions | 6 = Yes, part-time but on sick leave right now |
| 3 = Yes, full-time but on sick leave right now | 7 = No, but not because of pain |
| 4 = Yes, part-time | 8 = No, unable to work or unemployed because of pain |
8. What is your educational background? (circle the appropriate response)
- | |
|---------------------------------|
| 1 = completed primary school |
| 2 = completed high school |
| 3 = college/university graduate |
| 4 = post-graduate university |

The following questions ask about your pain

9. When did your current pain condition first start?
 Month _____ Year _____
10. Under what circumstances did your pain begin?
- | |
|-------------------------------------|
| 1 = Accident at work |
| 2 = At work, but not an accident |
| 3 = Accident at home |
| 4 = Motor vehicle accident |
| 5 = Following surgery |
| 6 = Following illness |
| 7 = Pain just began, no reason |
| 8 = Other (<i>describe</i>) _____ |
11. Where is your pain located? Circle all areas:

- 1 = Head
- 2 = Face
- 3 = Neck
- 4 = Shoulder
- 5 = Arm
- 6 = Elbow
- 7 = Hand or Wrist
- 8 = Chest
- 9 = Abdomen
- 10 = Genito-urinary (bowel, bladder, sex-organs)
- 11 = Groin
- 12 = Upper back
- 13 = Mid back
- 14 = Lower back
- 15 = Buttock
- 16 = Thigh
- 17 = Knee
- 18 = Calf
- 19 = Ankle or foot
- 20 = Multiple joints
- 21 = Other (*describe*) _____

12. What time of day is your pain the worst?

- 1 = Morning, on arising
- 2 = Later in the morning
- 3 = Afternoon
- 4 = Evening
- 5 = Bedtime
- 6 = Night (during usual sleeping hours)
- 7 = Pain is always the same
- 8 = Pain varies, but is not worse at any particular time

13. Which statement best describes your pain? (circle one)

- 1 = Always present – always the same intensity
- 2 = Always present – intensity varies
- 3 = Often present – have short periods without pain
- 4 = Often present – have pain-free periods lasting 1 to 6 hours
- 5 = Often present – have pain-free periods lasting over 6 hours
- 6 = Occasionally present – have pain once to several times per day,
lasting a few minutes to an hour
- 7 = Occasionally present – have pain for brief periods,
lasting a few seconds to a few minutes
- 8 = Rarely present – have pain every few days or weeks

Appendix H
Primary Care Evaluation of Mental Disorders

PATIENT QUESTIONNAIRE

NAME: _____

TODAY'S DATE: _____

Instructions: This questionnaire will help us better understand problems that you may be having. You may be asked more questions about some of these items. Please make sure to check a box for every item.

<i>During the PAST MONTH, have you been bothered A LOT by...</i>		
	YES	NO
1. little interest or pleasure in doing things?	<input type="checkbox"/>	<input type="checkbox"/>
2. feeling down, depressed, or hopeless?	<input type="checkbox"/>	<input type="checkbox"/>
3. "nerves or feeling anxious or on edge?"	<input type="checkbox"/>	<input type="checkbox"/>
4. worrying about a lot of different things?	<input type="checkbox"/>	<input type="checkbox"/>
5. have you had an anxiety attack (suddenly feeling fear or panic)?	<input type="checkbox"/>	<input type="checkbox"/>
6. have you thought you should cut down on your drinking of alcohol?	<input type="checkbox"/>	<input type="checkbox"/>
7. has anyone complained about your drinking?	<input type="checkbox"/>	<input type="checkbox"/>
8. have you felt guilty or upset about your drinking?	<input type="checkbox"/>	<input type="checkbox"/>
9. was there ever a single day in which you had five or more drinks of beer, wine, or liquor?	<input type="checkbox"/>	<input type="checkbox"/>
10. Have you experienced a traumatic event in which your life or physical well-being was in danger?	<input type="checkbox"/>	<input type="checkbox"/>
11. Do you have episodes in which you reexperience the traumatic event by way of thoughts, dreams or flashbacks?	<input type="checkbox"/>	<input type="checkbox"/>

PANIC DISORDER

- | | | | |
|----|---|--|---|
| 1. | <i>In the past month, have you ever had a panic attack when you <u>suddenly</u> felt frightened, anxious, or extremely uncomfortable?
(What was that like?)</i> | 1 = YES
2 = NO → Go to Generalized Anxiety Disorder | |
| 2. | <i>Has this ever happened before?</i> | 1 = YES | 2 = NO → Go to Generalized Anxiety Disorder |
| 3. | <i>Does the attack sometimes come <u>suddenly out of the blue</u>, for no apparent reason?
(Even in situations where you don't expect to be nervous or uncomfortable?)</i> | 1 = YES | 2 = NO |

- | | | | |
|----|---|---------|--------|
| 4. | <i>Have you worried a lot about having another attack?</i> | 1 = YES | 2 = NO |
|----|---|---------|--------|

5. ***During your worst attack...***

***Interviewer:** Once 4 of the following symptoms have been coded YES go to GENERALIZED ANXIETY DISORDER

- | | | | |
|----|--|---------|--------|
| a) | <i>Were you short of breath?</i> | 1 = YES | 2 = NO |
| b) | <i>Did your heart race, skip or pound?</i> | 1 = YES | 2 = NO |
| c) | <i>Did you have chest pain or pressure?</i> | 1 = YES | 2 = NO |
| d) | <i>Did you sweat?</i> | 1 = YES | 2 = NO |
| e) | <i>Did you feel as if you were choking?</i> | 1 = YES | 2 = NO |
| f) | <i>Did you have hot flashes or chills?</i> | 1 = YES | 2 = NO |
| g) | <i>Did you have nausea or an upset stomach, or the feeling you were going to have diarrhea?</i> | 1 = YES | 2 = NO |
| h) | <i>Did you feel dizzy, unsteady or faint?</i> | 1 = YES | 2 = NO |
| i) | <i>Did you have tingling or numbness in parts of your body?</i> | 1 = YES | 2 = NO |
| j) | <i>Did you tremble or shake?</i> | 1 = YES | 2 = NO |
| k) | <i>Were you afraid you were dying?</i> | 1 = YES | 2 = NO |

6. SUBJECTIVE ANXIETY

Have you felt nervous, anxious, or on edge on more than half the days in the last month?

(How often have you felt this way?)

(How bad does it get?)

(Does it come and go?)

If item # 6 <3 then go to MAJOR DEPRESSION

- | | |
|---|---|
| 0 | Not at all |
| 1 | Slight, e.g. occasionally feels somewhat anxious. |
| 2 | Mild, e.g. often feels somewhat anxious, but not excessively and not more than half the time. |
| 3 | Moderate, e.g. most of the time feels anxious (more than half the time). |
| 4 | Strong, e.g. most of the time feels very anxious. |
| 5 | Severe, e.g. almost all of the time feels intense anxiety. |
| 6 | Extreme, e.g. constant feelings of severe, pervasive anx |

7. In the last month, have you been bothered by any of these problems nearly every day?

***Interviewer:** Once 3 of the following symptoms have been coded YES go to Item # 8.

- | | | |
|--|---------|--------|
| a) <i>Feeling restless so that it is hard to sit still?</i> | 1 = YES | 2 = NO |
| b) <i>Getting tired very easily?</i> | 1 = YES | 2 = NO |
| c) <i>Muscle tension, aches, or soreness?</i> | 1 = YES | 2 = NO |
| d) <i>Trouble falling asleep or staying asleep?</i> | 1 = YES | 2 = NO |
| e) <i>Trouble concentrating on things such as activities, reading, or watching TV?</i> | 1 = YES | 2 = NO |
| f) <i>Becoming easily annoyed or irritated?</i> | 1 = YES | 2 = NO |

***Interviewer:** If fewer than 3 are checked then go to MAJOR DEPRESSION

8. *In the past month, has your anxiety made it hard for you to be with people, take care of things you wanted to do, or get along with people?* 1 = YES 2 = NO → Go to MAJOR DEPRESSION

9. *In the last six months, have you been worrying a great deal about different things? (Do you worry about things that you recognize that other people do not worry about?) (When things are going well, do you still find things to be worried and anxious about?)* 1 = YES 2 = NO → Go to MAJOR DEPRESSION

***Interviewer:** Code as YES only if also YES to: "Has this been on more than half the days in the last six months?"

10. *When you are worrying this way do you find that you cannot stop?
(If you need to focus on something else, are you able to put the worry out of your mind?)
(Does your worry rarely result in your reaching a solution for the problem?)*
- 1 = YES 2 = NO

***Interviewer:** Determine if the client's worry is excessive and uncontrollable

MAJOR DEPRESSION

11. SUBJECTIVE DEPRESSION

*In the past month, have you felt depressed (sad, blue, moody, down, empty, as if you did not care?)
(Have you cried or been tearful?)
(How often? Does it come and go?)
(How long does it last?)
(Can you stand it?)*

If ≥ 2

12. *Do you feel this way most of the time?
(Nearly every day?)*

13. *How long have you felt this way?
(For more than a couple of weeks?)*

- 0 Not Depressed
- 1 Slight, e.g. only occasionally feels "sad" or "down"
- 2 Mild, e.g. often feels somewhat "depressed", "blue", or "downhearted"
- 3 Moderate, e.g. most of the time feels "depressed"
- 4 Strong, e.g. most of the time feels "wretched" or very depressed
- 5 Severe, e.g. almost all of the time feels extreme depression which "I can't stand"
- 6 Extreme, e.g. constant unrelieved extremely painful feelings of depression

Nearly Every Day 1 = YES
2 = NO

Duration ≥ 2 weeks 1 = YES
2 = NO

14. LOSS OF INTEREST OR PLEASURE

*Do you find that you have lost interest in or get less pleasure from things that you used to enjoy -- like your friends, family, or watching TV?
(Which things have you lost interest in?)
(I'm not thinking so much about your ability to do things as about your interest in them.)
(Are there things that you still enjoy as much as usual?)*

If ≥ 3

15. *Do you feel this way most of the time?
(Nearly every day?)*

16. *How long have you felt this way?
(For more than a couple of weeks?)*

- 0 All activities as interesting or pleasurable
- 1 1 or 2 activities less interesting or pleasurable
- 2 Several activities less interesting or pleasurable
- 3 Most activities less interesting or pleasurable
- 4 Almost all activities less interesting or pleasurable
- 5 All activities less interesting or pleasurable
- 6 No interest or pleasure at all in any activities

Nearly Every Day 1 = YES 2 = NO

Duration ≥ 2 weeks 1 = YES 2 = NO

17. *For the last two weeks, have you had any of the following problems nearly every day?*

1 = YES

2 = NO

***Interviewer:** Give credit without asking for symptoms already acknowledged in Generalized Anxiety Disorder module

a) *Trouble falling or staying asleep, or sleeping too much?*

1 = YES

2 = NO

b) *Feeling tired or having little energy?*

1 = YES

2 = NO

c) *Poor appetite or overeating?*

1 = YES

2 = NO

d) *Feeling bad about yourself – or that you are a failure or have let yourself or your family down?*

1 = YES

2 = NO

e) *Trouble concentrating on things, such as reading the newspaper or watching television?*

1 = YES

2 = NO

f) *Being so fidgety or restless that you were moving around a lot more than usual?*

1 = YES

2 = NO

**If no: What about the opposite – moving or speaking so slowly that other people could have noticed.*

1 = YES

2 = NO

***Interviewer:** Code as YES if YES to either question or if psychomotor agitation or retardation is observed during interview

18. SUICIDAL IDEATION

When a person feels depressed or hopeless, he may even think about killing himself.

Have you?

(Have you thought about how you would do it?)

(Have you actually done anything?)

(What did you do?)

(How were you found?)

(Did you really want to die?)

0 No suicidal ideation

1 Slight, e.g. has had occasional thoughts of death (without suicidal thoughts); "I would be better off dead"

2 Mild, e.g. occasional thoughts of suicide without a specific method; (suicide as a possibility for the future)

3 Moderate, e.g. often thinks of suicide or has thought of a specific method

4 Strong, e.g. often thinks of suicide and has thought of, or mentally rehearsed a specific plan or has made a suicidal gesture of a communicative rather than a potentially medically harmful type.

5 Severe, e.g. has made preparations for a potentially serious suicide attempt.

6 Extreme, e.g. has made a suicide attempt with definite intent to die or potentially medically harmful.

MAJOR DEPRESSION IN PARTIAL REMISSION

19. *Have you recently had a time when you were either much more down or depressed or had even less interest or pleasure in doing things?*

1 = YES

2 = NO

IF YES: At that time, did you have many of the problems that I just asked you about, like trouble sleeping, concentrating, feeling tired, poor appetite, little interest in things?

***Interviewer:** Code as YES only if, in the recent past, subject probably had five criterion symptoms and acknowledges some current depressed mood or little interest or pleasure

20. **DYSTHYMIA**

Over the last two years, have you often felt down or depressed or had little interest or pleasure in doing things? (Have you felt depressed more days than not?)

1 = YES 2 = NO

21. *In the last two years, has that often made it hard for you to be with people, take care of things you wanted to do, or get along with people?*

1 = YES 2 = NO

POST-TRAUMATIC STRESS DISORDER

22. *Have you experienced a traumatic event in which your life or physical well-being was in danger? Have you ever witnessed an event that was very frightening or traumatic for you? (Tell me about it)*

1= YES 2=NO→Go to Alcohol Module
1= YES 2=NO→Go to Alcohol Module
1= YES 2=NO→Go to Alcohol Module

23. *What was your reaction at the time? (fear?, felling helpless?, horror?)*

24. *Do you have episodes in which you reexperience the traumatic event by way of thoughts, dreams or flashbacks? (Specifically tell me what you experience:)*

Interviewer: Establish that he/she reexperiences the event in at least one of the following ways

Do you have recurrent and intrusive recollections of the event (images, thoughts)? Do you have bad dreams about the event? Flashbacks? (reliving the event vividly; hallucinations) Do you get very upset when you see or hear something that reminds you of the event? Do you get very physically excited when you see or hear something that reminds you of the event?

1= YES 2=NO
1= YES 2=NO
1= YES 2=NO
1= YES 2=NO
1= YES 2=NO

25. *Do you try to avoid things that remind you of the trauma by any of the following?*

Interviewer: Once 3 of the following are coded yes go to next question

<i>Do you try to avoid or block thoughts or feelings associated with the trauma?</i>	1= YES	2=NO
<i>Do you avoid places, people or things that remind you of the trauma?</i>	1= YES	2=NO
<i>Do you problems remembering all of the trauma?</i>	1= YES	2=NO
<i>Do you find you have lost interest in pleasurable activities?</i>	1= YES	2=NO
<i>Do you find you have drifted away from others?</i>	1= YES	2=NO
<i>Have you been feeling numb lately? (unable to feel joy or sadness when you thought you should?)</i>	1= YES	2=NO
<i>How do you feel about the future? (pessimistic?)</i>	1= YES	2=NO

26. *In the last month, have you been bothered by any of these problems nearly every day?*

Interviewer: Once 2 of the following are coded yes go to next question. Give credit for symptoms already acknowledged in previous module

<i>Trouble falling or staying asleep, or sleeping too much?</i>	1= YES	2=NO
<i>Feeling irritability or becoming easily annoyed to the point of getting angry?</i>	1= YES	2=NO
<i>Trouble concentrating on things such as reading, watching TV, etc.?</i>	1= YES	2=NO
<i>Always watching out for things that may upset you?</i>	1= YES	2=NO
<i>Are you jumpy? (get startled easily)</i>	1= YES	2=NO
<i>How long have you felt this way? (For more than a couple of weeks?)</i>	Duration \geq 4 weeks	1= YES 2=NO \rightarrow Go to Alcohol Modu
<i>In the past month, has this problem made it hard for you to be with people, take care of things you wanted to do, work, or get along with people?</i>	1= YES	2=NO \rightarrow Go to Alcohol

Section A

27. If Patient Questionnaire #6 checked YES:
...you thought you should cut down on your drinking. Why?

If Patient Questionnaire #7 checked YES:
...someone has complained about your drinking. Who? Why?

If Patient Questionnaire #8 checked YES:
...you have felt guilty or upset about your drinking. Why?

If Patient Questionnaire #9 checked YES:
*...you had five or more drinks on a single day in the past month.
How often have you had that much to drink in the past 6 months?
Has that caused any problems?*

Section B

***Interviewer:** Assess #28 to #32 by any of the following: 1) asking the patient each question; or 2) considering the responses given above.

28. *Has a doctor ever suggested that you stop drinking because of a problem with your health?* 1= YES 2=NO

Has any of the following happened to you more than one time in the last 6 months?

29. *Were you drinking, high from alcohol, or hung over while you were working, going to school, or taking care of other responsibilities?* 1= YES 2=NO

30. *What about missing or being late for work, school, or other responsibilities because you were drinking or hung over?* 1= YES 2=NO

31. *What about having a problem getting along with other people while you were drinking?* 1= YES 2=NO

32. *What about driving a car after having several drinks or after drinking too much?* 1= YES 2=NO

***Interviewer:** Is at least one of #28 or #31 Yes--or-- do responses in Section A indicate patient has probably had a significant problem with alcohol within the past 6 months

1= YES 2=NO
(Probable Alcohol Abuse)

Appendix I
Structured Interview For Sleep Disorders for DSM-III-R

Now I am going to ask you some more questions about your sleep habits

CURRENT EPISODE

*Tell me what a typical night's sleep is like for you
(How long does it take you to fall asleep? More than 30 mins?)
(How many hours of sleep do you get at night?)
(How many times do you wake up?)
(When you do sleep, is it a good restful sleep? Why not?)*

*How many times does this occur in a week?
(Do you have good nights? How many?)*

How long has this been going on?

*What kind of impact has this been having on your daytime activities?
(Feeling tired, no energy, hard to get things done, trouble concentrating)
How about your mood?
(Irritable, moody, short fuse, cranky)*

***Interviewer:** Determine (after completion of PRIME-MD) that insomnia is not the result of sleep disorder, mental disorder, or substance abuse.

PAST EPISODE

*How was your sleep before your pain condition began?
Did you ever have insomnia?
(How long did it last?)
(How bad was it?)*

INSOMNIA DISORDER

A. The predominant complaint is of difficulty in initiating or maintaining sleep, or of nonrestorative sleep (sleep that is apparently adequate in amount but leaves the person feeling unrested), for at least 1 month
UNDERLINE APPROPRIATE
DESCRIBE:

? 1 2 3
|
GO TO NARCOLEPSY

RATE SEVERITY (1=Mild; 2= Moderate; 3= Severe):
DURATION OF CURRENT EPISODE (IN MONTHS):

B. The sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3
|
GO TO NARCOLEPSY

C. The disturbance does not occur exclusively during the course of another Sleep Disorder or other mental disorder.

1 = YES
2 = NO

D. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition.

1 = YES
2 = NO

Past episode of insomnia (sleep disturbance or nonrestorative sleep almost every night causing significant impairment in daytime functioning) lasting at least 1 month.

1 = YES
2 = NO

YEARS SINCE LAST EPISODE:
DURATION OF PAST EPISODE:

NARCOLEPSY DISORDER

*Have you ever had sudden sleep attacks that couldn't resist?
(i.e., times when you fell asleep uncontrollably?)
(How long did they last)
(Were you sleepy before it happened?)
(How long has this been going on?)*

A. Irresistible attacks of refreshing sleep that occur daily over at least 3 months

? 1 2 3
|
GO TO SLEEP-SCHEDULE DISORD

Describe what happens

B. The presence of (1) cataplexy (episodes of sudden loss of muscle tone on both sides of the body, or (2) recurrent intrusions of REM sleep into the transition between sleep and wakefulness, as manifested by either hypnagogic hallucinations or sleep paralysis at the beginning or end of sleep episodes.

? 1 2 3
|
GO TO SLEEP-SCHEDULE DISORD

*Before this happened, were you taking any drugs or medicine?
Any change in the amount you were taking?
Did a doctor say that anything was physically wrong with you?*

C. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition.

1 = YES 2 = NO

*What is the usual time you go to bed?
What is the usual time you get up in the morning?
(Does your job require shift work?)
(Have you recently come back from a trip)*

SLEEP-WAKE SCHEDULE DISORDER

A. A persistent or recurrent pattern of sleep disruption leading to excessive sleepiness or insomnia that is due to a mismatch between the sleep-wake schedule required by a person's environment and his or her circadian sleep-wake pattern.

? 1 2 3
|
GO TO DREA ANXIETY

***Interviewer:** Determine if there is a significant mismatch between the person's normal sleep-wake schedule and the one required by his/her's environment

CURRENT SLEEP WAKE PATTERN:

Does this schedule cause you any difficulties?

***Interviewer:** Determine if person's disrupted sleep-wake schedule is his or her way of compensating for sleep loss (e.g., going to bed very early in evening) from insomnia

B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

? 1 2 3
|
GO TO DREA ANXIETY

C. The disturbance does not occur exclusively during the course of another Sleep Disorder or other mental disorder.

1 = YES 2 = NO

*Before this happened, were you taking any drugs or medicine?
Any change in the amount you were taking?
Did a doctor say that anything was physically wrong with you?*

D. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition. 1 = YES 2 = NC

SPECIFY SUBTYPE:

(1) Advanced or Delayed type

(2) Disorganized type

(3) Jet lag type

(4) Shift work type

DREAM ANXIETY DISORDER

*Have you often been woken by bad dreams or nightmares?
(during the day, or at night?)
(Were you able to remember the content of your dreams?
What were they?)
Did you wake up in the first or in the second half of your
sleep?*

A. Repeated awakenings from the major sleep period or naps with detailed recall of extended and extremely frightening dreams, usually involving threats to survival, security, or self-esteem. The awakenings generally occur during the second half of the sleep period
CONTENTS:

? 1 2 3
|
GO TO SLEEP
TERROR

*Have you been disoriented or confused shortly after the
awakening?
(Did you know where you were?)*

B. On awakening from the frightening dreams, the person rapidly becomes oriented and alert (in contrast to the confusion and disorientation seen in Sleep Terror Disorder and some forms of epilepsy).

? 1 2 3
|
GO TO SLEEP
TERROR

*Have you been bothered by these dreams, as a result of the
dream or because of the disturbance of your sleep?*

C. The dream experience or the sleep disturbance resulting from the awakenings cause significant distress.

? 1 2 3
|
GO TO SLEEP
TERROR

*Before this happened, were you taking any drugs or
medicine? Any change in the amount you were taking?
Did a doctor say that anything was physically wrong with
you?*

D. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition.

1 = YES
2 = NO

DESCRIBE:

SLEEP TERROR

Have you ever awoke abruptly from your sleep with a scream?

IF YES: How often was that?

How long did it last?

In which part of the night did you wake up?

A. A predominant disturbance of recurrent episodes of abrupt awakening (lasting 1-10 minutes from sleep, usually occurring during the first third of the major sleep period and beginning with a panicky scream.

? 1 2 3
|
GO TO SLEEPWALKING

DESCRIBE:

HOW OFTEN?:

HOW LONG?:

WHEN?:

How did feel after waking? (Have you been scared, have you been so agitated that you were sweating, breathing rapidly or had a racing heart?

B. Intense anxiety and signs of autonomic arousal during each episode, such as tachycardia, rapid breathing, and sweating.

? 1 2 3
|
GO TO SLEEPWALKING

DESCRIBE:

Could you be comforted by others after the dream? After waking up, have you been confused for a while, disoriented or did you maybe tug on your pillow?

C. Relative unresponsiveness to efforts of others to comfort during the episode and almost invariably, at least several minutes of confusion, disorientation and perseverative motor movements (e.g., picking at pillow).

? 1 2 3
|
GO TO SLEEPWALKING

DESCRIBE:

Can you remember your dream?

D. No detailed dream is recalled

What kind of impact has this been having on your daytime activities?

E. Episodes cause clinically significant distress or impairment in social, occupational or other important areas of functioning.

? 1 2 3
|
GO TO SLEEPWALKING

Before this happened, were you taking any drugs or medicine? Any change in the amount you were taking? Drinking a lot?

Did a doctor say that anything was physically wrong with you?

F. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition.

SLEEPWALKING

Have you ever left your bed during the night and started walking around while asleep (Has anyone told you this)

A. Repeated episodes of arising from bed during sleep and walking about, usually occurring during the first third of the major sleep period.

? 1 2 3

IF YES: Which part of the night does this occur:

DESCRIBE:

***Would it be difficult for you to be awakened?
Have others told you how you responded to anything while walking around?***

B. While sleepwalking, the person has blank stare, is relatively unresponsive to the efforts of others to influence the sleepwalking or to communicate with him or her, and can be awakened only with great difficulty.

? 1 2 3

DESCRIBE:

Would you remember anything of the incident the next morning?

C. On awakening (either from the sleepwalking episode or the next morning), the person has amnesia for the episode.

? 1 2 3

When awakening from an episode of sleepwalking, would your thinking be clouded or impaired in any way? (e.g., ability to concentrate, answer questions)

D. Within several minutes after awakening from the sleepwalking episode, there is no impairment of mental activity or behaviour (although there may initially be a short period of confusion or disorientation).

? 1 2 3

What kind of impact has this been having on your daytime activities?

E. Episodes cause clinically significant distress or impairment in social, occupational or other important areas of functioning.

***Before this happened, were you taking any drugs or medicine? Any change in the amount you were taking?
Drinking a lot?
Did a doctor say that anything was physically wrong with you?***

F. The disturbance is not due to the direct physiological effects of a substance (e.g., medication or drug) or general medical condition.

Appendix J
Daily Sleep Diary

To Be Completed in the Morning

1. What time did you go to bed (circle a.m. or p.m.)? _____ p.m. / a.m.
2. What time did you get out of bed? _____ p.m. / a.m.
3. Approximately how many hours of sleep did you get last night (to the nearest half hour): _____ hours
4. How long did it take you to fall asleep last night? _____ minutes
5. How many times did you wake up during the night? _____ times
6. In the morning, did you awaken at the time you wanted to? _____ Earlier
 _____ On time
 _____ Later

7. Please rate the overall quality of your sleep last night (circle one):

0	1	2	3	4	5
Extremely Poor					Extremely Good

8. Please rate how rested you felt this morning upon awakening:

0	1	2	3	4	5
Not at all Rested					Well Rested

Medication Log (to be completed before going to bed)

Please indicate the type and amount of medications you have taken today (in total):

Medication (Please be as specific as possible)	Dose per pill	Number of pills taken
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

Appendix K
Pittsburgh Sleep Quality Index

PSQI

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night?
USUAL BED TIME _____
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
NUMBER OF MINUTES _____
3. During the past month, when have you usually got up in the morning?
USUAL GETTING UP TIME _____
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed).
HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, check the best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you ...
 - a) Cannot get to sleep within 30 minutes
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - b) Wake up in the middle of the night or early morning
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - c) Have to get up to use the bathroom
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - d) Cannot breathe comfortably
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - e) Cough or snore loudly
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - f) Feel too cold
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week
 - g) Feel too hot
 - ___ Not during the past month
 - ___ Less than once a week
 - ___ Once or twice a week
 - ___ Three or more times a week

h) Had bad dreams

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

i) Have pain

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

j) Other reason(s), please describe: _____

How often during the past month have you had trouble sleeping because of this?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

6. During the past month, how would you rate your sleep quality overall?

- Very good
- Fairly good
- Fairly bad
- Very bad

7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

- No problem at all
- Only a very slight problem
- Somewhat of a problem
- A very big problem

Appendix L
Instructions for wearing actigraph

Instructions for Wearing the Activity Monitor

1. Wear the activity monitor for the specified two night period. Wear the activity monitor on your non-dominant hand.
e.g. - If you are left-handed, wear the unit on your right hand. If you are right-handed, wear it on your left arm. If you are ambidextrous (i.e., can use either hand to do most activities: write, throw a ball, etc.) wear the unit on the side you feel you use the least.
2. **IMPORTANT: DO NOT SHOWER OR BATH WHILE WEARING THE MONITOR!** In addition, please take off the unit in situations which may cause the unit to become wet (e.g., washing dishes). Take the monitor off in any other situation which you feel may put it in danger of being damaged.
3. On the sleep diary, record the exact times you went to bed and got up in the morning.

Appendix M
Manuscript of concordance study



Daily diary and ambulatory activity monitoring of sleep in patients with insomnia associated with chronic musculoskeletal pain

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Abstract

Insomnia is a significant problem for many people with chronic pain. In this study, we used a combination of daily sleep diaries and ambulatory activity monitoring (actigraphy) to: (i) examine the nature and severity of the sleep disturbance in this patient group; (ii) determine the concordance between sleep diary and actigraph measures of different sleep parameters; (iii) assess the reliability of sleep parameters across nights; and (iv) identify the clinical correlates of insomnia severity. Forty subjects with insomnia associated with chronic musculoskeletal pain completed questionnaires addressing clinical issues of pain severity, medication use, sleep quality, and affective distress. For 2 consecutive nights, each subject then completed a sleep diary and wore an actigraph unit on the non-dominant wrist. The results showed that the sleep diaries and the actigraphs provided similar estimates of total sleep time, time awake after sleep onset, and sleep efficiency, but differed in the measurement of sleep onset latency and nocturnal awakenings. Both methods of assessment exhibited low to moderate reliability across nights. Measures of the same sleep parameters across the two methods of assessment showed low concordance. Of the clinical variables, pain severity had the strongest association with disturbed sleep, but only using the diary method of assessment. Subjects who reported high pain severity also reported greater sleep impairment than subjects with low pain severity, but this was not confirmed by actigraphy. In general, both methods of assessment point to the significance of insomnia associated with chronic musculoskeletal pain as a distinct clinical problem, but the activity monitoring and self-report procedures provide different information. These findings suggest that multi-method assessment is an important consideration for studies of insomnia in patients with chronic pain. © 1998 International Association for the Study of Pain. Published by Elsevier Science B.V.

Keywords: Chronic pain; Sleep; Insomnia; Activity monitoring; Actigraphy

1. Introduction

Although insomnia is a common problem in the general population (Mellinger et al., 1985; Ford and Kamerow, 1989; Moffitt et al., 1991), it is particularly prevalent among people who suffer from chronic pain. In clinical samples, reports of impaired sleep have ranged from 51% of patients receiving orthopedic referrals for chronic low back pain (Atkinson et al., 1988) to 70% in a mixed group of patients attending a specialty pain clinic (Pilowsky et al., 1985). Several studies have also used questionnaires (Pilowsky et al., 1985; Atkinson et al., 1988) or daily

sleep diaries (Haythornthwaite et al., 1991; Affleck et al., 1996) to identify the clinical correlates of insomnia in various groups of patients. These studies have uniformly found that both pain severity and the level of depressive symptoms are associated with the degree of sleep impairment. Thus, while pointing to the significance of the insomnia problem in chronic pain patients, these findings indicate that the clinical interpretation of the sleep disturbance can be complicated. For example, it remains unclear whether disturbed sleep is best viewed as insomnia associated with the experience of pain, or insomnia due to co-occurring depression or emotional distress.

A few studies have used objective measures, such as polysomnography, to investigate the sleep behavior of patients with chronic pain syndromes. These studies have

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found that individual patients can exhibit a range of anomalies during sleep, including reduced latencies for rapid eye-movement (REM) sleep (Blumer et al., 1982; Atkinson et al., 1988), alpha-wave intrusions into non-REM sleep (Moldofsky et al., 1975; Wittig et al., 1982; Pivik and Harman, 1995), frequent clusters of microarousals (Staedt et al., 1993), and restless leg movements (Wittig et al., 1982; Atkinson et al., 1988). More generally, they provide further validation of the significance of the insomnia problem in this patient group. In the largest study of this type, Wittig et al. (1982) conducted a single night of polysomnography with 26 chronic pain patients who complained of insomnia, and found an average sleep onset latency of 38 min, a total sleep time of 6.1 h, and 72.5 min of wake time after sleep onset. Although their sleep was more impaired than that of a comparison group of psychiatric patients with insomnia, it was much more impaired than that of patients with subjective insomnia but no objective findings.

The use of objective measures of sleep behavior provides a valuable addition to studies of insomnia, because the exclusive reliance on self-reports is subject to a number of limitations. For example, polysomnographic studies have shown that insomniacs often underestimate their total sleep time and sleep efficiency, while overestimating the time it takes them to fall asleep (Carskadon et al., 1976; Frankel et al., 1976). Although polysomnography is the accepted criterion standard for objective sleep assessments, methodological advances on other fronts, particularly in the area of ambulatory activity monitoring, now offer the possibility of studying some aspects of sleep behavior in a non-intrusive way while subjects sleep at home. With this technology, the subject wears a small electronic monitoring device (actigraph), which registers physical activity counts sufficient to displace an internal transducer. The rationale for the use of actigraphy in sleep studies is that periods of wakefulness are likely to be associated with more frequent movements than periods of sleep. Computer scoring algorithms have been developed that derive estimates of various sleep parameters from the actigraph data. In validation studies with healthy subjects, the concordance between polysomnographic and actigraphic discriminations of sleep versus wakefulness has been in the range of 88–96% of minutes scored (Mullaney et al., 1980; Webster et al., 1982; Cole et al., 1992; Sadeh et al., 1994). In clinical groups, the sleep-scoring algorithms may overestimate sleep times because of periods when subjects are awake but immobile, leading to somewhat lower concordance with polysomnography in patients with insomnia. Even with these patients however, the range of agreement has been 78–82% (Sadeh et al., 1989; Hauri and Wisbey, 1992). Thus, a recent review of the role of actigraphy in sleep studies concluded that it 'may be a useful, cost-effective method for assessing specific sleep disorders, such as insomnia' (Sadeh et al., 1995).

To date, only one study has used actigraphy to examine

the sleep of patients with chronic pain. Lavie et al. (1992) compared 13 patients with rheumatoid arthritis with nine patients suffering from chronic low back pain and 12 healthy controls. They found good reliability across nights for all actigraphically derived sleep parameters in each group. They also found that the patients with arthritis had more fragmented sleep than controls, while patients with back pain occupied an intermediate position. Despite the small sample sizes, this study offered further evidence that actigraphic assessment can potentially provide a meaningful objective perspective on the sleep of patients with chronic pain.

In this study, we used a combination of actigraphic monitoring and daily diaries to assess the sleep of a group of 40 subjects with insomnia associated with chronic musculoskeletal pain. The goals of the study were to: (i) further examine the nature and severity of the sleep disturbance in this group; (ii) determine the concordance between actigraph and sleep diary measures of various sleep parameters; (iii) assess the reliability of sleep parameters across nights; and (iv) identify the clinical correlates of insomnia severity as measured by both subjective and objective methods.

2. Methods

2.1. Subjects

The subjects were 40 patients with chronic musculoskeletal pain complaints (19 males and 21 females, mean age = 44.9 ± 7.9 years, range = 29–59 years). They had all been treated at a rehabilitation center or at a community psychiatry clinic, but continued to experience poor sleep. The majority of subjects ($n = 27$; 67.5%) reported back pain as their primary complaint, whereas others reported pain in the cervical region ($n = 6$; 15.0%), shoulder and upper limbs ($n = 3$; 7.5%), lower limbs ($n = 3$; 7.5%), and abdominal region ($n = 1$; 2.5%). Patients whose main pain-related diagnosis was fibromyalgia were not included; nor were patients with other significant medical problems. The average pain duration was 9.1 ± 9.3 years.

Most subjects (80.0%) were married or cohabiting. Educationally, 47.5% of the subjects had obtained college or university degrees, 45.0% were high school graduates, and the remainder (7.5%) had not completed high school. The majority of subjects (62.5%) reported that they were unable to work because of pain, while others reported working either full-time (25.0%), part-time (7.5%), or were unemployed for reasons other than pain (5.0%). Subjects were not excluded because of medication use; however, we did establish that medication use was consistent across nights. Twenty-one (52.5%) subjects reported no medication use, while others reported the use of non-narcotic analgesics (32.5%), weak narcotics (20.0%), antidepressants (27.5%) and sedatives/hypnotics (17.5%).

2.2. Procedure

A letter was sent to patients who had been treated at the participating clinics, informing them of a research program related to chronic pain and insomnia. To determine eligibility, individuals who responded to the letter underwent an initial assessment using questionnaires and structured interviews. Each subject also wore a wrist actigraph and completed a sleep diary over 2 consecutive nights.

2.2.1. Interview assessment

Structured Interview for Sleep Disorders According to DSM-IV. The Structured Interview for Sleep Disorders According to DSM-IV (SIS-D; Schramm et al., 1993) is a structured clinical interview to assess sleep-wake disorders. It was developed originally around criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders-Third Edition, Revised (DSM-III-R; American Psychiatric Association, 1987); we have modified it slightly to incorporate revisions that appeared in the DSM-IV (American Psychiatric Association, 1994). The interview consists of a brief overview of health and lifestyle factors that can affect sleep, followed by screening questions for symptoms of specific sleep disorders. For current diagnoses, Schramm et al. (1993) reported that the main categories of sleep disorders identified by the SIS-D had good inter-rater reliabilities (kappas ranging from 0.49 to 0.91). They also found generally good concordance between diagnoses based on the SIS-D and polysomnography.

To be considered eligible for the study, each patient was required to have a diagnosis of insomnia (disorder of initiating or maintaining sleep) that was regarded as severe enough to interfere with daytime functioning, or to cause significant distress. Patients with other SIS-D sleep disorders were not included. All diagnoses were assigned by clinical consensus after discussion at a team meeting involving a psychologist and two psychology doctoral students (one of whom served as the interviewer).

Primary Care Evaluation of Mental Disorders. The Primary Care Evaluation of Mental Disorders (PRIME-MD; Spitzer et al., 1994) is a brief assessment procedure for diagnosing a range of mental disorders according to DSM-IV criteria (American Psychiatric Association, 1994). It includes a one-page questionnaire that is completed by the patient before seeing the interviewer. The questionnaire consists of a series of 'yes/no' questions about symptoms present during the past month. Using a structured evaluation guide to follow up on the questionnaire responses, the interviewer then reviews the criteria for specific mental disorders. Based on a study of 1000 primary-care medical patients, Spitzer et al. (1994) found good agreement between PRIME-MD diagnoses and those of independent mental health professionals (kappa = 0.71 for any psychiatric diagnosis). For the present purpose, the PRIME-MD was used to screen out subjects who suffered from comorbid major depression, generalized anxiety disorder, panic dis-

order, and alcohol dependence (all of which can affect sleep). However, subjects with less severe presentations of depression were included in the study.

2.2.2. Self-report assessment

Multidimensional Pain Inventory-Pain Severity Scale. The Multidimensional Pain Inventory-Pain Severity Scale (MPI-PS; Kerns, et al., 1985) is a 3-item measure that assesses an individual's overall level of pain severity. Subjects are asked to respond on 7-point scales, to items addressing one's present pain level, average pain severity over the past week, and the extent of suffering because of pain. The MPI-PS has acceptable internal consistency ($\alpha = 0.72$) and good test-retest reliability ($r = 0.82$) with chronic pain patients (Kerns et al., 1985). The MPI-PS has also been shown to have good construct validity when correlated with other pain-relevant measures (Bernstein et al., 1995; Lousberg et al., 1997).

Beck Depression Inventory. The Beck Depression Inventory (BDI; Beck and Steer, 1987) is a 21-item self-report measure of depressive symptomatology, which has demonstrated acceptable validity in studies of chronic pain patients (Turner and Romano, 1984). Although subjects with current major depressive disorder were excluded from the study, the BDI was used because many subjects nevertheless reported a range of symptoms of general affective distress, albeit at a lower level of severity than a fully syndromal major depression.

Medication Quantification Scale. The Medication Quantification Scale (MQS; Steedman et al., 1992) provides a means for quantifying medication use in patients with chronic pain. For each pain-related medication, a detriment weight is assigned based on the potential for adverse effects associated with long-term use, and a dosage weight is assigned based on the recommended daily dosage. For each medication, the detriment weight is multiplied by the dosage weight to yield an MQS score. A total score is then obtained by summing MQS scores for all medications used. The MQS has been shown to have excellent inter-rater reliability ($r = 0.99$) and good concurrent validity when compared with judgments made by clinicians (Steedman et al., 1992).

Pittsburgh Sleep Quality Index. The Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) is a self-rated questionnaire that assesses an individual's sleep quality and the presence of specific sleep problems over the past month. The PSQI comprises 19 items that generate seven component scores. The sum of these scores (range = 0-21) yields a global measure of sleep quality, with higher scores indicating increasingly poor sleep. Buysse et al. (1989) have reported that the PSQI has good internal consistency ($\alpha = 0.83$) and test-retest reliability ($r = 0.85$).

2.2.3. Sleep monitoring

Daily sleep diary. The sleep diary used in this study was modified from a similar method developed by Haythorn-

thwaite et al. (1991) for use with chronic pain patients. It consisted of one section that was completed in the evening, and another that was completed upon awakening in the morning. For the evening recording, the subject was asked to rate the level of pain at bedtime on a 6-point scale ranging from 0 ('no pain') to 5 ('very intense pain'). The subject also recorded the type and dosage of any medications taken during that day. Immediately upon awakening in the morning, the subject filled out the questions pertaining to the previous night's sleep, including bedtime and risetime, the number of hours of sleep, sleep onset latency, and number of awakenings. Using 6-point scales, the subject also gave overall ratings of sleep quality (0 = 'extremely poor' to 5 = 'extremely good'), sleep restfulness (0 = 'not at all rested' to 5 = 'well rested'), and pain upon awakening.

Actigraph recording. Ambulatory activity monitoring was conducted using a Mini Motionlogger Actigraph, a small lightweight ($4.4 \times 3.3 \times 0.96$ cm, 57 g) unit worn on the non-dominant wrist, which provides continuous monitoring of the subject's activity level (Fig. 1). Activity level was measured in counts per 15-s epoch, with one activity count being any movement sufficient to displace the unit's internal piezoelectric transducer. Data collected with the actigraph were downloaded to a computer via an interface unit. They were then scored using a dedicated software package (Ambulatory Monitoring Inc., 1994) that provides estimates of common sleep parameters, using algorithms developed by Webster et al. (1982) and Cole et al. (1992). The actigraph was initialized to begin

recording at 2100 h on the first night the subject began wearing the unit.

3. Results

3.1. Structured interviews

Subjects were not included in the study if they met full criteria for a current episode of one of the psychological exclusion diagnoses. Thirty-one subjects (77.5%) met no PRIME-MD diagnostic criteria, whereas seven subjects (17.5%) were given the diagnosis of major depression in partial remission, and two (5.0%) met criteria for dysthymia. All subjects met SIS-D criteria for insomnia, although there was variability in the nature of their sleep disturbances. Specifically, 13 subjects (32.5%) reported problems with sleep maintenance only, while the other 27 (67.5%) had problems with both sleep onset and sleep maintenance.

3.2. Sleep assessments

The parameters of total sleep time, sleep efficiency (the percentage of time in bed that is actually spent sleeping), sleep onset latency, number of awakenings, and time spent awake after initial sleep onset, were derived from both the sleep diary and the computer-scored actigraph data. Ratings of time in bed and sleep quality were derived from the sleep diaries alone, whereas mean activity level (average number

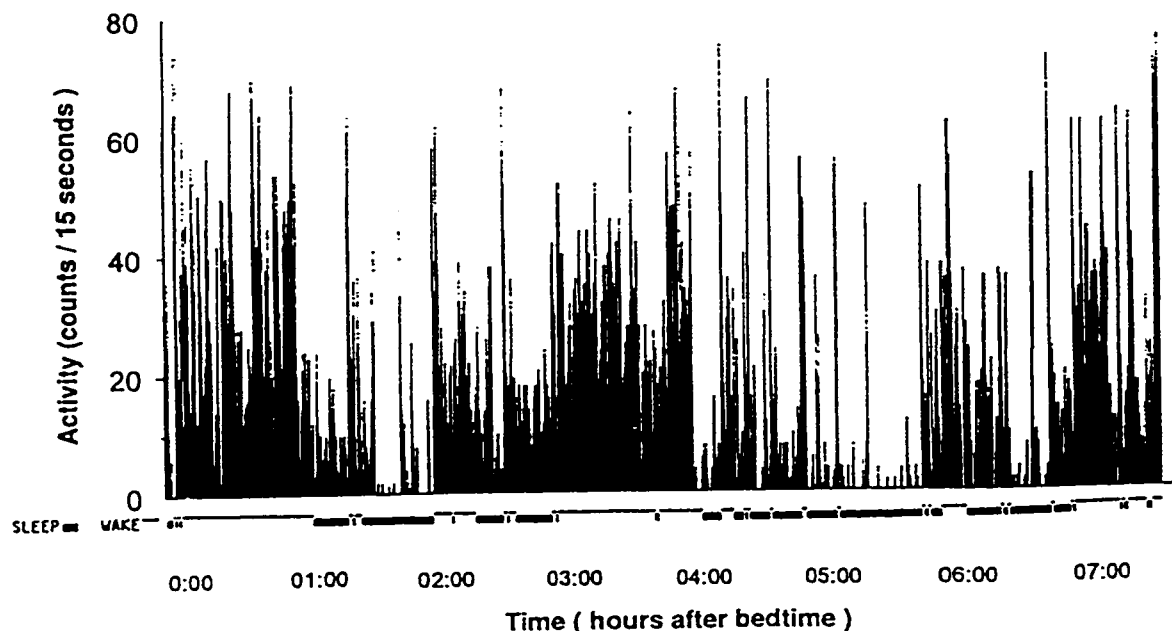


Fig. 1. Discrimination of sleep/wake states based on overnight ambulatory activity data, recorded from a patient with insomnia associated with chronic musculoskeletal pain.

Table 1
Mean scores and standard deviations of sleep diary and actigraph measures

Measure	Sleep diary		Actigraph	
	Night 1	Night 2	Night 1	Night 2
Time in bed (min)	461.58 (113.11)	471.85 (101.74)	–	–
Total sleep time (min)	318.00 (105.42)	322.76 (111.66)	349.25 (125.59)	352.09 (107.34)
Sleep efficiency (%)	70.75 (21.15)	69.44 (19.89)	76.40 (21.60)	75.61 (17.56)
Sleep onset latency (min)	40.60 (45.50)	36.35 (33.69)	24.45 (50.76)	22.23 (31.13)
Number of nocturnal awakenings	4.00 (2.83)	3.63 (2.41)	17.65 (10.36)	19.40 (10.86)
Time awake after sleep onset (min)	105.79 (108.60)	114.38 (105.81)	82.83 (100.10)	83.38 (63.47)
Mean activity level(counts/15 s)	–	–	8.70 (7.52)	8.84 (5.74)
Sleep quality	3.65 (1.94)	3.90 (2.32)	–	–

of activity counts per 15-s epoch) was taken from the actigraphs. The rating of sleep quality was derived by summing the diary scores for the items addressing sleep quality and sleep restfulness. Means and standard deviations for each of these parameters for both nights are presented in Table 1. Comparisons using paired *t*-tests showed no significant differences in group means for any of these parameters across the 2 nights of recording (all *P*'s > 0.10).

In general, the sleep diaries and the actigraph assessments were consistent in documenting the extent of the sleep disturbance in this group of patients. Both methods showed low sleep efficiency (means = 65–76%), long periods of wakefulness after sleep onset (means = 1.4–2.1 h), and low total sleep times (means = 4.9–5.9 h). Ratings of sleep quality and restfulness were generally low, at an average of 3.8 on the 10-point composite scale.

3.3. Reliability of sleep parameters

Although the overall group means for all sleep parameters were comparable across nights, this does not necessarily reflect stable and consistent patterns of sleep for individual subjects. To address this level of reliability, product-moment correlations were calculated across Night 1 and Night 2 for each of the sleep parameters derived from the sleep diaries and the actigraphs. The results are presented in Table 2.

As is evident in Table 2, the across-night reliabilities within a given method of assessment were low to moderate. For the actigraphs, the measures of sleep onset latency were essentially uncorrelated across nights, while the reliabilities for the remaining parameters ranged from $r = 0.40$ for mean activity level, to $r = 0.69$ for total sleep time. For the sleep diaries, the measures of time awake after initial sleep onset were not correlated significantly across nights. The estimates of total sleep time showed the highest reliability at $r = 0.56$, while the other measures ranged from $r = 0.34$ for sleep quality, to $r = 0.50$ for sleep onset latency.

3.4. Concordance between sleep diary and actigraph assessments

Table 2 also shows the correlations between the sleep

diary and actigraph assessments of the same parameters. The concordance between the two measures was statistically significant for both Nights 1 and 2 for the measures of total sleep time and number of awakenings, although the magnitudes of the correlations were relatively low, ranging from $r = 0.34$ to 0.42. Sleep onset latency and time awake after sleep onset were correlated significantly for Night 1 only, and the correlations for sleep efficiency were uniformly non-significant for both nights.

The two methods of assessment also differed systematically in the measurement of some sleep parameters. Specifically, averaging across nights, it was found that the actigraphs scored many more nocturnal awakenings than the subjects recalled on their sleep diaries, $t(39) = -10.69$, $P < 0.001$. In addition, the subjects reported longer sleep onset latencies on their diaries than were recorded by the actigraphs, $t(39) = 2.52$, $P = 0.016$. However, the two methods provided comparable estimates of total sleep time, time awake after sleep onset, and sleep efficiency (*P*'s > 0.05).

3.5. Clinical correlates of insomnia severity

3.5.1. Sleep diaries

The mean scores for the self-report measures, as well as for the diary measures of pain severity at bedtime and awakening, are shown in Table 3. For the latter measures, the entries in Table 3 have been averaged over the 2 days of monitoring. The correlations of these variables with the diary measures of different sleep parameters (averaged across nights) are presented in Table 4.

Subjects who reported more severe global sleep disturbances on the PSQI also reported longer sleep onset latencies on the sleep diaries, less total sleep time, and lower sleep efficiency. MQS scores were positively correlated with sleep onset latency, indicating that subjects with the highest medication use actually reported taking the longest time to fall asleep. Depression scores on the BDI were not correlated significantly with any of the sleep parameters, the highest correlation being $r = 0.31$, $P = 0.054$, with sleep onset latency.

The strongest clinical correlates of insomnia severity

Table 2

Across-night reliability coefficients and correlations between actigraph and sleep diary measures

Correlated measures	TST	SEF	SOL	AWK	WASO	MAL	SQL	TIB
Actigraph night 1 × actigraph night 2	0.69***	0.66***	-0.06	0.57***	0.67***	0.40**	-	-
Diary night 1 × diary night 2	0.56***	0.47**	0.50**	0.49**	0.29	-	0.34*	0.44**
Actigraph night 1 × diary night 1	0.34*	0.14	0.35*	0.41**	0.44**	-	-	-
Actigraph night 2 × diary night 2	0.40*	0.24	0.12	0.42**	0.30	-	-	-

AWK, number of awakenings; MAL, mean activity level; SEF, sleep efficiency; SOL, sleep onset latency; SQL, sleep quality; TIB, time in bed; TST, total sleep time; WASO, time awake after sleep onset.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

were the measures of pain. Although none of the pain measures was correlated significantly with the number of nocturnal awakenings or time awake after sleep onset, a number of robust findings were evident with the other sleep parameters. The ratings of pain severity at bedtime were correlated significantly with total sleep time, sleep onset latency, and sleep quality. Pain severity upon awakening was associated with total sleep time, sleep efficiency, and sleep quality, and the MPI-PS was correlated significantly with total sleep time and sleep onset latency.

In order to probe the clinical significance of these findings, the ratings of pain severity at bedtime were entered into a series of bivariate least-squared regression analyses. With these analyses, the regression coefficients (B) can be interpreted directly as the amount of change in each dependent variable that is associated with a unit increase in pain severity ratings (Schroeder et al., 1986). The results indicated that a 1-point increase in pain ratings at bedtime was associated with a $B = 10.8$ min (28.1%) increase in self-reported sleep onset latency, $R^2 = 0.10$, $F(1,37) = 4.29$, $P = 0.045$, a $B = -35.6$ min (11.1%) reduction in total sleep time, $R^2 = 0.15$, $F(1,37) = 6.41$, $P = 0.016$; and a $B = -0.92$ point (24.4%) decrease in ratings of sleep quality, $R^2 = 0.29$, $F(1,37) = 15.45$, $P < 0.001$.

Following the work of Atkinson et al. (1988), we also examined the sleep patterns of subgroups of subjects identified as having relatively high or low global levels of pain severity. For this purpose, subjects who scored below the median on the MPI-PS ($n = 18$) were compared with subjects who scored at or above the median ($n = 22$). The two groups were then compared on all sleep parameters (averaged across nights), including those derived from the actigraphs. The results are presented in Table 5.

Subjects in the high pain-severity group reported less total sleep time than subjects in the low pain-severity group, $t(38) = -2.12$, $P = 0.041$. They also had lower sleep efficiencies, $t(38) = -2.14$, $P = 0.030$, and reported longer sleep onset latencies, $t(38) = 2.06$, $P = 0.049$. The two groups did not differ significantly on the other sleep parameters (P 's > 0.10).

3.5.2. Actigraphs

In marked contrast to the corresponding analyses based

on the sleep diaries, no significant correlations were observed between any of the clinical variables and the sleep parameters derived from the actigraphs (all P 's > 0.10). Similarly, as shown in Table 5, subjects in the high and low pain-severity groups had comparable scores for all actigraph measures (all P 's > 0.10). The latter finding suggests that the discrepancies between the actigraphs and the sleep diaries may be particularly pronounced among subjects with high-severity pain. Indeed, paired t -tests conducted within the high pain-severity group showed that, compared to the actigraph estimates, the diary reports of these subjects revealed lower total sleep times, $t(21) = -2.12$, $P = 0.046$, longer sleep onset latencies, $t(21) = 2.50$, $P = 0.021$, more time awake after sleep onset, $t(21) = 2.15$, $P = 0.043$, and lower sleep efficiencies, $t(21) = -2.20$, $P = 0.039$, but fewer nocturnal awakenings, $t(21) = -6.68$, $P < 0.001$. Comparable analyses within the low pain-severity group also showed fewer awakenings recorded with the diaries than with the actigraphs, $t(17) = -9.07$, $P < 0.001$, but the two methods provided similar estimates of the other sleep parameters (all P 's > 0.10).

4. Discussion

The results of this study confirm the significance of the problem of insomnia for many patients with chronic pain, and they provide further information about its nature and correlates. In interpreting the results, it is important to note that all subjects were screened to ensure that they in fact suffered from clinically significant insomnia, which is not

Table 3

Mean scores and standard deviations of clinical measures

Clinical measure	Mean	SD
Pain severity at bedtime	3.15	1.04
Pain severity upon awakening	3.13	0.99
MPI-PS	12.08	2.68
PSQI	13.25	3.40
MQS	3.76	5.15
BDI	14.50	7.37

BDI, Beck Depression Inventory; MPI-PS, Multidimensional Pain Inventory-Pain Severity Scale; MQS, Medication Quantification Scale; PSQI, Pittsburgh Sleep Quality Index.

Table 4
Correlations between clinical measures and sleep diary parameters

Clinical measure	SOL	AWK	TST	SEF	WASO	SQL
Pain severity at bedtime	0.32*	0.18	-0.38*	-0.27	0.15	-0.54***
Pain severity upon awakening	0.21	0.28	-0.46**	-0.32*	0.23	-0.35*
MPI-PS	0.37*	0.13	-0.42**	-0.23	0.10	-0.30
PSQI	0.50***	-0.03	0.44**	-0.32*	0.10	-0.14
MCS	0.35*	-0.14	-0.24	-0.07	-0.07	-0.13
BDI	0.31	-0.16	-0.21	-0.06	-0.02	-0.26

AWK, number of awakenings; BDI, Beck Depression Inventory; MPI-PS, Multidimensional Pain Inventory-Pain Severity Scale; MQS, Medication Quantification Scale; PSQI, Pittsburgh Sleep Quality Index; SEF, sleep efficiency; SOL, sleep onset latency; SQL, sleep quality; TST, total sleep time; WASO, time awake after sleep onset.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

necessarily the case for all individuals with chronic pain. In addition, subjects with current major psychopathology, which can have marked effects on sleep, were excluded from the study. Thus, the subjects who participated represent a relatively homogeneous group of patients with insomnia associated with chronic musculoskeletal pain. For some purposes, however, the exclusion of both good sleepers and some potentially very poor sleepers would have the effect of restricting the range of variability in measures and lowering correlations.

4.1. Nature and severity of insomnia associated with chronic musculoskeletal pain

Every subject in the present study had problems with the maintenance of sleep, although almost a third reported no difficulties initiating sleep. When subjects did report sleep-onset insomnia, it never occurred in the absence of a concurrent difficulty with sleep maintenance.

Both the sleep diaries and the actigraphs revealed relatively low total sleep times, sleep disrupted by frequent awakenings, and sleep efficiency values well below the 85% criterion that is often used to differentiate good and poor sleepers (Frankel et al., 1976; Lacks and Morin, 1992). The sleep diaries and the actigraphs were broadly consistent

in estimating total sleep times in the range of 4.9-5.9 h and sleep efficiencies of 67-76%. In other studies of patients with chronic pain, these values have ranged from 5.2 to 6.5 h of sleep, with sleep efficiencies ranging from 75% to 87% (Wittig et al., 1982; Atkinson et al., 1988; Haythornthwaite et al., 1991; Lavie et al., 1992; Staedt et al., 1993). After first falling asleep, the actigraphs recorded an average of 83.1 min during which subjects were awake during the night. Wittig et al. (1982) reported a corresponding value of 72.5 min based on polysomnography. By most measures, then, the subjects in the present study had insomnia problems that were relatively severe when compared to other studies of patients with chronic pain.

4.2. Reliability of sleep parameters

For both methods of assessment, the across-night reliability coefficients were low to moderate. It should be noted, however, that studies of individuals with primary insomnia have shown that there can in fact be great variability in sleep from night to night (Frankel et al., 1976; Roth et al., 1976; Coates et al., 1982), as have studies of healthy volunteers (Moses et al., 1972). Thus, while the observed reliability coefficients for the actigraph recordings were somewhat lower than those reported by Lavie et al. (1992) for small

Table 5
Mean scores and standard deviations of sleep diary and actigraph measures for subjects with high ($n = 22$) and low ($n = 18$) pain severity

Measure	Sleep diary		Actigraph	
	High severity	Low severity	High severity	Low severity
Total sleep time (min)	292.39 ^{ab} (89.60)	354.58 (94.42)	346.51 (91.15)	355.76 (126.70)
Sleep efficiency (%)	65.02 ^{ab} (17.84)	76.30 (15.53)	75.90 (13.94)	76.13 (22.11)
Sleep onset latency (min)	47.50 ^{ab} (43.06)	27.44 (13.59)	25.73 (31.11)	20.42 (26.83)
Number of nocturnal awakenings	4.33 ^b (2.52)	3.18b (1.80)	18.27 (10.62)	18.83 (7.98)
Sleep quality	3.39 (1.94)	4.25 (1.39)	-	-
Time awake after sleep onset (min)	128.84 ^b (96.12)	87.15 (67.93)	82.69 (64.41)	83.60 (88.46)
Mean activity level (counts/15 s)	-	-	9.14 (5.06)	8.32 (6.26)

^aSubjects with high-severity pain differ from subjects with low-severity pain ($P < 0.05$). ^bThe sleep diary method of assessment differs from the actigraph method in the subject group indicated.

groups of patients with rheumatoid arthritis and chronic low back pain, they are generally consistent with the broader literature. Similarly, the reliabilities of the diary measures were comparable to the stability coefficients reported by Haythornthwaite et al. (1991), which ranged from $r = 0.36$ to 0.62 for various sleep parameters.

4.3. Concordance between sleep diary and actigraph assessments

In general, the concordance between the sleep diary and actigraph assessments of the same sleep parameters was relatively modest, with estimates of shared variance (r^2) ranging from 1% to 19%. For example, the correlation across methods in the assessment of sleep efficiency was not significant for either night. Sleep onset latency and time awake after sleep onset showed significant correlations for only 1 of the 2 nights. In addition, the actigraphs recorded shorter sleep onset latencies than did the diary reports. Although the number of awakenings showed consistent correlations between the two methods, the average numbers of awakenings recorded were very different between the actigraph (mean = 18.5) and diary (mean = 3.8) methods of assessment. This substantial difference can be attributed to the fact that the actigraph records as awakenings any movements associated with restless sleep or brief periods of arousal, which may not be recalled by the subject upon awakening in the morning. Finally, total sleep time also showed consistent correlations between the actigraphs and sleep diaries for both nights, but the magnitudes of these correlations were relatively low at $r = 0.34$ and 0.40. Evidently, then, the activity monitoring and self-report measures are correlated rather loosely with one another. Future studies of sleep in patients with chronic pain should be informed by this fact and consider the merits of multi-method assessment over repeated nights.

4.4. Clinical correlates of insomnia severity

The importance of the discrepancies between the actigraph and sleep diary recordings was especially clear in the analyses of clinical correlates of insomnia severity. The three measures of pain (MPI-PS scores and ratings of pain at bedtime and in the morning) were all associated with various sleep parameters reported in the diaries. Similarly, the analyses of subgroups of subjects with relatively high or low levels of global pain severity replicated the findings of Atkinson et al. (1988) of a greater sleep disturbance in patients with high-severity pain. Other clinical correlates are also noteworthy. For example, the positive correlation between MQS scores and diary reports of sleep onset latency suggests that the use of medications does not necessarily ensure the rapid initiation of sleep. On the other hand, the general lack of association between BDI scores and various sleep parameters is inconsistent with the reports of other investigators (Pilowsky et al., 1985; Atkinson et al.,

1988; Haythornthwaite et al., 1991). We attribute this inconsistency to the exclusion in the present study of patients with current major depressive disorder. This interpretation suggests that the association between depression scores and insomnia depends on the inclusion of patients with particularly severe depressive symptomatology, but also the insomnia associated with chronic musculoskeletal pain is a distinct clinical problem, and not an artifact of comorbidity with depression.

Importantly, however, significant correlations between the clinical measures and sleep parameters were only observed with the diary method of assessment; the corresponding correlations with the actigraph-derived measures were uniformly low and non-significant. The rationale for the actigraph assessment was to provide an objective measure of sleep that would limit the biases of common methods: variance inherent in the exclusive reliance on self-reports, as well as those associated with the misperception of sleep and inaccurate recall. Because polysomnography was not conducted, we are left with the question as to which measure provides the most valid assessment of sleep. When actigraphs have been compared with polysomnograph recordings in controlled laboratory settings, the degree of concordance has been robust, albeit with the potential for overestimation of sleep times due to periods when subjects are awake but motionless (Sadeh et al., 1995). Thus, it is possible that the actigraphs were insensitive to the magnitude of the sleep disturbance in subjects with high-severity pain, if indeed they were immobile during periods of extended wakefulness. On the other hand, these findings may also indicate that patients with high-severity pain subjectively experience a greater sleep impairment than is evident using objective methods of assessment. In this event, the correlations between clinical measures and the severity of insomnia that appear in the self-reports should be viewed cautiously as predictors of actual sleep behavior, particularly among patients who report high pain levels.

5. Conclusion

In conclusion, this study underscores the significance of the problem of insomnia for many people with chronic musculoskeletal pain. Hence, an important direction for future research will be to determine how effectively it can be treated (National Institutes of Health Technology Assessment Panel, 1996). Although medications are the traditional mainstay of insomnia therapy, their long-term use for people with chronic sleep disorders is controversial (Lacks, 1987; Dement, 1992). Behavioral treatments are now well-established for primary insomnia, but to date their application to patients with chronic pain has been limited to case reports and uncontrolled trials (Morin et al., 1989, 1993). The initial results have been promising, however, and these methods merit further investigation in future research.

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Appendix N
MPI-PS

Appendix O
Sleep Self-Efficacy Scale

Appendix P
Sleep and Pain Knowledge Quiz

SLEEP AND PAIN KNOWLEDGE QUIZ

Each of the questions has one answer that is better than all of the others. Please circle the letter beside the answer that you think is best. Try to answer all the questions even if you have to guess.

1. A person with chronic pain can be bothered by sleep disturbances because _____
 - (a) pain causes a chemical imbalance
 - (b) pain medication increases arousal
 - (c) low activity levels impair sleep
 - (d) chronic pain causes nightmares
2. Why is slow-wave (deep) sleep important?
 - (a) it is the stage of sleep where dreaming takes place
 - (b) it is the most restful stage of sleep for the muscles
 - (c) it is the lightest form of sleep and easy to wake up from
 - (d) it helps the immune system fight illness
3. The amount of slow-wave sleep you have at night is most affected by _____?
 - (a) making sure not to nap during the daytime
 - (b) how much sleep you had the night before
 - (c) the amount of physical activity you do during the day
 - (d) how long it takes you to fall asleep
4. Which of the following is not an effective way of coping with chronic sleep problems?
 - (a) avoiding daytime napping
 - (b) getting up at the same time every morning
 - (c) going to bed only when you are tired
 - (d) staying in bed until sleep finally comes
5. The best thing to do when you have a poor night's sleep is to _____
 - (a) take a nap during the day to recover the lost sleep
 - (b) go to bed earlier the following night
 - (c) reduce your activities for the day
 - (d) go to bed at the same time you normally would
6. Feeling as though you should always be able to sleep as well as someone without pain is an example of ____
 - (a) an unrealistic expectation
 - (b) the power of positive thinking
 - (c) low self-esteem
 - (d) a self-fulfilling prophesy
7. Which of the following is the most important condition for falling asleep
 - (a) putting your body in a state of relaxation
 - (b) a cool room temperature
 - (c) putting your mind in a relaxed state
 - (d) a firm comfortable mattress
8. One good thing to do when you can't get to sleep is to _____
 - (a) get out of bed and read a boring book.
 - (b) do some exercise to feel tired.
 - (c) drink some hot chocolate.
 - (d) take some pain medication.
9. To avoid interference with your sleep, you should not drink any caffeinated beverages _____
 - (a) 1 hour before bedtime.
 - (b) 2 hours before bedtime.
 - (c) 3-4 hours before bedtime.
 - (d) more than 4 hours before bedtime.

10. Some people with chronic pain don't have sleep problems. This suggests that _____
- (a) they have lower pain levels.
 - (b) pain is not the sole cause of disturbed sleep.
 - (c) they need less sleep at night.
 - (d) they take pain medication before bedtime.
11. Which of the following is not a good pre-bedtime activity?
- (a) taking a hot bath
 - (b) having a glass of warm milk
 - (c) doing the household finances
 - (d) imagery relaxation
12. Sleeping pills are intended to help insomnia by _____
- (a) increasing dream activity
 - (b) altering the kind of sleep you have
 - (c) helping you achieve a deeper sleep
 - (d) helping you feel more refreshed in the morning
13. If you have to nap, the best time to do it is in the _____
- (a) late afternoon
 - (b) morning
 - (c) early evening
 - (d) mid-afternoon
14. Believing that you need 8 hours of sleep each and every night is an example of _____
- (a) emotional reasoning
 - (b) catastrophizing
 - (c) goal-setting
 - (d) all-or-none thinking
15. Which of the following is not a good way to reduce stressful thoughts before bedtime
- (a) imagining a pleasant scene in your mind
 - (b) telling yourself not to worry
 - (c) writing down your problems on paper
 - (d) thinking about the worst that could happen and then developing a coping plan
16. Sleep efficiency is _____
- (a) a measure of how fast you can fall asleep.
 - (b) the ratio of your good nights of sleep to bad nights in a typical week
 - (c) the ratio of your hours spent sleeping to hours spent in bed.
 - (d) a measure of how deep your sleep is.
17. In general, the time you spend in bed should not exceed the time you spend sleeping by more than
- (a) 3 hours
 - (b) 2 hours
 - (c) 1 hour
 - (d) 20 minutes
18. Which of the following is the best way to exercise if you want to sleep better?
- (a) a brisk walk every day at the same time
 - (b) 20 minutes of intense aerobic exercise 3-4 times per week
 - (c) change the exercise depending on the season (e.g., skating in the winter, swimming in the summer)
 - (d) choose individual over group or paired sports
19. Which of the following is not a side-effect of sleeping pills?
- (a) hangover
 - (b) memory problems
 - (c) reduced alertness
 - (d) rebound insomnia
20. The best way to avoid napping during the daytime is to _____
- (a) find an activity to do outside your home
 - (b) drink coffee to stay awake
 - (c) read a book or watch television
 - (d) take a cold shower

Appendix Q
Pre-Sleep Arousal Scale

PSAS

When trying to fall asleep last night, did you have any one of the following experiences? Please indicate (by circling the appropriate number) the degree to which you experienced each of those listed below.

	Not at all	A little	Moderately	A lot	Extremely
Heart racing, pounding, or beating irregularly	1	2	3	4	5
A jittery, nervous feeling in your body	1	2	3	4	5
Worry about falling asleep	1	2	3	4	5
Review or ponder events of the day	1	2	3	4	5
Shortness of breath or laboured breathing	1	2	3	4	5
Depressing or anxious thoughts	1	2	3	4	5
A tight, tense feeling in your muscles	1	2	3	4	5
Worry about problems other than sleep	1	2	3	4	5
Being mentally alert, active	1	2	3	4	5
Cold feeling in your hands, feet, or your body in general	1	2	3	4	5
Can't shut off your thoughts	1	2	3	4	5
Have upset stomach (knot or nervous feeling)	1	2	3	4	5
Perspiration in palms of your hands or other parts of your body	1	2	3	4	5
Thoughts keep running through your head	1	2	3	4	5
Dry feeling in mouth or throat	1	2	3	4	5
Distracted by sounds, noise in the environment (e.g., ticking clock, house noises)	1	2	3	4	5

Appendix R
Adherence Checklist

Name: _____

Instructions

We would like to find out what you are finding most useful from the program in helping you sleep . This will help us in our evaluation of the program. Please take a minute to answer the following questions.

1. How much of the assigned chapter(s) from *Coping with Chronic Pain Sleep Problems* would you say that you read? Please estimate the amount of the chapter that you read. _____
%

2. How many nights did you use relaxation exercises to help you get to sleep?
_____ nights out of 7

3. a. Over the last week, how many times in total did you wake up and were not able to get back to sleep within 20 minutes?
_____ times
b. When this happened, how many of these times did you get out of bed?
_____ times
c. How many of these times did you engage in some non-stimulating activity?
_____ times

4. How many nights this week did you have stressful thoughts that kept you awake?
_____ nights out of 7
b. When this happened, how often did you try one of the stress coping strategies from chapter 6 (Mind over Matter: Your thoughts and Sleep) to help you cope with the anxiety?
_____ nights out of _____

5. In the last week, how many mornings did you get out of bed at roughly the same time (i.e., within 30 minutes)?
_____ mornings

Appendix S
Client Satisfaction Questionnaire

CLIENT SATISFACTION QUESTIONNAIRE

1. How would rate the quality of service you have received?

4	3	2	1
<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>

2. Did you get the kind of service you wanted?

1	2	3	4
<i>No, definitely not</i>	<i>No, not really</i>	<i>Yes, generally</i>	<i>Yes, definitely</i>

3. To what extent has this program met your needs?

4	3	2	1
<i>Almost all of my needs have been met</i>	<i>Most of my needs have been met</i>	<i>Only a few of my needs have been met</i>	<i>None of my needs have been met</i>

4. If a friend were in need of similar help, would you recommend our program to him or her?

1	2	3	4
<i>No, definitely not</i>	<i>No, not really</i>	<i>Yes, generally</i>	<i>Yes, definitely</i>

5. How satisfied were you with the amount of help you have received?

1	2	3	4
<i>Quite satisfied</i>	<i>Indifferent or mildly dissatisfied</i>	<i>Mostly satisfied</i>	<i>Very satisfied</i>

6. Have the services you received helped you deal more effectively with your problem?

4	3	2	1
<i>Yes, they helped a great deal</i>	<i>Yes, they helped somewhat</i>	<i>No, they really didn't help</i>	<i>No, they seemed to make things worse</i>

7. In an overall, general sense, how satisfied are you with the service you have received?

4	3	2	1
<i>Very satisfied</i>	<i>Mostly satisfied</i>	<i>Indifferent or mildly dissatisfied</i>	<i>Quite dissatisfied</i>

8. If you were to seek help again, would you come back to this program?

1	2	3	4
<i>No, definitely not</i>	<i>No, I don't think so</i>	<i>Yes, I think so</i>	<i>Yes, definitely</i>

9. If you have any other comments or suggestions, please write them on the back: