

INSOMNIA: A RISK FACTOR FOR PHYSICAL AND MENTAL HEALTH ILLNESSES

By

ANGIE LEE HAYS

**A clinical project submitted in partial fulfillment of the
requirements for the degree of**

MASTER OF NURSING

**WASHINGTON STATE UNIVERSITY
COLLEGE OF NURSING**

DECEMBER 2006

To the Faculty of Washington State University:

The members of the committee appointed to examine the clinical project of
ANGIE LEE HAYS find it satisfactory and recommend that it be accepted.


Chair





TABLE OF CONTENTS

Abstract.....	5
Introduction.....	6
Statement of Problem.....	7
Statement of Purpose.....	8
Neuman System's Model.....	8
Definitions.....	10
Pathophysiology and Psychopathology.....	12
Epidemiology.....	15
Clinical Presentation.....	18
Diagnostic Tests.....	19
Tools for Assessing Sleep Patterns.....	22
Treatments.....	23
Pharmacological Interventions.....	26
Implications for Practice.....	29
Summary.....	31
References.....	32

LIST OF TABLES

Table 1 Neuman's Model.....	36
Table 2 Neuman Systems Model.....	37
Table 3 Neuman Systems Model.....	38
Table 4 Example of a Sleep Log.....	39
Table 5 Pharmacological Agents.....	40
Table 6 Pharmacological Agents.....	41

Appendix

Appendix A Sleep Hygiene.....	42
-------------------------------	----

INSOMNIA: A RISK FACTOR FOR PHYSICAL AND MENTAL HEALTH ILLNESSES

Abstract

By Angie Lee Hays
Washington State University
December, 2006

Chair: Lorrie Dawson

Insomnia is one of the most common sleep complaints in adulthood. It is a major health problem and interferes with daily activities including cognition, driving, poor job performance, and productivity. Insomnia is also a risk factor for hypertension, obesity, diabetes, heart disease, depression, and illness of the immunological system. Insomnia is underreported by patients and undertreated by providers. Clinicians lack expertise in diagnosing and treating this disorder. Insomnia requires an accurate diagnosis and effective treatment. Diagnostic and treatment options include polysomnography, actigraphy, behavioral treatment, relaxation therapy, stimulus control therapy, and pharmacological interventions. Insomnia is often multidimensional and requires a thorough evaluation.

This manuscript will explain the clinical presentation of insomnia and how nurse practitioners can gain needed assessment skills to adequately assess, diagnosis, and prescribe appropriate interventions and treatments for patients who suffer with insomnia.

Introduction

Insomnia is one of the most common sleep complaints in adulthood. It is “believed that 10% to 15% of the adult population suffers from chronic insomnia, and an additional 25% to 35% have transient or occasional insomnia” (Doghramji, 2006, p.S214). Insomnia has significant medical and public health implications with an annual cost between 9.25 and 107.5 billion dollars (Summers, Crisostomo, & Stepanski, 2006). Insomnia is a sleep disorder that is characterized by difficulty falling and/or staying asleep, waking up too early in the morning, and feeling tired upon waking (Shuman, 2005).

The two types of insomnia are primary and secondary. Primary insomnia occurs when an individual’s sleep problem is not associated with other health conditions. However, insomnia can potentiate the risk for depression, anxiety disorders, alcohol abuse or dependence, suicide, and decreased immune response. Secondary insomnia is associated with a variety of health conditions such as asthma, depression, arthritis, cancer, heartburn, or pain (Shuman). Additionally, insomnia can be associated with medication side effects or treatment. For example, medications used to manage depression such as Bupropion or a SSRI causes insomnia. Atenolol (an antihypertensive), bronchodilators, hormones, neurologic agents, and some over-the-counter medications will cause insomnia (Zee & Bloom, 2006). The respiratory pattern of congestive heart failure can lead to insomnia.

“Sleep is essential to well-being and occupies about a third of our lives. Without enough sleep, fatigue, clouded thinking, possible metabolic dysregulation leading to diabetes and obesity, and diminished quality of life can occur” (National Heart, Lung, and Blood Institute [NHLBI], 2005, National Institute on Aging section, ¶ 1).

The 2003 National Sleep Disorders Research Plan stated that “excessive daytime sleepiness is a major public health problem associated with interference with daily activities including cognitive problems, motor vehicle accidents, poor job performance and reduced productivity” (U.S. Department of Health and Human Services [DHHS] 2003, p.49). Research has been shown that major industrial disasters, such as those at Chernobyl, Three Mile Island, Exxon Valdez, and the Challenger have been attributed to sleepiness in the work place (Nadolski, 2005). Most individuals experiencing a lack of sleep will develop cognitive deficits as well as physical and mental health consequences such as viral illness, diabetes, obesity, heart disease, altered metabolisms of glucose, depression, and a worsening of outcomes in individuals with concurrent psychiatric disorders (DHHS). There has been progress made in understanding of the epidemiology and risk factors, adverse outcomes, and identifying effective treatments. Insomnia is a health problem that remains underdiagnosed and undertreated. The nurse practitioner should have the knowledge to assess, diagnosis, and treat these individuals. Appropriate treatment should include interventions which address the symptoms of insomnia and the factors that contribute to it (Morin, 2006).

Statement of Problem

According to Bender (2006), two-thirds of patients do not report their symptoms to their providers and thus, they are not given the appropriate treatment. There are many people that suffer from insomnia, but few clinicians are expert at diagnosing and treating this disorder. Part of the problem hampering insomnia research may be the lack of an universally accepted definition of insomnia and the absence of accepted clinical guidelines for appropriate assessment of this condition (Summers et al., 2006).

Statement of Purpose

The purpose of this manuscript is twofold. First, it will identify the primary and secondary causes of insomnia and the possible medical conditions that can occur should insomnia go untreated. Secondly, it will outline the varied treatments that can be implemented to overcome insomnia. These recommended treatments will include both behavioral and pharmacological interventions in order to adequately address symptoms and coexisting factors associated with insomnia (Morin, 2006). It is hoped that the use of these treatment guidelines will assist nurse practitioners in properly assessing, diagnosing, and treating their patients with primary and secondary insomnia, thus decreasing the risk for heart disease diabetes, depression, and decreased immunological processes.

This manuscript includes the epidemiology of insomnia, associated clinical signs and symptoms, a review of current practice guidelines, and relevant research findings. In addition, a theoretical framework supporting the assessment, diagnosis, and treatment of insomnia is suggested.

Neuman Systems Model

In 1972 Betty Neuman published an article titled, "*A Model for Teaching the Total Person Approach to Patient Problems*" which was the basis for the Neuman's model (McEwen & Wills, 2002). "Neuman's model uses a systems approach that is focused on the human needs of protection or relief from stress" (McEwen & Wills. p.144). There is a dynamic balance through identification of problems, setting goals, and using concepts of prevention as the intervention to reduce stress and keep the individual in a state of equilibrium. Neuman believes the client is composed of variables such as physiological,

psychological, sociocultural, developmental, and spiritual that is unique to that individual with a range of responses common to all human beings (Stanhope & Lancaster, 1996). The model shows the client system as concentric rings surrounding the basic core and is based on the client's reaction to stress as it maintains boundaries to protect the client's stability (McEwen & Wills). The primary method of this model is the three step nursing process. Diagnosis is the first step. This step includes the collection of data and the analysis of the variances from wellness to make the diagnosis. The assessment has to be accurate and potential stressors are identified. Setting goals with the patient are the second step. Prevention strategies are also chosen in this step.

The Neuman Model suggests three intervention modalities (Stanhope & Lancaster, 1996). The first intervention modality is primary prevention which is to reduce and prevent stress. The second intervention modality may begin after the occurrence of symptoms to strengthen the individual by establishing relevant goals. The third is tertiary prevention which can be initiated at any point after treatment has occurred. It can be the evaluation or change of goals. Specific examples of how a nurse practitioner may incorporate the Neuman Systems Model into practice are contained in Tables 1, 2, and 3.

When a nurse practitioner uses the Neuman Systems Model to assess for insomnia, they take into account the five interacting variables that make up the whole person. Disturbance in any of the variables, or with the environment affect the individual and may cause insomnia. Insomnia is multidimensional and can be related to situational, environmental, medical, and psychiatric illnesses. With the Neuman Systems Model, the nurse practitioner can focus on each of the variables to diagnosis and incorporate the three step nursing process. The five variables are physical, psychological, sociocultural,

developmental, and spiritual (McEwen & Willis). For example, a patient may be experiencing a job change which constitutes shift work. The shift work may disturb wake-sleep patterns, increase anxiety, social isolation, and physical and psychological stress. A job change would affect three or four of the variables and make the patient unstable and insomnia is increased. The nurse practitioner can focus on and analyze the variances from wellness to make the diagnosis, and to identify the causes of the disturbance. Goals are made to improve the sleep wake patterns by using sleep hygiene measures. Behavioral and cognitive therapy can help decrease anxiety and social isolation. The patient would be educated on foods and drinks that affect sleep. The environmental barriers that are inductive to insomnia are examined and goals are made to change the barriers. The nurse practitioner and the patient can rank the priorities of the interventions and relieve some of the symptoms of insomnia. The third step is evaluation of the treatment plan by reviewing sleep logs, providing education, and understands the stressors by improved coping skills.

Overview of Insomnia

Definitions

Insomnia has been conceptualized many ways. There are four acceptable methods to define insomnia. They are: *The Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV-TR)* (American Psychiatric Association, 2000), *The ICD-10 Classification of Mental and Behavioural Disorders*, *The International Classifications of Sleep Disorders (ICSD)* by the American Academy of Sleep Medicine, and The National Institute of Mental Health (NIMH). Each has their own diagnostic criteria.

DSM-IV-TR

In the *DSM-IV-TR* (2000, p.267) the criteria for the diagnosis for primary insomnia are:

- (a) the predominant complaint is difficulty initiating or maintaining sleep, or nonrestorative sleep for at least one month; (b) the sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning;
- (c) the sleep disturbance does not occur exclusively during the course of Narcolepsy, Breathing-Related Sleep Disorder, Circadian Rhythm Sleep Disorder or a Parasomnia; (d) the disturbance does not occur exclusively during the course of another mental disorder (e.g. Major Depressive Disorder, Generalized Anxiety Disorder, a delirium); and (e) the disturbance is not due to the direct physiological effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition.

ICD-10

The second classification system that can help define the criteria for diagnosing insomnia is *The ICD-10*.

The ICD-10 defines the clinical condition of insomnia as follows: the complaint is either of difficulty falling asleep or maintaining sleep, or of poor quality of sleep; the disturbance has occurred at least three times per week for at least 1 month; the unsatisfactory quantity and/or quality of sleep either causes marked distress or interferes with ordinary activity in daily living (Szelenberger & Soldatos, 2005, p.186).

ICSD

The third classification system used was first published in 1979, and was revised by the *International Classification of Sleep Disorders (ICSD)*. The revised edition of the *ICSD* is comprised of 88 syndromes divided into categories. The categories are as follows: (a) dyssomnias, the disorder of initiating and maintaining sleep; (b) parasomnias, the undesirable phenomena that occur during sleep, (c) sleep disorders associated with mental, neurologic, or other medical disorders, (d) proposed sleep disorders, and (e) polysomnographic diagnostic criteria. A universally accepted classification is needed to increase diagnostic precision and implement treatment plans (Szelenberger & Soldatos, 2005).

NIMH

The National Institute of Mental Health defines insomnia as “(a) transient insomnia lasting several days and related to minor situational stress; (b) short-term insomnia lasting up to three weeks and associated with acute personal loss in work or family life, and (c) long-term insomnia” (Szelenberger & Soldatos, 2005, p.187). The National Institute of Mental Health’s classification may be helpful in treatment plans and interventions.

Pathophysiology and Psychopathology

Sleep is a dynamic activity and the brain is very active during sleep. Neurotransmitters control the sleep cycle by acting on different groups of neurons. The different neurotransmitters are: serotonin, norepinephrine, dopamine, and adenosine. Neurons in the brainstem produce serotonin and norepinephrine (NE) and keep part of the brain active while we are awake. Other neurons signal the brain when it is time to sleep. The neurons switch off the signals that keep individuals awake (National Institute of

Neurological Disorders and Stroke [NINDS], 2006). Norepinephrine is important in maintaining normal sleep patterns. Serotonin is involved in sleep regulation. Sleep is reduced when there is a decrease in serotonin. Dopamine has an alerting effect. Drugs that increase dopamine in the brain cause an increased wakefulness, the ones that decrease dopamine in the brain cause sleepiness (Dipiro, Talbert, Yee, Matzke, Wells, & Posey, 2002). Research also suggests that a chemical called adenosine builds up in the blood while we are awake and causes drowsiness, which breaks down during sleep. Caffeine is an antagonist of adenosine receptors, which will cause insomnia (Akerstedt & Nilsson, 2003).

Sleep is an active process that is regulated by the central nervous system. Sleep occurs in an orderly fashion through all 5 stages and is called sleep architecture. The sleep architecture is made up of stages named 1, 2, 3, 4, (Non-REM) and REM (rapid eye movement). Fifty percent of sleep time is spent in stage 1 and 2, 20% in REM and the remaining 30 percent in stages 3 and 4. Stage 1, is a light sleep with one drifting in and out of sleep and can be aroused easily. In stage 2, the eye movement's stop and the brain waves become slower, body temperature drops. In stage 3, extremely slow brain waves called delta waves begin to appear. During stage 4, the brain produces delta waves almost exclusively (Zee & Bloom, 2006). Stage 4 allows the body to rebuild or repair itself. The body secretes growth hormone which helps cells divide, multiply, and build new tissue for growth (Nadolski, 2005). Sleep is an important regulator of the neuroendocrine function. In young healthy men, 60-70% of growth hormones are secreted in stages 3 and 4. Blackman (2000) stated there is a relationship between alterations in sleep quality and changes in the body that influence neuroendocrine

functions. Insulin and glucose levels are sensitive to manipulations of sleep. The effects of insulin are impaired during sleep (Akerstedt & Nilsson, 2003). People not getting more than 4 hours of sleep a night show that their insulin and blood sugars will mimic that of a person developing diabetes. In REM sleep the heart rate and blood pressure increases and most dreams occur during this stage (Zee & Bloom, 2006). While in REM sleep the individual weaves in and out of stages 1-4. It has been suggested that REM sleep helps memory processes (Nadolski). Learning and REM sleep use the same areas of the brain, so it has been postulated that learning is decreased with insomnia (Akerstedt & Nilsson).

The disturbance in the sleep wake stages affects different diseases. Body functions are directed by a biological clock or circadian rhythm. Circadian is Latin for “about a day” (Nadolski, 2005, p.169). All of the body functions cycle regularly across each day and many hormones are affected by these rhythms (Nadolski). In the aging individual, there is a decrease in the production of melatonin and growth hormone which affects the sleep cycle (Zee & Bloom, 2006).

A wealth of data on sleep in mental disorders has been accumulated to date. Clinical manifestations have been documented from a series of journal articles published in the 1970's and 1980's by Kale's group (Szelenberger & Soldatos, 2005). Stressful life events or stressors of everyday life can be triggering factors. There can be many causes for insomnia. Some of the factors include shift work, wake-sleep pattern disturbances, grief, depression, worry, anxiety or stress, excitement, medications, and aging. Chronic activation of the stress system plays a role in poor mental and physical health associated with persistent insomnia especially anxiety and mood. “Anxiety disorders were found to

be the most common mental disorders in insomnia and hyperinsomnia.”(Szelenberger & Soldatos, p.186).

Epidemiology

It is generally believed that 10% to 15% of adults suffer from chronic insomnia. It has been estimated that 8 million elderly suffer from insomnia with more than one million newly diagnosed each year. The disturbed sleep in the elderly is associated with impairment in memory and attention and can be misinterpreted as signs as dementia (Doghramji, 2006).

Individuals over 85 are more likely to experience insomnia. In that age group, men have a higher incidence than women, plus men have more disrupted sleep (Kupfer & Reynolds, 1997). Interestingly, women under 85 actually have a higher incidence of insomnia than men in that age group, plus they are less likely to achieve remission (Doghramji, 2006). Women typically suffer loss of sleep in connection with menstruation, pregnancy, and menopause. The hormone progesterone has been found to help a person sleep. When the progesterone level drops during menstruation and rises during ovulation, sleep can be affected (Depression and Bipolar Support Alliance, 2006).

People who are divorced, widowed, or separated have insomnia more often than married people. Some of the studies have shown that lower socioeconomic status also correlates with insomnia along with lower parental education (Johnson, Roth, Schultz, & Breslau, 2006; Kupfer & Reynolds, 1997). Throughout the studies, there has been little evidence of difference by race/ ethnicity (Johnson et al.). Chronic insomnia is associated with an increased risk for automobile accidents, increased alcohol use, and daytime sleepiness (Kupfer & Reynolds).

Epidemiological studies have found individuals with insomnia are at greater risk for developing a depressive disorder (Szelenberger & Soldatos, 2005; Holbrook, Crowther, Lotter, Cheng, & King, 2000). Insomniacs have nearly four times higher risk for developing a new depressive disorder in the following 3.5 years (Szelenberger & Soldatos, 2005).

Some medications can also be a cause of insomnia. Medications known to cause insomnia include (a) beta-adrenergic blockers, (b) thyroid preparations, (c) corticosteroids, (d) selective serotonin reuptake inhibitors, (e) monoamine oxidase inhibitors, (f) methyldopa (Aldomet), (g) phenytoin (Dilantin), and (h) some chemotherapeutic agents (Rajput & Bromley, 1999).

Insomnia is associated with an increased risk of myocardial infarction, altered glucose metabolism and diabetes, low grade inflammation, and fatal accidents at work. The risks for accidents or mistakes are increased with the irregular work hours or by on-call health care workers. There are reports of major medical mistakes that are related to fatigue from the individuals on call (Akerstedt & Nilsson, 2003).

The inflammatory processes are activated by inadequate sleep (Meier-Ewert, et al., 2004). Over activation of the inflammatory processes can result in high CRP concentrations. The C-reactive protein (CRP) is a pentameric hepatocyte protein with a half life of 15-19 hours, is a stable marker of inflammation, and has been shown to be predictive of cardiovascular morbidity. It is proposed “that sleep loss may be one of the ways that inflammatory processes are activated and contribute to the association of sleep complaints, short sleep duration, and cardiovascular morbidity...” (Meier-Ewert, et al., 2004, p. 679). There is an increased peripheral circulation of leukocytes and interleukin

(IL)-6 with sleep deprivation. This suggests that sleep loss contributes to inflammation and a cardiovascular risk (Meier-Ewert et al.). Sleep deprivation has been a predictor of both a short and long term risk of stroke and myocardial infarction in men and women.

The CRP promotes “secretion of inflammatory mediators by vascular endothelium and opsonizes low-density lipoprotein for uptake by macrophages in atherosclerotic plaque. This data suggest that CRP may be directly implicated in the development of atherosclerotic lesions”(Meier-Ewert et al.p.679). Sleep gives the heart and vascular system rest. During the non-REM sleep, the heart rate and blood pressure decreases as deeper sleep is achieved. The association between decreased sleep duration and coronary heart disease may be mediated through several mechanisms including sympathetic over activity and increase in blood pressure, especially in the waking hours of the sleep-deprived individuals (Ayas et al., 2003). There may be an association between elevated CRP and sleep deprivation that is related to blood pressure increases. Restriction of sleep to less than 4 hours a night for 6 nights has shown an increase in blood pressure and altered cardiovascular output (Meier-Ewert et al.). A finding showed that a single night of 50% reduced sleep resulted in increased systolic and diastolic blood pressure and heart rate (Meier-Ewert et al.).

Sleep loss has been associated with decreased glucose sensitivity and insulin resistance. Studies have shown that glucose remains at a relatively normal level during sleep and may increase because insulin is impaired during sleep (Akerstedt & Nilsson, 2003; Meier-Ewert, et al.). Insomnia has been associated with weight gain, which is a contributing factor for diabetes. Small elevations in inflammatory mediators have been associated with the syndrome of insulin resistance and type II diabetes mellitus

(Akerstedt & Nilsson, 2003; Meier-Ewert et al., 2004). This chronic low grade inflammation and diabetes type 2 could be linked to insomnia.

Obesity is another medical problem which can be brought on by primary insomnia. During sleep there is a markedly decreased level of leptin, which is an appetite suppressant, and causes an increase in hunger. This effect could be linked to metabolic syndrome (Akerstedt & Nilsson, 2003).

Sleep is necessary for the nervous system to work properly. Lack of sleep is associated with drowsiness and the inability to concentrate. Insomnia is also associated with impaired memory and physical performance. If the deprivation continues hallucinations and mood swings will develop. Some neurons that control sleep interact with the immune system (NINDS, 2006). Cytokines which are the chemicals that are produced by our immune system to fight infections are powerful sleep inducing chemicals. Sleep may help the body conserve energy that the immune system needs to mount an attack (National Heart, Lung, and Blood Institute Working Group on Insomnia [NHLBI Working Group], 1998). With sleep deprivation there is an increased peripheral circulation of leukocytes and interleukin (IL)-6 (Meier-Ewert et al., 2004).

Clinical Presentation

Patients with chronic insomnia report difficulty in falling asleep. They may also complain that they have difficulty staying asleep or experience early awakening. Insomniacs feel worse in the morning and arise feeling sleepy, groggy, physically and mentally fatigued, anxious, and depressed. When bedtime approaches, individuals often feel tense and worried about health, work, personal problems, and sometimes even death (Vgontzas & Kales, 1999).

Insomnia becomes more prevalent with age, and older people may experience a change in sleep patterns, activity, and in health. Some of the consequences, morbidities, co-morbidities, and public health burden associated with chronic insomnia are: risk of developing psychiatric disease, absenteeism from work, decreased work performance, work related and motor vehicle accidents, falls in the elderly, decreased quality of life and social relationships, decreased memory, cognitive function, and mood (“NIH State-of-the-Science,” 2005).

Diagnostic Tests

Insomnia is an important public health problem that requires accurate diagnosis and effective treatment. It is multidimensional and a thorough evaluation is recommended. The standard guidelines specify that insomnia should be primarily diagnosed by clinical evaluation through a careful, detailed medical, psychiatric and thorough sleep history. (Littner et al., 2004). The most fundamental aspect is a comprehensive history and physical examination with sleep logs/ diaries, and structured questionnaires (Summers et al., 2006).

Intakes

Doghramji (2006) believes the best time to assess for insomnia is during an initial intake. These intakes allow the clinician to discover concomitant medical and psychiatric disorders. If the patient has other sleep disorders such as obstructive sleep apnea or restless leg syndrome, the clinician can identify these problems during the interview process. A careful examination of all medications and their possible side effects should also be reviewed (Summers et al., 2006).

Eliciting specific information from patients regarding sleep habits requires asking specific questions. Family members also provide important information regarding the patient's sleep patterns (Nadolski, 2005). A provider may use the mnemonic REST to assess the patient's sleep. R stands for restorative sleep; E stands for excessive daytime sleepiness, tiredness, or fatigue; S stands for snoring; and T stands for total sleep time (Holcomb, 2006).

Sleep Logs

Sleep logs and diaries are used in the preliminary evaluation of patients. Patients tend to underestimate total sleep time. Sleep logs and diaries are good indicators of patient perception of sleep disturbances (Summers et al., 2006). Assessment of these logs and diaries will often identify areas in which nonpharmacological and/or pharmacological interventions may be introduced (Holcomb 2006).

The sleep log should include the timing and quantity of meals, use of alcohol, medications, and exercise. This information may reveal aspects of the patient's lifestyle that could be destructive to sleep (Kupfer & Reynolds, 1997). The sleep log and diary should be completed every day for seven consecutive days (Schenck, Mahowald, & Sack, 2003). Insomnia is complex and may have many factors; the use of a sleep log prior to and during treatment may be beneficial (Holcomb, 2006). Table 4 includes an example of a sleep log.

Polysomnography

Polysomnography (PSG) is not the standard of practice, but may be indicated if there are sleep-related breathing disorders, periodic limb movement disorders, or if the diagnosis is uncertain or treatment fails (Summers et al., 2006). Although

polysomnography is the most sensitive tool to differentiate wakefulness and sleep, it is expensive and may disrupt sleep with all the electrodes that are used (“NIH State-of-the-Science,” 2005).

Polysomnography is a basic sleep study which records the biophysiological changes that occur during sleep. Polysomnography is usually performed at night while the patient sleeps. The polysomnography collects biophysiological information by various methods, which may include electroencephalography (EEG), electro-oculography (EOG), and electromyography (EMG) (Ross, Murray, & Steiner, 2004). Two EOG’s, one EEG, and one EMG are the minimal recordings used in scoring sleep stages. Other measurements of polysomnography are oral and nasal airflow, respiratory effort, oxygen desaturation, periodic leg movements, and gross motor activity (Dipro, et al., 2002).

Artigraphy

Artigraphy uses a watch sized motion sensor that the patient wears on the nondominant wrist and can be useful in evaluating circadian rhythms (Summers et al., 2006). The artigraph can record rest/activity for ≥ 2 weeks continuously. It will record even if the patient is quiet, not moving, or has taken the watch off. For that reason, it is important that the patient use the artigraph with the sleep log. After the two weeks, the data is downloaded into a computer which then uses the information to create an algorithm to perform sleep and wake estimation (Summers et al., 2006).

Artigraphy can supplement the initial patient evaluation consisting of history, physical examination and sleep diary. Information from artigraphy can help diagnose, document severity, and guide proper treatment, and monitor compliance for the treatment of

insomnia. Actigraphy has the ability to assess sleep/wake patterns. It can be useful in the evaluation of circadian rhythm patterns (Summers et al., 2006).

Tools for Assessing Sleep Patterns

Structured interviews and questionnaires are important tools that can be used to measure sleep quality and insomnia severity. The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument to measure the quality and patterns of sleep. This instrument differentiates “poor” from “good” sleep by measuring seven areas: Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. This tool can be used for the initial and ongoing assessments (Smyth, 1999).

The Insomnia Severity Index (ISI) is a reliable and valid instrument to measure the perceived insomnia severity and the subjective symptoms and consequences along with the degree of impairment or emotional distress associated with insomnia (Summers et al., 2006). This tool is designed to evaluate and screen specifically for insomnia following the criteria from *Diagnostic and Statistical Manual for Mental Disorders* and the *International Classification of Sleep Disorders*. This 7-item instrument evaluates the perceived severity of insomnia over the previous two weeks. The patient rates the severity of difficulties falling asleep, maintaining sleep, and early morning awakening as well as the dissatisfaction with current sleep, the degree of daytime functioning, and level of distress or worry caused by sleep difficulties. The ISI is a Likert-type scale and has five points ranging from 0 (not at all) to 4 (very much) according to the degree of insomnia. The total score is obtained by summing the seven items. The total possible

score is 28. A higher score indicates greater insomnia (Savard, Savard, Simard, & Ivers, 2005).

Treatments

When treating insomnia, the underlying condition should be addressed first. There are behavioral and pharmacological interventions the nurse practitioner can use to treat patients with insomnia. These resources include: behavioral treatments, relaxation, and cognitive therapies which include day-time sleep restriction and stimulus control (Rajput & Bromley, 1999; Summers, et al., 2006). These therapies may take several weeks to provide relief after the training has been complete (Summers et al.). Medication alone can be effective, but it is recommended by experts that the treatment plan also incorporate behavioral therapy (Zee & Bloom, 2006). Medication should be given at the lowest effective dose and on a short term basis (Rajput & Bromley, 1999).

Behavioral Treatment

It is important to teach the patient that some behaviors disrupt sleep. Behavioral interventions seek to change maladaptative sleep habits and reduce autonomic arousal. These interventions have been proved reliable and durable (NHLBI Working Group, 1998).

Sleep hygiene may be beneficial to the patient. Good sleep hygiene includes but is not limited to: (a) limiting or stopping the use of nicotine, caffeine and alcohol, (b) keeping regular bedtimes and wake times, even on weekends and holidays, (c) exercising regularly, but not in the late afternoon or early evening, (d) avoiding the use of the bed as a place of worry, (e) only using the bedroom for sleep (rather than reading, watching television, or eating), (f) avoiding daytime naps, (g) eating meals on a

regular schedule, (h) eating a light snack before bedtime if food is needed, (i) getting regular exposure to outdoor sunlight (Rajput & Bromley, 1999). Appendix A summarizes methods to insure appropriate sleep hygiene.

Relaxation Therapy

Relaxation therapy is based on the behaviors and observations of the patient. Patients often tend to display high levels of physiologic, cognitive and or emotional arousal. There are several relaxation methods that can be incorporated into their treatment plan. Progressive muscle relaxation, autogenic training, EMG biofeedback, attention-focused procedures and abdominal breathing are various relaxation techniques (NHLBI Working Group, 1998).

The progressive muscle relations, autogenic training and the EMG biofeedback seek to reduce muscle tension. The attention-focused procedures include imagery training or meditation. The attention-focused procedure helps the patient control intrusive thoughts and a racing mind (NHLBI Working Group, 1998). Cognitive approaches may help the patient identify negative thoughts that keep them from falling asleep or staying asleep, and help the patient find ways to positively handle the negative thoughts (Holcomb, 2006).

Cognitive-Behavioral Therapy

Cognitive therapy is aimed at addressing the cognitive changes that accompany insomnia and contribute to the problem. These cognitive changes may include irrational fears, unrealistic expectations, and excessive worry (Summers et al., 2006). Cognitive therapy involves identifying dysfunctional beliefs and attitudes such as believing that sleeping 8 hours a night is absolutely necessary to function. Individuals who feel that

insomnia is destroying their life need to have adaptive coping skills. The cognitive component is to assist patients to recognize and modify stressful, distorted sleep cognitions.

Sleep Restrictive Therapy

Sleep restriction is a cognitive behavioral therapy approach and consists of curtailing the amount of time spent in bed to increase the percentage of time asleep (NHLBI Working Group, 1998). Many patients will spend 8-9 hours in bed and get only 5 hours of sleep. If they get 5 hours of sleep, they should only spend 5 hours in bed, arising at the same time every morning (NHLBI Working Group, 1998). They are encouraged to decrease the amount of time spent in bed to the actual sleep time. As sleep improves, patients can increase time spent in bed as long they can fall asleep quickly and sleep most of the night (Summers, et al., 2006). The goal is that they should spend eighty five percent of the time sleeping (Kupfer & Reynolds, 1997). The theory behind sleep restrictive therapy is that the patient is to experience more consolidated sleep at night (Zee & Bloom, 2006).

The bedtime can be altered, but the rise time has to remain constant to keep a regular sleep-wake rhythm. Sleep restriction might create a mild state of sleep deprivation, but it will promote rapid sleep onset and more efficient sleep (NHLBI Working Group). The patient is to avoid daytime naps, but if a nap is to be taken, it has to be early in the day, and no longer than 30 minutes (Rajput & Bromley, 1999). During the initial phases of this therapy, patients may find themselves sleepier (Summers, et al., 2006).

Stimulus Control Therapy

Stimulus Control Therapy (SCT) is a behavioral therapy that is based on the assumption that insomnia is due to increased tension and arousal that occurs as a conditioned response to the stimulus of the sleep environment (Summers et al., 2006). Spending time in bed, wide awake, will strengthen the association between wakefulness and the bedroom (Summers et al.). The main objective of stimulus control therapy is to reassociate the bed and bedroom with rapid sleep onset. Stimulus control instructions are that the individual goes to bed only when sleepy and to use the bed and bedroom only for sleep and sex. They are to avoid watching television which has an arousing effect, reading, eating, or working (Kupfer & Reynolds, 1997). If they can't sleep, the individual is to get out of bed and go to another room, returning only when sleepy again. They can read a book with a dim light, but no television because of the full-spectrum bright light. The rise time is consistent regardless of sleep duration the previous night. There is also no day time napping (NHLBI Working Group, 1998). The aim is to reestablish the psychological connection between the bedroom and sleeping (Kupfer & Reynolds, 1997). It will stabilize the sleep-wake schedule and enhance sleep efficiency (Kupfer & Reynolds). With stimulus control and restricted sleep therapy, the patient should be educated on health practices such as a diet, exercise, substance use, and environmental factors that lead to insomnia.

Pharmacological Interventions

Five basic principles characterize rational pharmacotherapy for insomnia. They are:

- (a) use the lowest effective dose, (b) use intermittent dosing, (two to four times weekly),
- (c) prescribe medication for short-term use, (which is no longer than 3-4 weeks),

(d) discontinue the medication gradually, and (e) watch for rebound insomnia (Kupfer & Reynolds, 1997). Several categories of medication to treat insomnia exist:

Benzodiazepines, nonbenzodiazepines, sedating antidepressants, and over-the-counter and/or herbal preparations.

Benzodiazepines

The use of hypnotic medications should be for short term symptom management and only until the underlying problem is controlled. The most common type of hypnotic medication prescribed is benzodiazepine receptor agonists. Examples of benzodiazepines include: Estazolam, flurazepam, lorazepam, temazepam, and triazolam (Holcomb, 2006). These drugs are effective in inducing, maintaining, and consolidating sleep.

Benzodiazepines decrease the duration of sleep stages 1 and 4, and increase stage 2. They do not decrease the REM sleep (Dipiro, Talbert, Yee, Matzke, Wells, & Posey, 2002).

There have been reports of improved symptoms after taking these medications. There is little safety or efficacy data to guide their use beyond 2 to 3 months (NHLBI Working Group, 1998). Benzodiazepines are unlikely to remain effective in the long run (Holbrook, Crowther, Lotter, Cheng, & King, 2000). When prescribing benzodiazepine receptor agonists, safety should always be a consideration. Adverse effects associated with these medications are cognitive and psychomotor impairment, rebound insomnia, and next-day residual effects (Morin, 2006). Excessive grogginess may occur and may increase the chance for a fall or accident in the elderly (Zee & Bloom, 2006).

Nonbenzodiazepines

The nonbenzodiazepines such as Lunesta, Ambien, Ambien CR, and Sonata have become the drugs of choice for the treatment of insomnia. The nonbenzodiazepines have

short half-lives which help with sleep onset and maintenance, and don't contribute to daytime drowsiness. The lack of daytime sleepiness leads to better daytime functioning (Holcomb, 2006). This may be a good drug choice for the elderly (Zee & Bloom, 2006).

Also a nonbenzodiazepine, Ramelteon (Rozerem) is a new FDA-approved prescription drug to be used for long-term use in insomnia. It is a selective melatonin receptor agonist that regulates circadian rhythms. It is indicated for those with difficulty in achieving sleep onset (Holcomb, 2006).

Sedating Antidepressants

Also effective in reducing insomnia are sedating antidepressants. However, some researchers argue that there is little evidence to support the usefulness of these drugs in the treatment of most types of insomnia (NHLBI Working Group, 1998, p.13). Examples of sedating antidepressants are trazodone, mirtazapine, doxepin, and amitriptyline. The doses needed for the treatment of insomnia are usually lower than the treatment for depression. Sedating antidepressants improve sleep symptoms more rapidly than the other symptoms of depression (NHLBI Working Group, 1998). Patients taking antidepressants for insomnia may experience anti-cholinergic symptoms such as a dry mouth, constipation, and orthostatic hypotension (Holcomb, 2006). Amitriptyline is the most anticholinergic and sedating of all the antidepressants (Turkoski, Lance, & Bonfiglio, 2004).

Nonprescription and Herbal Preparations

The nonprescription medications that can be used to induce and/or improve sleep are diphenhydramine (Benadryl), doxylamine (Unisom Nighttime), melatonin, and valerian. Melatonin has several physiological actions including an effect on circadian rhythms.

Melatonin is a hormone made in the pineal gland from tryptophan and serotonin and is important in the sleep-wake cycle (Holcomb, 2006). Melatonin has been used as a clock-resetting agent in disorders such as jet lag and shift work. It has been shown to improve sleep onset (Rajput & Bromley, 1999). Melatonin has adverse effects, and should not be given to young women who are planning on becoming pregnant, as it can inhibit ovulation by decreasing lutenizing hormone concentrations (Rajput & Bromley). Melatonin is marketed as a dietary supplement and there is no FDA regulation (Dipiro, et al., 2002). Valerian is an herb and is known as nature's valium. It has been utilized in children as young as three years of age, although no scientific data has been found on its safety (Holcomb).

Choosing the right medication is an essential part of the treatment plan. Many considerations need to be taken into account such as age, reason for insomnia, and the history of the patient. See tables 5 and 6 for pharmacological agents used to treat insomnia.

Implications for Practice

The literature review has shown that primary insomnia is a risk factor for depression, decreased immune functioning, heart disease, and diabetes. Insomnia also interferes with daily activities such as cognition, safety at work or on the road, and job performances (Bender, 2006). This public health burden is associated with many direct and indirect costs (Summers et al., 2006). The literature indicated that insomnia is underdiagnosed and undertreated (Bender).

Research emphasizes that most important aspect of diagnosing insomnia is the complete and thorough assessment and history (Doghrumji, 2006). As the nurse

practitioner completes a thorough history and physical assessment it will be possible to identify the concomitant medical and psychiatric disorders or determine if the patient is having a reaction to a substance or a medicine. The assessment and history will also identify the situational stress or changes in sleep schedules or environments (Bender).

The initial sleep history may be a take-off point for the use of additional evaluations such as the PSQI or the ISI. These tools can assist the practitioners in determining if the need for further diagnostic measures is needed.

Sleep logs and diaries may also be used in the evaluation of the patient. It is essential to educate the patient on the causes and behavior that disrupt sleep. The patient may be educated on behavioral treatment such as sleep hygiene, relaxation therapy, sleep restrictive therapy, and stimulus control therapy. While cognitive behavioral therapy is the therapy of choice for chronic insomnia, pharmacological interventions may be needed on a short-term basis (Bender, 2006).

A larger research data base needs to be available for the clinicians and patients to promote informed treatment choices. Most of the studies on insomnia have been cross-sectional rather than prospective (“NIH State-of-the Science,” 2005). Future studies should be focused on genetic indicators for insomnia. These studies may show the importance of family history in determining causes and risk factors for insomnia and may include a search for specific genes. Correlational studies could be undertaken to determine relationships with the development of subsequent insomnia in individuals going through stressful conditions such as divorce, separation, or bereavement. The effects of polypharmacy, and major chronic diseases on insomnia should also be further investigated. Longitudinal observational studies could be approached to identify the incidence and remission of insomnia (“NIH State-of-the-Science”).

Education is an important part of the client-provider relationship. Education must be

given on behavior and diet that promotes insomnia, and give interventions that will benefit the patient such as sleep hygiene education.

Summary

Insomnia is a sleep disorder that is a risk factor for many physical and mental illnesses. It is also associated with high health care utilization. It can be a risk factor for depression, anxiety, heart disease, obesity, diabetes, and decreased immunological functioning. Insomnia is associated with reduced quality of life and a heightened risk for injury and accidents. The nurse practitioner must be able to perform a comprehensive history including a sleep history, social factors, medications, and medical and psychological factors. Sleep diaries, polysomnography, and sleep questionnaires are a few tools to use for diagnosis, but the diagnosis is mostly patient-derived. There are many interventions that are available for the patient which include behavioral, cognitive, and pharmacological therapies. Chronic insomnia is a major health problem that is undertreated and underdiagnosed. There is a need for educational programs for physicians, nurse practitioners, and the public regarding the seriousness of insomnia.

Insomnia is a widespread problem affecting many individuals. It can reduce the quality of life, deteriorate health, and heighten the risk for injuries. It is up to nurse practitioners to bring the issue of insomnia out into the open and discuss the causes so treatments and interventions are provided.

References

- Akerstedt, T., & Nilsson, P.M. (2003). Sleep as restitution: An introduction. *Journal of Internal Medicine*, 254, 6-12.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th ed., text revision). Washington, DC: Author
- Ayas, N.T., White, D.P., Manson, J.E., Stampfer, M.J., Speizer, F.E., Malhotra, A. et al. (2003). A prospective study of sleep duration and coronary heart disease in women. *Archives of Internal Medicine*, 163, 205-209.
- Bender, K.J. (2006 March). Managing chronic insomnia. *Psychiatric Times*. pp. 1-4
- Bephage, G. (2005). Promoting quality sleep in older people: The nursing care role. *British Journal of Nursing*, 14, 205-210.
- Blackman, M.R., (2000). Age-related alterations in sleep quality and neuroendocrine function. *JAMA*, 284, 879-881.
- Depression and Bipolar Support Alliance. (2006, October 23). *Sleepless in America: Why is sleep so important?* Retrieved August 10, 2006 from [http:// www.sleeplessinamerica.org/why.html](http://www.sleeplessinamerica.org/why.html)
- Dipiro, J.T., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G., & Posey, L.M., (2002). *Pharmacotherapy: A pathophysiologic approach*. (5th ed.). New York: McGraw-Hill.
- Doghramji, K.(2006). The epidemiology and diagnosis of insomnia. *The American Journal of Managed Care*, 12(8 suppl.), S214-S219.
- Holbrook, A.M., Crowther, R., Lotter, A., Cheng, C., & King, D. (2000). The diagnosis and management of insomnia in clinical practice: A practical evidence-based approach. *CMAJ: Canadian Medical Association Journal*, 162 (2), 216-220.

- Holcomb, S.S., (2006). Recommendations for assessing insomnia. *The Nurse Practitioner*, 31(2), 55-60.
- Johnson, E.O., Roth, T., Schultz, L., & Breslau, N. (2006). Epidemiology of DSM-IV insomnia in adolescence: Lifetime prevalence chronicity, and an emergent gender difference. *Pediatrics*, 117 (2), e247-e256.
- Kupfer, D.J., & Reynolds, C.F. (1997). Management of insomnia. *The New England Journal of Medicine*, 336 (5), 341-346.
- Littner, M., Hirshkowitz, M., Kramer, M., Kapen S., Anderson, W.M., Bailey, D., et al., (2004, March 25). *Practice parameters for using polysomnography to evaluate insomnia: An update. National Guideline Clearinghouse.*
Retrieved September 7, 2006 from
http://www.guideline.gov/summary/summary.aspx?doc_id=4370
- McEwen, M., & Wills, E.M. (2002). *Theoretical basis for nursing*. Philadelphia: Lippincott Williams & Wilkins.
- Meier-Ewert, H.K., Ridker, P.M., Rifai, N., Regan, M.M., Price, N.J., Dinges, D.F., & Mullington J.M. (2004). Effect of sleep loss on C-reaction protein, an inflammatory marker of cardiovascular risk. *Journal of the American College of Cardiology*, 43, 678-683.
- Morin, A.K. (2006). Strategies for treating chronic insomnia. *The American Journal of Managed Care*, 12(8 Suppl.), S230-S245.
- Nadolski, N. (2005). Getting a good night's sleep: Diagnosing and treating insomnia. *Plastic Surgical Nursing*, 25(4), 167-173.

National Heart, Lung, and Blood Institute. (2005) *Annual Report of the Trans-NIH Sleep Research Coordinating Committee. Fiscal year 2005*. Retrieved August 10, 2006 from <http://nhlbi.nih.gov/health/prof/sleep/sleep-05.htm>

National Heart, Lung, and Blood Institute Working Group on Insomnia .(1998, September). *Insomnia: Assessment and management in primary care*. Bethesda, MD: Author. Retrieved August 7, 2006 from http://www.nhlbi.nih.gov/health/prof/sleep/insom_pc/htm

National Institute of Neurological Disorders and Stroke. (2006, October 13) Brain basics: Understanding sleep. Retrieved August 22, 2006 from [http://www.ninds.nih.gov/disorders/brain_basics/understanding\)sleep.htm](http://www.ninds.nih.gov/disorders/brain_basics/understanding)sleep.htm)

NIH State-of-the-Science Conference Statement on Manifestations and Management Of Chronic Insomnia in Adults. (2005, June 13-15). Retrieved September 7, 2006 from <http://consensus.nih.gov/2005/2005InsomniaSOS026html.htm>

Rajput, V. & Bromley, S.M. (1999). Chronic Insomnia: A practical review. *American Family Physician*, 60,(5), 1431-1438, 1441-1442.

Ross, L.E., Murray, B.J., & Steiner, M. (2005). Sleep and perinatal mood disorders: A critical review. *Journal of Psychiatry Neurosciences*, 30, p.247-256.

Savard, M.H., Savard, J., Simard, S., & Ivers, H. (2004). Empirical validation of the insomnia severity index in cancer patients. *Psychooncology*, 14, p 429-441.

Schenck, C.H., Mahowald, M.W., & Sack, R.L., (2003). Assessment and management of insomnia. *JAMA*. 289, 2475-2479.

Shuman, T. (2005, December). *Sleep Disorders: Insomnia*. Retrieved August 8, 2006 from <http://www.webmd.com/content/Article/104/107649.htm>

- Smyth C.(1999). The pittsburgh sleep quality index (PSQI). *Try This: Best Practices in Nursing Care to Older Adults*, 6. Retrieved August, 2006. from [http:// www.hartfordign.org/publications/trythis/issue06.pdf](http://www.hartfordign.org/publications/trythis/issue06.pdf)
- Stanhope, M.& Lancaster, J. (1996). *Community health nursing: Promoting health of aggregates, families, and individuals*. (4th ed.). St. Louis, MO: Mosby
- Summers, M.O., Crisostomo, M.I., & Stepanski, E.J., (2006). Recent developments in the classification, evaluation, and treatment of insomnia. *Chest*. 130. 276-286.
- Szelenberger, W., & Soldatos, C.(2005). Sleep disorders in psychiatric practice. *World Psychiatry*, 4 (3), 186-190.
- Turksoki, B.B., Lance, B.R., & Bonfiglio M.F. (2004).*Drug information handbook for advanced practice nursing*. (5th ed.). Hudson OH; Lexi-Comp, Inc.
- U.S. Department of Health and Human Services. (2003). *National sleep disorders research plan* (NIH Publication No. 03-5209). Retrieved August 10, 2006 from http://www.nhlbi.nih.gov/health/prof/sleep/re_plan/sleep-rplan.pdf
- Vgontzas, A.N., & Kales, A. (1999). Sleep and its disorders. *Annual Review of Medicine*, 50, 387-400.
- Zee, P., & Bloom, H.G. (2006). Understanding and resolving insomnia in the elderly. *Geriatrics*, 61 (5 suppl.), Retrieved August, 2006 from <http://www.geri.com/geriatrics/data/articlestandard/geriatrics/182006/324498/article>.

Table one

Neuman System's Model

Concepts	Definitions	Application	Outcomes
Basic Core: Client 5 Variables that form the whole person.	The five variables function together to attain, maintain and retain system stability. (McEwen & Wills 2002)	Environment is influencing and being influenced by external and internal forces.	Health is defined as the constantly subject to change, optimal wellness or stability indicated the needs are being met.
1) Physical	Genetic structure, Age Gender Sleep/wake architect Cognition factors Any illnesses	Wake sleep patterns disturbed Diet change Shift work Age- decreased immobility. Medications	Decreased sleep will occur if there is any disturbance in any one of these variables.
2) Psychological	Response and coping patterns Mental health Education Communication ability	Anxiety Loss Alcoholism Physical or psychological loss	Decreased sleep will occur if there is an change in the psychological status of the patient
3) Sociocultural	Race Ethnicity Single, Married Divorced Relationships Economic factors	Single mothers Bigotry Newly separated or divorced Relationship problems New relationship Isolation	Decreased sleep if there are any problems in an individual's life that deals with social and cultural problems or added stress. They search for security.
4) Developmental	Age: Most common	Young people-more difficulty falling asleep .Laying awake in the middle of the night->40	Worrying about something particular.
5) Spiritual	Spiritual beliefs Moral and value system	Spiritual comfort is interlinked with psycho-emotional comfort. (Bephage, 2005).	Any negatively impact on a person that affects their moral and value system may increase insomnia.
Environment / Stressors	Comprises of the internal and external forces surrounding the client. It might penetrate the flexible and normal lines of defense.	All 5 of the variables affect the client and the model is based on the client's reaction to stress as it maintains it boundaries to protect the client stability.	Negentropy: more energy is generated than used--Wellness Entropy: More energy is required than generated---illness

Table 2

Neuman's System Model

Concepts	Definition	Application	Outcome
Lines of Resistance	Internal resistance factors which function to stabilize and realign the client to the wellness state. The lines of resistance protect the basic structure.	The reactions that an individual has, their natural and learned resistance patterns and their own weaknesses can let the lines of resistance be penetrated.	If the lines of resistance are penetrated, the patient can be a danger to themselves and to the public. If they drive a car to work, operate machinery, or calculate drugs, there could be a mistake because of the fatigue that they feel.
Normal line of defense	Each client has a normal range of responses to the environment. Can be used as a standard to measure health deviation. This can be from a result of a previous system behavior.	There could be more than one stressor that occurs simultaneously. It can vary with the age and development of the patient and how they deal with the stressors. If the patient has stress from more than one variable, than the patient can become more anxious, worried, and have insomnia.	If the normal lines of defense are broken down because the individual has more than one stressor going on at a time, they will have increased sleeplessness brought on by the worries, problems, and response pattern. They could have insomnia because of the increase stress from a loss of a loved one, increased financial problems, and drinking more alcohol.
Flexible line of defense	The interrelationships of client variables can affect the degree to which a client is protected by the flexible lines of defense, buffer zone.	The patient may have problems with a relationship, but will use another variable in dealing with it such as the spiritual or physical variable. That will keep the patient protected. They are using their coping skills as a barrier.	The patient uses other variables to keep themselves stable. The patient interacts with the environment and uses input, output, and feedback to sustain stability. Primary prevention can strength the flexible lines of defense.

Table 3

Neuman System's Model

Neuman's Three Step	Nursing Process:		
1) Nursing Diagnosis <u>Primary Prevention</u>	The nurse collects adequate data bases to analyze variances from wellness to make diagnosis	1) Assessment/History 2) Sleep History 3) Sleep logs 4) Sleep questionnaires (PSQI, and Insomnia Severity Test.) 5) Polysomnography 6) Labs—TSH, H-pylori, CBC, CMP	1) Diagnose-primary or secondary insomnia 2) Provider will diagnose other medical or psychiatric problems that the patient may have and treat those first. (For example, restless leg syndrome, anxiety, or depression.)
2) Nursing goals Prevention as intervention <u>Secondary Prevention</u>	Bases on degree of reaction Goals are set by client Use of resources Treatment	Patient will express the discomfort that they feel emotionally, physically, or mentally. Addresses the environmental barriers for a good night's sleep.	Provider encourages communication. Provider will educate the patient on good sleep hygiene. Provider will educate the patient on the therapies that are available and help the client choose the one best suited for them. Teach about diet and what foods will affect their sleep.
3) Nursing outcome evaluated—reassessment <u>Tertiary Prevention</u>	Adjustive process as reconstitution begins and maintenance factors move client back towards primary prevention.	Reassessment by Nurse Practitioner	1) Review sleep logs 2) Provide education 3) Assist the patient to understand stressors by providing improved coping skills 4) Improved sleep is experienced by the patient.

McEwen, M. & Wills, E.M.(2002). *Theoretical Basis for Nursing*. Philadelphia: Lippincott
 Stanhope, M. & Lancaster, J. (4th ed.)(1996). *Community Health Nursing, Promoting Health of Aggregates, Families, and Individuals*. Missouri: Mosby.

Table 4

Sleep Log

Name							
Dates							
Bedtime (of previous night)							
Rise Time							
Estimated time to fall asleep							
Estimated # of awakening and total time awake							
Estimated amount of sleep obtained							
Naps Time and duration							
Alcoholic Drinks Number and Time							
List Stressors experienced today							
Rate how you felt today 1-very tired 2-Somewhat tired 3-Fairly alert 4-Wide awake							
Irritability 1-not at all 2- Somewhat 3-Fairly 4-Very							
Medications							

National Center on Sleep Disorders Research, National Heart, Lung and Blood Institute, National Institutes of Health, (1998). *Insomnia: Assessment and Management in Primary Care* [Brochure] Walsh, J.K., Benca, R.M., Bonnet, M., Buysse, D.J., Ricca J., Hauri, P.J. et al.

Table 5

Pharmacological Agents

Name	Dose	Onset	Nursing Implications
Non Prescription			
Diphenhydramine (Benadryl)	25-50 mg	60-180 minutes	Drowsiness, dizziness Geriatric considerations
Doxylamine (Unisom Nighttime)	25 mg	60-120 minutes	
Melatonin	1.5-5 mg	30-60 minutes	Do not use on women who want to become pregnant
Valerian	400-900	120 minutes (may take 2-4 weeks to work)	Herb: known as 'nature's valium'
Prescription Drugs			
Trazodone (Desyrel)	25-150 mg	30-60 minutes	Inhibits reuptake of serotonin Priapism, hypotension
Mirtazapine (Remeron)	15-45 mg	60-120 minutes	Antidepressant,, do not use if prior seizure disorder-
Antipsychotics/Neuroleptics			
Gabapentin-(RLS-not for insomnia)	100-300 mg	60 minutes	Anticonvulsant, increases NE, and serotonin-does not inhibit
Benzodiazepines			
All Benzodiazepines			
** Estazolam (ProSom)	0.5-1.5 mg	15-30 minutes	1. Induce a sedative action 2. Are an anxiolytic
*** Flurazepam (Dalmane)	15-30 mg	60-120 minutes	3. Muscle relaxant 4. Divided into groups by
** Lorazepam (Ativan)	.25-1.25 mg	30-60 minutes	Length of action—short, medium, and long.
* Oxazepam (Serax)	10-30- mg	20-45 minutes	5. May cause daytime drowsiness and memory problems.
* Temazepam (Restoril)	7.5-30 mg	45-60 minutes	6. May lead to dependency 7. May lead to falls in elderly
* Triazolam (Halcion)	0-125-0.25 mg	15-30 minutes	*** longest acting ** Medium Acting * Short Acting
*** Quazepam (Doral)	7.5-30 mg	20-45 minutes	

Table 6

Pharmacological Agents

Name	Dose	Onset	Nursing Implications
Nonbenzodiazepines			Nonbenzodiazepines—class of choice to treat insomnia.
Eszopiclone (Lunesta)	1-3 mg	30-60 minutes	First FDA approved drug for long term use in chronic insomnia. Helps with sleep onset and maintenance.
Zolpidem (Ambien)	5-10 mg	30 minutes	Has a short half life-does not lead to daytime sedation. Enters breast milk and crosses placenta. Actions explained by its effects on benzodiazepine receptors. Patient to avoid, St. John's wort, and valerian. Monitor elderly for hypotension. (Turkoski,2004)
Zolpidem CR (Ambien CR)	6.25-12.5 mg		Same as above
Zalepion (Sonata)	5-20 mg Elderly 5mg	20 minutes	Has a short half life-does not lead to daytime sedation. Do not use with breast feeding, crosses placenta. Absorption is rapid and complete. (Turkoski, 2004)
Ramelteon (Rozerem)	8 mg	30 minutes Take medication no sooner than 30 minutes before retiring.	Does not have a controlled substance designation and is approved for long term use. MT-1/MT-2 (Melatonin) receptor agonist. MT-1 receptors are responsible for inducing sleep. MT-2 is responsible for the body's regulation of circadian rhythms. Rapidly absorbed

Holcomb, S.S., (2006). Recommendations for assessing insomnia. *Nurse Practitioner*. 31, 55-60.

Turksoki, B.B., Lance, B.R., & Bonfiglio M.F. (2004). *Drug information handbook for advanced practice nursing*. (5th ed.). Hudson, OH; Lexi-Comp, Inc.

Appendix A

Sleep Hygiene

- Limit or stop the use of nicotine, caffeine, and alcohol.
- Keep regular bedtimes and wake times, even on weekends and holidays.
- Exercise regularly, but no later than late afternoon or early evening.
- Do not use the bed as a place of worry. If necessary write down the worries and concerns before going to bed.
- Use the bedroom for sleep. Don't read, watch television or eat in bed.
- Try to avoid daytime naps.
- Eat meals on a regular schedule; avoid heavy dinners, especially 2-3 hours before bedtime.
- Eat a light snack before bedtime if food is needed.
- Get regular exposure to outdoor sunlight especially in the late afternoon.
- Be sure the room is dark, the temperature comfortable, uncluttered, and conducive to sleep.
- Limit the total amount of time spent in bed to 8 hours.

(Holcomb, 2006; Rajput & Bromley, 1999).