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"Effect of a meditation-based strategy on sleep quality and perceived stress of healthy older adults living in the community."

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"Effect of a meditation-based strategy on sleep quality and perceived stress of healthy older adults living in the community."

By

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Dedication

This body of work is dedicated to my husband. I would not have been able to complete my dissertation without his full support, inspiring words, and thoughtful encouragement. He has been a loving husband to me and an amazing father to Meryll, our little miracle. I specially thank my Mom and Dad for being there for me always. I love you both very much.

Acknowledgements

"Effect of a meditation-based strategy on sleep quality and perceived stress of healthy older adults living in the community."

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Abstract

The study assessed the comparative effectiveness of two nonpharmacological interventions, Mantram, a meditation-based strategy, and sleep techniques, to improve sleep in the healthy older adults living in the community. The study also evaluated the feasibility of delivering a 5-week, 60-90 minute, weekly Mantram repetition training program to a sample of healthy older adults living in the community. Qualified subjects were healthy older adults aged 50 and above who are English literate. Individuals with a diagnosis of obstructive sleep apnea and dementia were excluded. A

convenient sample of 44 subjects consented to participate. One subject left the study due to illness and eight subjects with missing posttests were removed from the analysis. A total of 35 subjects (sleep technique group n=19, Mantram group n=16) remained for the analysis. The study used a quasi-experimental pretest and posttest nonequivalent comparison group approach. A blocked design by gender was used and blocks were randomly assigned to either the Mantram intervention group or sleep technique group. Sleep quality was measured with the Pittsburgh Sleep Quality Index (PSQI). The level of perceived stress was measured with the Perceived Stress Scale (PSS). The self-reported questionnaires (PSQI and PSS) were completed before and after the 5-week training. Analysis of Covariance was performed to determine the impact of Mantram Repetition on sleep quality and perceived stress. Multiple regression analysis was implemented to identify the best set of predictors of sleep. The results showed that the Mantram group and the sleep technique group significantly differed in perceived stress, sleep latency, and subjective sleep quality scores post training. The Mantram group exhibited a beneficial change in perceived stress level, sleep quality (global), frequency of sleep-aid use, sleep latency, and subjective sleep quality. Gender and marital status were not found to have effect on the subjects' intervention response. Marital status was the strongest predictor of global sleep quality and subjective sleep quality. Age was a significant predictor of sleep latency. Perceived stress was the strongest predictor of daytime dysfunction and sleep disturbance, and has exhibited important predictive value on sleep latency and sleep disturbance. Intervention group membership was the strongest predictor for sleep duration.

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List of Abbreviations

UTMB   University of Texas Medical Branch

GSBS   Graduate School of Biomedical Science

CHAPTER 1: INTRODUCTION

Poor sleep, a common complaint and an important problem in older adults, has gained attention as a health risk factor due to increasing evidence of its association with chronic diseases. Poor sleep has been shown to be a health risk factor that is linked to increased mortality and morbidity in major illnesses, higher level of stress (perceived and physiological response) frequent use of health services, reduced functional capabilities, and diminished quality of life (Irwin, Cole, & Nicassio, 2006; Akerstedt, 2006; Kalimo et al., 2000). Efforts to discover an effective treatment to improve sleep have increased; however, pharmacological intervention is still currently the popular approach. There is a need for effective non-pharmacological interventions to improve sleep in the older population.

Problem Statement

Current literature has presented findings that indicated a relationship between sleep disturbance and chronic diseases. Short sleep duration has been associated with the pathogenesis of obesity, diabetes, and hypertension, all of which are potent factors for atherosclerosis (Gangwisch, et al., 2010). Studies also found that sleeping too much and sleeping too little has an association with increased mortality and morbidity in major illnesses such as diabetes, hypertension, hyperlipidemia, and cardiovascular diseases (Kaneita, Uchiyama, Yoshiike, & a, 2008). Other important information obtained from research studies include association of sleep problems to greater use of health services and increased use of hypnotics (Irwin, Cole, & Nicassio, 2006). Sleep-promoting pharmacological agents are commonly utilized to treat sleep. Even though studies show that improvements in sleep with sedative use are statistically significant, the degree of

effectiveness is small while the increased risk of adverse events is statistically significant, especially in older adults (Glass, Lanctôt, Herrmann, Sproule, & Busto, 2005). There is a need to investigate nonpharmacological options for improving sleep in the older population. Mantram repetition, a meditation-based approach that has shown many benefits to patients with physical and psychological ailments, is a promising option.

Purpose Statement

Almost all research studies conducted on Mantram repetition have been within the Veterans Affairs (VA) system with veteran samples. This was one of the first studies on Mantram repetition outside of the VA community. The study assessed the comparative effectiveness of two non-pharmacological interventions (Mantram and sleep technique) to improve sleep in the older population and to evaluate the feasibility of providing a 5-week Mantram repetition program consisting of 60-90-minute weekly training classes to a sample of healthy older adults living in the community. The objective was to examine the extent to which Mantram Repetition can improve sleep quality and decrease stress in older adults living in the community. The long-term goals are: (1) to utilize findings to conduct a longitudinal study examining changes in sleep two months and four months after the end of the training, and (2) ultimately to provide evidence on the efficacy and safety of non-pharmacological interventions such as Mantram repetition to help improve sleep quality in older adults and to decrease the use of sedatives, improve functional capabilities, improve health, and increase quality of life.

Significance

The use of safe, nonpharmacological interventions will lead to decreased use of sedatives and its side effects, increased functional capabilities, and improved quality of life,

and maintain health and overall well-being. The conceptual framework for this study, the mind and body interaction, presents a cause and effect relationship between the mind and the body (Sousa, 1984). Meditation techniques can trigger a relaxation response that helps in initiation of sleep (Wallace, Benson, & Wilson, 1971). Mantram repetition is a meditation-based strategy that uses words of power that can penetrate the inner self. These words are repeated silently and continually to focus attention, slow down thinking for mental clarity, interrupt the stress response, tap inner resources, transform consciousness, and trigger a mental change in the person. Mantram repetition, unlike meditation and spiritual-based treatment options, does not need a quiet place and a period of quiet time to practice. Mantram repetition may be a useful option for healthy older adults. Mantram repetition is a strategy that is easy to learn, portable, and readily accessible. It can be utilized during any activity at any time of the day without a need to change action or environment (Bormann, et.al, 2005). Almost all research studies conducted on Mantram repetition have been within the Veterans Affairs (VA) system with veteran samples. This is one of the first studies on Mantram repetition outside of the VA community. The study is significant because it can help improve sleep quality, decrease the need for sedatives, decrease stress level, lead to a reduction in the use of health services, increase functional capabilities, and improve quality of life. In addition, the study can contribute to the current knowledge and understanding of poor sleep in the older adults living in the community,

Specific Aims

The specific aims and research questions (RQ) of the proposed study were:

1.   To assess the relationship between sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of

sleep-promoting medication (prescribed or over-the-counter) and daytime dysfunction) and perceived stress for those practicing a Mantram Repetition intervention and those who are not.

RQ1.1 What are the relationships between sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction) and perceived stress for those practicing a Mantram Repetition intervention and those who are not, controlled for age?

2.   To determine the impact of Mantram Repetition on sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction) and perceived stress.

RQ2.1 What are the differences in sleep quality (subjective sleep quality, the frequency of use of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and sleep technique education and the group that received sleep education only controlling for pre-test scores?

H2.1 There will be a greater positive change in sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress in the group that received Mantram training compared to the group that received sleep technique education controlling for age and gender.

RQ2.2 What are the differences in sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and the group that received sleep technique education across time controlling for age?

RQ 2.3 Do men and women differ in their response to the intervention via sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and the group that received sleep technique education across time controlling for age?

RQ 2.4 Do marital groups differ in their response to the intervention via sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and the group that received sleep technique education across time controlling for age?

3. Determine the best set of predictors of sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction) from age, gender, marital status (married or single/divorced/separated), Mantram intervention group membership, frequency of sleep training use and perceived stress.

RQ3.1. What is the best set of predictors of sleep quality from age, gender, marital status, intervention group membership, frequency of sleep training use and perceived stress?

Delimitations

The study was conducted from July 24, 2014 to July 9, 2015. The target population was healthy older adults in the community aged 50 and above who were English literate. Individuals with a diagnosis of dementia and obstructive sleep apnea were excluded. Older adults residing in North Orange County California and Southwest Los Angeles County were recruited in the study. Classes were held at four senior community centers in Orange County and Southwest Los Angeles County.

Definition of Terms

This section provides a short definition for the terms used in the study.

Mantram. A mantram is a Sanskrit word that means, "To cross the mind". Mantrams are powerful words or phrases that contain divine syllables or sound that have been passed on for generations (Bormann, 2005).

Sleep quality. Sleep quality has been defined by good and poor sleepers by tiredness on waking and throughout the day, feeling rested and restored on waking, and the number of awakenings they experienced in the night (Harvey, Stinson, Whitaker, Moskovitz, Virk, 2008).

Sleep duration. Sleep duration typically refers to the total amount of sleep obtained, either during the nocturnal sleep episode or across the 24-h period (Kline, 2013).

Sleep efficiency. Sleep efficiency is the proportion of total sleep time to total time in bed (National Sleep Foundation, 2016).

Sleep latency. Sleep latency is the duration of time from "lights out," or bedtime, to the onset of sleep (National Sleep Foundation, 2016).

Sleep disturbance is a general symptom that includes problems initiating and maintaining sleep, excessive somnolence, insomnia, sleepiness, and dysfunctions associated with sleep and sleep stages of which there are many causes (Locke, 2011).

Daytime dysfunction is difficulty functioning during the day due to sleepiness and decreased enthusiasm (Pal, Thennarasu, Fleming, Schulzer, Brown, & Calne, 2004).

Organization

The remainder of the study is organized into five chapters and bibliography. Chapter two contains a review of literature relating to sleep, stress, pharmacological and nonpharmacological treatment for poor sleep, and Mantram repetition. Chapter three describes the research design and methodology of the study. Data analysis and limitations are presented in Chapter four. Study summary, conclusions, and recommendations are discussed in Chapter five. The study concludes with a bibliography and appendixes.

CHAPTER 2: REVIEW OF LITERATURE

Introduction

Interest is growing on understanding sleep in the scientific community. Although there are an increasing number of studies on sleep and disorders associated with sleep, there is still a dearth of literature on its effect on the body and effective treatment approaches for the older adults. This section will discuss current evidence on sleep quality, stress, pharmacological and nonpharmacological treatment of poor sleep, sleep education, and Mantram repetition.

Sleep Quality

Sleep quality is a complex entity to define and measure. Some have described it quantitatively. Others have characterized it as a subjective experience. Buysse et al. (1989) assert that it has both quantitative and subjective characteristics. Quantitative aspects of sleep include sleep duration, sleep latency and number of awakenings. Subjective characteristics include restfulness or depth of sleep. Research studies have measured different aspects of sleep quality, but the general consensus was that poor sleep is a health risk factor.

Sleep duration has been linked to increased mortality and morbidity in major illnesses such as diabetes, hypertension, hyperlipidemia, and cardiovascular diseases (Kaneita et al., 2008; Ferrie, Shipley, & Cappuccio, 2007; Shankar, Koh, Yuan, Lee, & Mimi, 2008). A large study with 1.1 million men and women participants, aged 30 to 102 years, found that subjects who sleep for 7 hours have the lowest mortality compared

to those who sleep less hours and to those who sleep more (Kripke et. al, 2002). The U-shaped correlation has also been found by other studies. Wingard and Berklam (1983) utilized the 1965 Human Population Laboratory survey of 2,222 men and 2,491 women, aged 30 to 69 years, to assess sleeping patterns and mortality rates correlations. They found that mortality rates from ischemic heart disease, stroke, cancer, and all causes combined were lowest for subjects sleeping 7 or 8 hours per night independent of self-reported trouble sleeping and health status. Short and long sleep duration have also been associated with the pathogenesis of obesity, diabetes, and hypertension (Björkelund, et al., 2005; Gangwisch, et al., 2010; Yaggi, Araujo, & McKinlay, 2006). The studies' difficulty was in adjusting for unmeasured potential confounders.

Recent studies have found that poor sleep is associated with cardiovascular disease (Gangwisch et al., 2010; Ekstedt, et.al. 2004; Ayas, White, & Manson, 2003). Investigations of the link between poor sleep and cardiovascular disease have explored the role of biomarkers. Cortisol excess is linked to metabolic syndrome and obesity, both risk factors for cardiovascular disease (Fraser et al., 1999). Elevation of cortisol level and blood pressure has been associated with sleep disturbance. Ekstedt, Akerstedt, & Soderstrom (2004) examined polysomnographically (PSG) recorded sleep fragmentation and its correlation to changes in blood pressure and cortisol level in a randomly selected subjects. They found that fragmentation of sleep or high frequency of arousal is clearly linked to elevations of blood pressure and cortisol level. Experimental studies indicate that altered sleep may affect levels of pro-inflammatory cytokines that induce production of C - reactive protein (CRP). Level of CRP is a reliable marker of inflammation that has been shown to be prognostic of cardiovascular morbidity (Malik et al., 2005; Pai et al.,

2004; Ridker, 2008). It is possible that sleep disturbance or poor sleep may be one of the ways that inflammatory processes are set in motion, and a factor that links sleep disturbance and cardiovascular morbidity observed in studies.

Studies found on poor sleep in older adults are limited. Presence of comorbidities in the older adults heightens the difficulty in adjusting for several possible unmeasured confounders. However, findings are consistent with studies that include other age groups. Dew et al. (2003) found that baseline sleep latencies greater than 30 minutes were at 2.14 times greater risk of death. Age, gender, and baseline medical burden were controlled in the study. Daytime sleepiness has been significantly associated with mortality in both older men and women (Newman, Enright, Manolio, Haponik, & Wahl, 1997). Men who reported difficulty falling asleep also had an increased mortality rate, which was not observed in women. Frequent and early morning awakenings were not associated with a significantly higher risk of mortality. Obesity, a risk factor for cardiovascular disease, has been associated with shorter sleep duration. Patel et al. (2008) found a sleep duration of less than 5 hours was associated with greater body mass index (BMI) in both men and women as compared to those sleeping an average of 7 to 8 hours per night. Central body fat distribution and increased percent body fat were associated with shorter sleep even after adjusting for sleep apnea, insomnia, and daytime sleepiness.

Older adults with poor sleep have a higher rate of self-reported chronic health problems and frequency of consultations with health care professionals. Daytime sleepiness in older adults is associated with moderate impairments in daily function, especially in activities such as housework, sports, activity level, and keeping pace with

others (Goonaratne et al., 2003). Additionally, patients with insomnia have complaints of cognitive impairment including difficulty with memory and concentration (Roth, Costa e Silva, & Chase, 2001). Blackwell et al. (2006) measured sleep disturbance in 2,932 community-dwelling women aged 65 years and older and found that it is consistently related to poorer cognition. Persons with poor sleep suffer from decreased quality of life, frequently reporting fair to poor general health, physical distress, mental distress, activity limitations, depressive symptoms, anxiety, and pain than those without frequent sleep disturbance (Strine & Chapman, 2005).

Stress

It is well known that sleep and stress are correlated. Akerstedt, Fredlund, Gillberg, and Jansson, (2002) explored the relationship between sleep disturbance and work-related stress using cross-sectional survey data obtained from the National Survey of Living Conditions (ULF), conducted annually by Statistics Sweden. A representative sample of 58,115 individuals (aged 18 to 64 years) was selected at regular intervals over a period of 20 years and interviewed on issues related to work and health. Consistent with other studies, findings show hectic work and high physical workload related to higher sleep problems. In addition, significant predictors for sleep disturbance that emerged from the multiple regression analysis were female gender, age 50 years and older, long-term illness, hectic and physically strenuous work, and shift work. Socioeconomic status was not found to be associated with disturbed sleep. Long-term illness was the strongest predictor.

Morin, Rodrigue, & Ivers (2003) examined the relationship of stress and coping skills to patterns of sleep. The study participants were 38 women and 29 men (age average of 39.6 years). Forty participants had insomnia while the rest were good sleepers. They found that poor sleepers rated the impact of daily minor stressors and the intensity of major negative life events higher than those who were good sleepers, even though both groups had equivalent numbers of minor stressful life events (Morin et al., 2003). The implication was that the appraisal of stressors and perceived lack of control over stress were more important influences to poor sleep than the number of stressful events. In addition, the findings interestingly showed that poor sleepers relied significantly on emotion-oriented coping strategies intended to alleviate emotional distress. No significant difference was found between the groups who were users of task-oriented coping strategies. A longitudinal study that examines the changes in sleep quality of emotion-oriented coping strategy users over time and other possible moderating factors such as perception of control would be valuable. The limitation of the study was the use of subjective and self-reported measures, which may be affected by recall biases. Akerstedt et al. (2007) used polysomnographic recordings to demonstrate the negative effect of stress on sleep. Sleep recordings were done on 33 normal subjects aged 28 to 69 years of age, for three nights. The participants made daily ratings of the level of stress/worries at bedtime and also two-hourly ratings of stress. Sixteen subjects who differed in stress/worries between nights 2 and 3 were analyzed. During the nights when higher stress/worry bedtime rating were given, a significantly lower sleep efficiency, a higher wake percentage and a longer latency to Stage 3 (33.9 min versus 18.3 min) were observed. The finding of the association of poorer sleep with higher

stress supports result of studies that used self-reported measures. The strength of the study is that sleep recording is done at home instead of a laboratory, which may alter a normal stress response. The weakness is the small sample size and the short amount of time (2 days) used in the analysis. Data collection over a period of a few weeks would strengthen the analysis and conclusion of the study. Perception of stress and sensed lack of control appear to increase the vulnerability to sleep disturbances. Treatment for poor sleep should include methods designed to teach effective stress evaluation and coping that can be easily integrated to everyday life.

Pharmacological Treatment for Poor Sleep

Pharmacological treatment for sleep remains the popular option. A wide variety of pharmacological agents for sleep, both over-the-counter such as antihistamine and melatonin, and prescription, are available. Hypnotics are effective interventions but not without risks. There is potential for dependence or abuse, withdrawal syndrome, dose escalation, and rebound insomnia (Park, Matthews, Maytal, & Stern, 2007). Glass et al. (2005) found that in people using any sedative, adverse cognitive events were 4.78 times more common, adverse psychomotor events were 2.61 times more common and reports of daytime fatigue were 3.82 times more common compared to those on placebo. In another study, subjects who were dissatisfied with their sleep were taking prescription and over-the-counter sleep aids, including alcohol, at least once a week (Daley et al., 2009). They continue to experience daytime impairment and problems initiating and maintaining sleep. They also had higher use of health-care services as compared to those who were "good sleepers".

Cao et al. (2007) examined the potential for abuse of psychoactive drugs among older adults. They reviewed the prevalence, risks and protective factors, and screening and diagnosis of drug abuse in older adults. The misuse and abuse of prescription drugs with abuse potential is becoming more problematic. They stated that nonmedical use of prescription drugs among all adults aged >50 years will increase to 2.7 million by the year 2020 due to factors that include medical exposure to prescription drugs with abuse potential. One of the two major classes of prescription drugs subject to abuse by older adults were the benzodiazepines for treatment of sleep. Prolonged periods of benzodiazepine use of greater than 4 months may be associated with development of dependency particularly in long acting benzodiazepines.

Previous studies have demonstrated higher debilitating effect of long acting benzodiazepine on older adults as compared to short-acting benzodiazepine; however, recent studies are also finding important negative effects of short-acting benzodiazepine. Gray et al. (2006) wanted to determine whether benzodiazepine use is associated with disability in mobility and activities of daily living (ADL) in older adults. They collected data from 14,456 participants from East Boston, Massachusetts, rural Iowa, New Haven, Connecticut, and Durham, North Carolina. The participants had no disability at baseline. The association between benzodiazepine use and incident mobility and Activities of Daily Living (ADL) disability was examined over a 6-year follow-up. Result showed a 23% increased risk for mobility disability after adjusting for health conditions, behaviors, and characteristics. This supports previous studies that found an association between benzodiazepine and decline in physical performance measures such as balance and walking speed. The increased risk for incident mobility

disability was found for short and long-acting agents. In addition, risk for ADL disability was highest for those using short acting agents.

Use of sedatives is a major risk factor for falls in older adults living in the community (Tinetti Speechley, & Ginter 1988). Sorock & Shimkin (1988) examined risk factors for falls in the elderly (N = 169) living at home in six senior-citizen buildings in New Jersey and found that continuous use of benzodiazepine appeared to increase the risk of falling. Adjusting for age, sex, health status, depressive symptoms, hearing, vision difficulties, and body mass index, any use of benzodiazepines was related to multiple falls. Glass, Lanctôt, Herrmann, Sproule, & Busto (2005) performed a meta-analysis using 24 studies investigating the risk and benefits of sedative in older adults. Compared to patients on placebo, those on sedatives had more reports of adverse events including memory loss, confusion, disorientation, dizziness, loss of balance, falls, residual morning sedation, and fatigue.

Over-the-counter (OTC) sleep aids used for sleep include diphenhydramine, herbs, and diet supplements that is claimed to have hypnotic effects. Majority of OTC sleep aids are composed of a combination of different herbs that may need further investigation of their side effects in older adults. Diphenhydramine can cause serious side effects in older adults. Possible side effects include sleepiness, decreased reaction time, dizziness, dry mouth, constipation, blurred vision, urinary retention, cognitive impairment, and confusion (Rickels et al., 1983). Some studies on herbs such as valerian, kava, passionflower, zizyphi spinosi semen, and glycyrrhizae radix show hypnotic effect on subjects; however, their efficacy requires further investigation (Chung

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& Lee, 2002).   There were very few studies found that examined possible side effects of herbs currently being used for sleep in older adults. MacGregor, Abernethy, Dahabra, Cobden, & Hayes (1989) have warned of the possible hepatotoxic effect of herbal remedies.   Polypharmacy is an important concern in older adults.   Sleep aids, most especially in combination with other medications, may lead to possible adverse effects that include hepatotoxicity, renal dysfunction, and elevation of blood pressure. There are mixed findings in randomized trials investigating the tranquilizing effect of melatonin. Gehrman et al. (2009) did not find any beneficial effect on elderly patients with Alzheimers' Disease.   Hughes, Sack, and Lewy (1998) examined the effects of Melatonin to sleep in 446 subjects using Polysomnographic reading actigraphy and subjective ratings. They found that melatonin could improve sleep latency; however, it was not effective in improving total sleep time, sleep efficiency, wake after sleep onset, and self-reports of nighttime sleep and daytime alertness. Baskett et al. (2003) also found no improvement in sleep duration or sleep quality in the study subjects (65 years and above) with age-related sleep maintenance.   This was in contradiction to Garfinkel, Laudon, & Zisapel, (1997) study findings. Melatonin treatment significantly increased sleep efficiency and total sleep time, and decreased wake after sleep onset, sleep latency, and number of awakenings compared to placebo in the 21 elderly subjects. In addition, its effect was enhanced when taken with benzodiazepines.   Zhdanova et al. (2007) investigated the effect of physiological doses of melatonin to restore nighttime levels and sleep efficiency in subjects with insomnia (50 years and over) in a double-blind, placebo-controlled study. Results revealed a significant improvement in the sleep of insomniac subjects by all three melatonin doses (0.1, 0.3, and 3.0 mg), with the 0.3-mg dose causing

the largest effect. There is evidence in the literature that melatonin may possibly increase seizure frequency (Sheldon, 1998), disturb sleep-wake pattern (Middleton, Stone, & Arendt, 1996), and result in optic neuropathy if taken with sertraline and a high-protein diet (Lehman & Johnson, 1999). There is no sufficient data available that demonstrates its efficacy and long-term safety for it to be recommended to older adults.

Non-pharmacological Treatment for Poor Sleep

Lack of knowledge about non-pharmacological treatment is reported by physicians as one of the main reasons for prescribing drugs for sleep (Lai & Good, 2005). In addition, access to training and professional support is limited. Evidence has supported efficacy of non-pharmacological interventions such as exercise, Tai chi, and music therapy.

Exercise has shown to improve sleep quality in older adults. Seventeen sedentary adults aged 55 years and older with insomnia were randomly assigned to a group that received a 16-week aerobic physical activity plus sleep hygiene or non-physical activity plus sleep hygiene (Reid et al, 2010). The physical activity group significantly improved in sleep quality on the global Pittsburgh Sleep Quality Index (PSQI), sleep latency, sleep duration, daytime dysfunction, and sleep efficiency. The study's weakness included a small sample size composed of mostly women; therefore, generalization to other population is limited. In addition, there was a high dropout rate of 22 % (4 in the non-physical group and 1 in the exercise group). This may have been due in part to Hawthorne Effect. Despite limitations, the information obtained reinforces the usefulness of exercise regimens in improvement of sleep.

Tai chi, a form of meditation that involves slow body movements and deep breaths, has been found to significantly improve sleep quality, sleep-onset latency, sleep duration, and sleep efficiency in older adults (Irwin et. al., 2008; Li et al., 2004). Li et al. (2004) compared the effect of tai chi and exercise on sleep quality and daytime

sleepiness. Participants, sixty years and above, were randomly assigned to either the tai chi group or the low-impact exercise groups. They found that there was an improvement in sleep quality and daytime sleepiness in the tai chi group while no change was found in the low-impact exercise group. One of the concerns in the study was attrition. Thirty-seven participants (33%) withdrew from both the Tai chi and low impact exercise program (19 from tai chi, 18 from low impact exercise) during the intervention period due to reasons that included time commitment and inconvenience.

Lai and Good (2005) used a randomized controlled trial with a two-group repeated measures design to investigate effect of soft music to sleep quality. They recruited sixty community-dwelling men and women in Taiwan, aged 60–83 years, with sleeping difficulty. Those who are on sleeping medications and caffeine and with conditions that might interfere with sleep such as cognitive impairment and depression were excluded. The intervention group chose from six 45-minute sedative music tapes to listen to at bedtime for 3 weeks. Sleep quality was measured before the study and three more times, at a weekly interval, after initiation of therapy. Result showed a cumulative dose effect. The difference in sleep quality score between groups was clinically significant with a 35% improvement overall in the music group.

Meditation-based approach to poor sleep has demonstrated benefits as well. Carlson, Speca, Patel, and Goodey (2003) found a decrease in reported poor sleep quality in cancer patients after completing the Mindfulness-Based Stress Reduction program (MBSR). Carlson and Garland (2005) found supporting results. In the study, the MBSR program consisted of 90-minute classes, a 3-hour silent retreat in the sixth week of the

program, mindfulness practice in experiential and group forms, and meditation techniques which included a body scan meditation, sitting and walking meditation and hatha yoga. A significant change in sleep quality was found post-intervention. In addition, there was a reduction in stress symptoms and mood disturbance. Ong, Shapiro, and Manber (2008) combined mindfulness meditation with Cognitive Behavioral therapy to strengthen the effect of sleep. There were 30 subjects who participated in the 6-week, multi-component group intervention using mindfulness meditation, sleep restriction, stimulus control, sleep education, and sleep hygiene. A significant reduction in the symptoms of insomnia, pre-sleep arousal, sleep effort, and dysfunctional sleep-related cognitions were found.

The literature demonstrates that non-pharmacological approaches to poor sleep can be very effective, but there may be adherence difficulty for older adults. The interventions require sustained and prolonged attention and concentration, considerable time commitment, and change in environment and physical activity.

Mantram Repetition

Mantram intervention is a meditation-based approach, used for management of stress, anxiety, and pain that involves repetition of a word or a phrase with spiritual association that is chosen by the participants that fits their current beliefs or philosophy or something that they desire to experience (Bormann, 2012; Bormann, Thorp, Wetherell, & Golshan, 2008). In contrast to the demands of exercise and traditional relaxation techniques, Mantram repetition does not need a change in environment and activity or a period of quiet time to practice. It can be practiced anytime, anywhere, and during any

activity. Its accessibility and portability will make it more "user-friendly" to older adults.

Bormann et al. (2006) examined how a Mantram training program is helpful or not helpful to veterans and Veteran Affairs (VA) staff using a qualitative design. They found that Mantram intervention was useful in controlling emotions, stress, unwanted thoughts, and attaining good sleep. Due to use of convenient sampling, generalization to other population would be difficult. However, the findings demonstrate the benefits that Mantram intervention could offer to veterans suffering from Post Traumatic Stress Disorder (PTSD). In the PTSD study by Bormann et al. (2008), a quantitative experimental design was used to examine the effect of Mantram repetition to symptoms of combat-related PTSD in veterans aged 40 to 76 years (average age of 56). They found that the Mantram intervention group showed improvement in PTSD symptom severity including sleep disturbance related to hyperarousal and re-experiencing trauma as well as a significant improvement on self-reported PTSD severity. Clinician-assessed scores also showed improvement. Other important findings included diminished psychological distress and increased quality of life. A more recent study also found significant improvements in psychological distress and spiritual well-being in randomized trials with 223 veterans aged 22 to 88 years of age with medical or psychiatric diagnosis (Buttner, et al., 2016).

HIV patients who have difficulty coping with the stress of living with HIV have been found to experience higher symptoms of psychological distress. Bormann, Aschbacher, Wetherell, Roesch, & Redwine (2009) examined effect of Mantram

repetition in this population. They compared the effects of a Mantram intervention using spiritual words or phrase with an attention-matched control intervention on average daily levels of salivary cortisol among HIV-infected adults (aged 18 to 65 years). Their findings indicate that subjects who had a stronger sense of faith exhibited lower levels of neuroendocrine activation with the sharpest declines of salivary cortisol in the Mantram intervention group as compared to the control group. Mantram intervention seems to enhance the effect of strong faith on the body's response to stress in HIV patients. More studies are needed to strengthen current knowledge on the effect of Mantram intervention on stress and modulators of stress especially in older adults.

Sleep Education

In 2004, the American Academy of Sleep Medicine analyzed and graded 37 articles from peer-reviewed scientific journals on behavioral and psychological treatment of insomnia (Morgenthaler et al., 2006). Sleep education is a form of behavioral intervention intended to make patients more aware of health practices and environmental factors that may be harmful or useful for sleep. They have found that there is insufficient data available to assess the effectiveness of sleep education as a single intervention to improve sleep. There is scarcity of evidence on the effect of sleep hygiene on sleep (Gellis, & Lichstein, 2009; Lacks & Rotert, 1986; Stepanski & Wyatt, 2003). Most of the studies used sleep education as part of the behavioral intervention or as the control condition. Hoch el al. (2003) tested sleep-restriction therapy with sleep hygiene education and sleep hygiene education alone in a controlled trial with older adult participants. They found that the group that received sleep-restriction therapy has a sustained improvement in sleep continuity and depth according sleep recording with electroencephalogram as

compared to the education only group. However, they concluded that both approaches have a positive contribution to offer their elderly participants. Sleep hygiene education was associated with improvements in a sense of well-being in the morning in the first 8 weeks.

CHAPTER 3: METHODOLOGY

Introduction

In this chapter, population and sample, research design, sampling design, instrumentation, data collection, data analysis, findings, and limitations are discussed. This study compared the effects of two nonpharmacological interventions (Mantram and sleep technique) on sleep quality and perceived stress.

The aims of the study were:

1. To assess the relationship between sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress for those practicing a Mantram Repetition intervention and those who are not.

2. To determine the impact of Mantram Repetition on sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress.

3. To determine the best set of predictors of sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and the frequency of use of prescribed or over-the-counter sleep-promoting medication) from age, gender, marital status (married or single/divorced/separated), Mantram intervention group membership, frequency of sleep technique use, and perceived stress.

Recruitment Strategies

Recruitment occurred through faith-based organizations, community centers, senior centers, and retirement communities in Orange and Southwest Los Angeles Counties. These areas were chosen due to proximity and accessibility to the primary investigator (PI) and proximity to training sites. Administrators and directors of community centers, health clinics, senior centers, and retirement communities were contacted to request permission to conduct presentations on site and to recruit potential subjects. Introductions were done through presentations by the PI. Interested individuals who meet the criteria were handed a consent form with a written detailed description of the research project and subjects' rights and protection along with a self-stamped return envelope.

Sample and Setting

The target population was healthy older adult in the community aged 50 and above who were English literate. Individuals with a diagnosis of dementia were excluded because Mantram repetition requires the ability to focus. Those with diagnosis of obstructive sleep apnea were also excluded. Qualification of interested individuals was confirmed during first contact. A sample of 44 subjects originally consented to participate with 38 females and 6 males. One subject left the study due to illness and eight who did not submit the posttests were removed from the analysis. A total of 35 subjects (sleep technique group n=19, Mantram group n=16) were used in the analysis.

The subjects were assigned to blocks based on gender, and then the groups were randomly assigned to either the sleep technique group or the Mantram group. There were four community and senior center training sites in North Orange County and Southwest Los Angeles.

Protection of Human Subjects

Each subject was assigned a number to maintain confidentiality. The assigned number, questionnaires, and all the data gathered were secured in a password protected private computer and locked box (for hard copies and USB back up), which are kept in a locked cabinet in the investigators office. No personal identifiers were written on the sleep diary and any of the measurement tools. The assigned number was used to label responses and collected data.

Research Design

The study used a quasi-experimental pretest-posttest nonequivalent comparison group approach. Mantram repetition training was a weekly, 60 to 90-minute, 5-week class held at the local community and senior centers. The classes were taught by the primary investigator, a trained Mantram instructor. An instructor guide developed from the VA San Diego Health Care System was followed. To minimize investigator bias, information was presented via pre-recorded instructional material consisting of power points with audio. Class activities and discussions were conducted after the presentation. Materials that were provided for the intervention group include a Mantram training manual, the book "Strength in the Storm" by Sri Eknath Easwaran, and for both groups, a sleep diary for tracking experiences and progress. The sleep technique class involved five

weekly, face-to-face sessions with pre-recorded power point presentation, discussions, and learning activities. Sleep experiences were recorded by the subjects in the sleep diary. Assignments and experiences were discussed during subsequent face-to-face sessions.

Instruments

Sleep quality and Pittsburgh Sleep Quality Index. This research study used Pittsburgh Sleep Quality Index (PSQI) with permission from the holder of the copyright. PSQI is a self-administered questionnaire that consists of 4 open-ended questions and 14 questions to be answered using event-frequency and scales, differentiating "poor" from "good" sleep. It measures seven areas: subjective sleep quality, sleep duration, sleep latency (the time it takes to fall asleep), habitual sleep efficiency (the ratio of total sleep time to time in bed), frequency of prescribed or over-the-counter sleep-promoting medication use, sleep disturbances, and daytime dysfunction over the last month (Buysse et al., 1989). PSQI is comprised of different response categories that include usual bed time, wake time, number of actual hours slept, and number of minutes in bed before sleep onset, and Likert-type responses.

Scoring. The PSQI raw scores from the 18 questions measuring the seven sleep indicators (subjective sleep quality, sleep duration, sleep latency, habitual sleep efficiency, frequency of prescribed or over-the-counter sleep-promoting medication use, sleep disturbances, and daytime dysfunction) are combined and rescored from 0 to 3 through the use of a specific software program for scoring the PSQI. The seven subscores are totaled, producing the global score that can range from 0 to 21 (Appendix B). A global score of 5 or more indicates poor sleep quality. The PSQI scoring instruction was provided by the

University of Pittsburgh, Department of Psychiatry and accessed via the department's website.

Validity and reliability. PSQI has been used in numerous studies with older populations living in the community and people with disorders including depression, type 2 diabetes, and cardiovascular disease, which have supported its validity (Smyth, 2008). According to a psychometric study of the PSQI, it has a global reliability coefficient (Cronbach's alpha) of .83 (Smyth, 2008). In this study, the Cronbach's alpha was .73 indicating an acceptable internal consistency.

Perceived Stress and Perceived Stress Scale. Perceived stress is a person's appraisal of how much stress he or she is under at a given point in time or over a given time period (Fliege et al., 2005). This study used Perceived Stress Scale (PSS), a measurement tool comprised of 10 items with responses varying from 0 to 4 for each item and ranging from never, almost never, sometimes, fairly often and very often. The response is based on the degree to which an occurrence is appraised as stressful.

Scoring. PSS-10 scores were obtained by reversing the scores on the four positive items (4, 5, 7, and 8) and then calculating the sum across all 10 items (Appendix D). The range of score is from 0 to 40. A higher score indicates a higher stress level (Cohen, Kamarck, Mermelstein, 1983).

Validity and reliability. Perceived Stress Scale questionnaire (10-item scale) was utilized because it has been widely used in older adult studies. It has a Cronbach's alpha of .78 to .91 with good factor structure and predictive validity (Cohen & Janicki-Deverts, 2012; Cohen & Williamson, 1988). The Cronbach's alpha in this study is .83 indicating good   internal   consistency.

Data Collection Procedure

After IRB approval on August 4, 2014, collection of data began on September 22, 2014. Once consent was received from qualified subjects, demographic and pre-training PSQI and PSS questionnaires were handed to subjects with a self-stamped envelope with the PI's return address. The self-reported questionnaires were completed by the subjects in the privacy of their own home or preferred location by printed material. The sleep diary and post training questionnaires (PSQI and PSS) were collected after week 5. Post-training questionnaire responses were submitted via mail using a self-stamped return envelope provided in week 5. Follow-ups were done via mail and phone when needed. On December 11, 2014, IRB approved an amendment of the research protocol to add a $10.00 Target gift card to be given to subjects after submission of the post-training questionnaires. Data collection ended on May 26, 2015.

Data analysis

Responses from the demographics and PSS questionnaires were entered in Excel spreadsheet and uploaded to SPSS. Responses from the PSQI were entered in a PSQI database provided by the University of Pittsburgh, Department of Psychiatry. The database automatically combined and rescored the raw scores into subscores for the seven sleep quality indicators. The total score was also provided. The output was entered into SPSS for data analysis.

The plans of analyses under each aim and research question (RQ) were as follow:

Aim 1. To assess the relationship between sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress for those practicing a Mantram Repetition intervention and those who are not.

RQ1.1. What are the relationships between sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress for those practicing a Mantram Repetition intervention and those who are not, controlling for age?

Plan of Analysis. In the preliminary Pearson's correlation analysis, age was significantly related to sleep efficiency and perceived stress. Partial correlation was calculated between all variables for each intervention group to examine the relationships between perceived stress and sleep quality.

Aim 2. To determine the impact of Mantram Repetition on sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress.

RQ2.1. What are the differences in sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress between the group that received Mantram training and the group that received sleep education only controlling for pre-test scores?

Plan of Analysis. A one way analysis of covariance (Mantram versus sleep education only) controlling for pretest scores was conducted across all study variables: sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction) and perceived stress. The strength of the effect or effect size was measured using Cohen's criteria (1988).

Hypothesis 2.1. There will be a positive change in sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication (prescribed or over-the-counter), and daytime dysfunction), and perceived stress between the group that received Mantram training and the group that received sleep education controlling for age and gender.

Plan of Analysis. Change scores were computed from pre to post scores (Pre-post). Positive values for sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress score indicated a change in a beneficial direction. A two-way analysis of covariance (Group (2) x Gender (2) controlling for age) was used to assess change across all change scores.

RQ2.2. What are the differences in sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress between the group that received Mantram training and the group that received sleep education across time controlling for age?

Plan of Analysis. A one-way repeated measures analysis of covariance (Group (2) controlling for age) was used to assess change across time (pre-post) and compared within and between groups on sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress.

RQ 2.3. Do men and women differ in their response to the intervention via sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress between the group that received Mantram training and the group that received sleep education across time controlling for age?

Plan of Analysis. A two-way repeated measures analysis of covariance (Group (2) x Gender (2) controlling for age) was used to assess change across time (pre-post) and compared within and between groups on sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress.

RQ 2.4. Do marital groups differ in their response to the intervention via sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the use of prescribed or over-the-counter sleep-promoting medication) and perceived stress between the group that received

Mantram training and the group that received sleep education across time controlling for age?

Plan of Analysis. A two-way repeated measures analysis of covariance (Group (2) x Marital Status- married or single/divorced/separated (2) controlling for age) was used to assess change across time (pre-post) and compared within and between groups on sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of prescribed or over-the-counter sleep-promoting medication, and daytime dysfunction) and perceived stress.

Aim 3. Determine the best set of predictors of sleep (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and the frequency of use of prescribed or over-the-counter sleep-promoting medication) from age, gender, marital status (married or single/divorced/separated), Mantram intervention group membership, frequency of sleep technique use, and perceived stress.

RQ3.1. What is the best set of predictors of sleep quality from age, gender, and marital status, intervention group membership, frequency of sleep training use, and perceived stress?

Plan of Analysis. Both forward and backward multiple regression was employed to evaluate the best predictor set of six of the seven sleep quality indicators (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, and sleep disturbances).

CHAPTER 4: DATA ANALYSIS

Introduction

The study reported here examined the effect of Mantram repetition and sleep techniques on sleep quality and perceived stress in older adults living in the community. It further examined the influence of demographic variables such as age, gender, marital status, education, religion, and spirituality on the response to the two interventions. Chapter 4 will present the sample size and the subjects' demographics and discuss the results of the seven research questions as well as challenges and limitations in the analysis. Effect size is examined following Cohen's criteria (1988).

Sample

There were a total of 44 subjects who initially qualified for the study (6 males and 38 females). Eight were excluded from the data analysis due to missing posttest data. One subject from the sleep technique group was unable to continue with the training due to illness. The final sample size was 35 subjects. The subjects were assigned to blocks based on gender, and then the groups were assigned to either the sleep technique group or the Mantram group.

Sample Description

The range of age in the sample was from 57 to 83 years of age. The mean age was 71 years of age (sd=7.2). Table 1 presents the sample's demographics. Thirty-seven percent of the subjects were Caucasian; 46% were Asian/Pacific Islander; and the remainder were Latino, Black, or Hispanic (Table 1). Sixty percent of the subjects had attained a Bachelor's

Degree or higher; 20% had a technical degree; and 20% reported a High School degree as the highest education attained. Sixty percent of the subjects were married while the other 40% were widowed, single, divorced, or separated. The total sample was comprised of 14.3% male and 85.7% female subjects. Gender breakdown with each of the study groups (Table 2) were equitable due to deliberate blocking on gender.

Table 1

Demographics (N=35)

Category	*f*	%
Ethnicity		
Asian/Pacific Islander	16	45.7
Caucasian/White	13	37.1
Hispanic/Latino/Black-American/Other	6	17.1
Education		
High School	7	20.0
Vocational/ Technical School (2-year)	7	20.0
Bachelor's Degree	15	42.9
Master's Degree/ Professional/Doctoral Degree (MS, JD, etc.)	6	17.1
Marital Status		
Divorced/Separated	7	20.0
Married	21	60.0
Single/Widowed	7	20.0
Gender		
Male	5	14.3
female	30	85.7

Table 2

Male and Female Distribution in Each Intervention Group

Group		f	%
Sleep	Male	2	10.5
Technique	Female	17	89.5
	Total	19	100.0
Mantram	Male	3	18.7
	Female	13	81.2
	Total	16	100.0

Seventy-one percent of the subjects had insomnia (n=25), of which 15 of the 25 subjects took sleep aids. Seven of the subjects taking sleep aids were in the sleep technique group, and eight were in the Mantram group. Eighty-six percent of the 35 subjects were on routine medication for chronic illness. Hypertension was the most commonly reported chronic disease in the sample (51%), followed by dyslipidemia (26%). Only 8.6% of the subjects had diabetes mellitus and 5.7% had chronic obstructive pulmonary disease. Comparisons between the intervention and control group showed no significant differences in gender (χ^2=.480, df=1, p=.489), age (t=.177, df=33, p=.860), ethnicity (χ^2=.742. df=2, p=.74), education (χ^2=.768, df=3, p=.901), marital status (χ^2=1.228, df=2, p=.655), and use of sleep aid (χ^2=.614, df=1, p=.494).

The two study groups were similar in the number of subjects with reported insomnia. The sleep technique group had 14 subjects with insomnia, while the Mantram group had 11. Both intervention groups had five members with no reported insomnia. Table 3 presents the number of subjects with reported insomnia within each of the intervention groups.

Table 3

Distribution of Subjects With Reported Insomnia in each Intervention Group

Groups		*f*	%
Sleep Technique	NO	5	26.3
	YES	14	73.7
	Total	19	100.0
Mantram	NO	5	31.3
	YES	11	68.8
	Total	16	100.0

Preliminary Analysis

In the preliminary Pearson's correlation analysis, age was significantly related to sleep efficiency ($r =.360$, $p=.034$) and perceived stress ($r =-.362$, $p=.033$). Assumption of normality was examined graphically and statistically using histogram, normal Q-Q plot, detrended Q-Q plots, skewness, and kurtosis. The test of normality was satisfactory in all variables in the sleep technique group except for subjective sleep quality and frequency of use of sleep-aids. Subjective sleep quality ($z=2.1$) and frequency of use of sleep-aids ($z=2.4$) scores had slight positive skewness. In the Mantram group, the test of normality was acceptable in all variables with the exception of the sleep disturbance scores which had a slight negative skewness ($z=-2.1$). Linearity and homoscedasticity was checked using scatterplots and found to be satisfactory. Levene's test was used to check for equality of variance. Welch's test was utilized to check for robustness of Analysis of Variance when Levene's test was not satisfied. Results meet the requirement of Analysis of Variance.

Study Aims and Research Questions

Aim 1: Relationship between Sleep Quality and Perceived Stress

RQ1.1. What are the relationships between sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction) and perceived stress for those practicing Mantram Repetition and those who are not, controlled for age?

To control for age, a partial correlation was used to explore the relationship between sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress (measured by PSS). There was no violation of linearity, however, violation of assumptions of normality and homoscedasticity were present; therefore, Spearman's rho is also reported in the analysis. In the sleep technique group, a significant positive correlation between sleep disturbance and perceived stress with a large effect size (.5) was found. As perceived stress increases, sleep disturbance also increases. The correlation between subjective sleep quality and perceived stress did not reach statistical significance but had a medium effect size, $r = .31$ suggesting a moderately strong positive relationship between the two variables. The same was found in global sleep quality and perceived stress (Table 4).

Table 4

Correlation of Dependent Variables to Perceive Stress in the Sleep Technique Group

DV		Perceived Stress
Duration	Correlation	.284

	Significance (2-tailed)	.254
	n	16
Disturbance	Correlation	.497[b]
	Significance (2-tailed)	.036[*]
	n	16
Latency	Correlation	.206
	Significance (2-tailed)	.412
	n	16
Daytime Dysfunction	Correlation	.247
	Significance (2-tailed)	.324
	n	16
Habitual Sleep Efficiency	Correlation	-.072
	Significance (2-tailed)	.777
	n	16
Subjective Sleep Quality	Correlation	.309[b]
	Significance (2-tailed)	.212
	n	16
Frequency of Use of Sleep-Aid	Correlation	.209
	Significance (2-tailed)	.405
	n	16
Sleep Quality (global)	Correlation	.412[b]
	Significance (2-tailed)	.089
	n	16

a=large effect size
b=medium effect size

In the Mantram group, no significant correlation was found between perceived stress and global sleep There was also no statistically significant correlation seen between perceived stress and each of the seven domains (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication). There was a moderately strong positive correlation between daytime dysfunction and perceived stress (Table 5).

Table 5

Correlation of Dependent Variables to Perceive Stress in the Mantram Group

DV		Perceived Stress
Duration	Correlation	.261
	Significance (2-tailed)	.347
	n	13
Disturbance	Correlation	.024
	Significance (2-tailed)	.932
	n	13
Latency	Correlation	.013
	Significance (2-tailed)	.964
	n	13
Daytime Dysfunction	Correlation	.426[b]
	Significance (2-tailed)	.113
	n	13
Habitual Sleep Efficiency	Correlation	.079
	Significance (2-tailed)	.779
	n	13
Subjective Sleep Quality	Correlation	-.065
	Significance (2-tailed)	.819
	n	13
Frequency of Use of Sleep-Aid	Correlation	.046
	Significance (2-tailed)	.872
	n	13
Sleep Quality (global)	Correlation	.146
	Significance (2-tailed)	.603
	n	13

a=large effect size
b=medium effect size

The Spearman's rho comparisons did not reach statistical significance in either the sleep technique and Mantram groups. In the sleep technique group, the correlation between perceived stress and sleep disturbance was not statistically significant but had a medium effect size indicating a fairly strong positive association. As perceived stress rises, so does sleep disturbance. A medium effect size was also found in the correlation between sleep

quality (global) and perceived stress which is consistent with the Pearson's correlation finding. Results for the sleep technique group are presented in Table 6.

Table 6

Nonparametric Correlations of the Dependent Variables to Perceive Stress in the Sleep Technique Group (n=19)

Sleep Technique Group			Perceived Stress
Spearman's rho	Duration	Correlation Coefficient	.250
		Sig. (2-tailed)	.301
	Disturbance	Correlation Coefficient	.449[b]
		Sig. (2-tailed)	.054
	Latency	Correlation Coefficient	.257
		Sig. (2-tailed)	.288
	Daytime Dysfunction	Correlation Coefficient	.223
		Sig. (2-tailed)	.358
	Sleep Efficiency	Correlation Coefficient	-.261
		Sig. (2-tailed)	.280
	Subjective Sleep Quality	Correlation Coefficient	.178
		Sig. (2-tailed)	.466
	Frequency of Sleep-Aid use	Correlation Coefficient	.218
		Sig. (2-tailed)	.370
	Sleep Quality (global)	Correlation Coefficient	.329[b]
		Sig. (2-tailed)	.169

a=large effect size
b=medium effect size

The Spearman's rho analysis in the Mantram group showed a moderately strong correlation between perceived stress and daytime dysfunction (see Table 7). The result is consistent with the Pearson's correlation finding. A moderately strong positive association between frequency of sleep aid use and perceived stress level was found indicating an increase in sleep aid use with elevations of perceived stress level.

Table 7

Nonparametric Correlation of the Dependent Variables to Perceive Stress in the Mantram Group (n=16)

Mantram Group			Perceived Stress
Spearman's rho	Duration	Correlation Coefficient	.099
		Sig. (2-tailed)	.715
	Disturbance	Correlation Coefficient	.065
		Sig. (2-tailed)	.811
	Latency	Correlation Coefficient	.075
		Sig. (2-tailed)	.781
	Daytime Dysfunction	Correlation Coefficient	.409[b]
		Sig. (2-tailed)	.116
	Sleep Efficiency	Correlation Coefficient	-.071
		Sig. (2-tailed)	.795
	Subjective Sleep Quality	Correlation Coefficient	-.119
		Sig. (2-tailed)	.660

Frequency of Sleep-Aid use	Correlation Coefficient	.312[b]
	Sig. (2-tailed)	.240
Sleep Quality (global)	Correlation Coefficient	.073
	Sig. (2-tailed)	.789

a=large effect size
b=medium effect size

The limitations in the correlation analysis were the small sample size and the scoring method of each domain in the PSQI. The scoring method used for calculating the global score for PSQI may lead to decreased sensitivity as questions are combined and rescored to 0-3. Power analysis indicated that a total sample size of 358 was needed to attain a power of .8 with .05 alpha level (2-tailed) and medium effect size. The study sample size of 35 achieved a low .12 power.

Aim 2: Impact of Mantram Repetition

RQ2.1. What are the differences in sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the Mantram group and the sleep technique group controlling for pre-test scores?

A one-way analysis of covariance controlling for pretest scores was conducted across all study variables: global sleep quality (subjective sleep quality, sleep latency, sleep

duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication, and daytime dysfunction) and perceived stress to compare the effect of Mantram repetition training and sleep technique training on the subjects' sleep quality and perceived stress. The subjects' scores on the pre-intervention administration were controlled in the analysis. Results revealed a significant difference between the Mantram group and the sleep technique group with a large effect size in perceived stress and subjective sleep quality, and with a medium effect size in sleep latency (Table 8). Mantram group reported higher improvement in perceived stress, subjective sleep quality, and sleep latency compared to the sleep technique group. The difference in the global sleep quality score between the Mantram group and the sleep technique group did not reach statistical significance, but had a medium effect size indicating a detectable difference. The Mantram group demonstrated an improvement in global sleep quality post-training. The difference between the two groups in sleep duration, habitual sleep efficiency, sleep disturbances, daytime dysfunction, and frequency of use of sleep-promoting medication did not reach statistical significance.

Table 8

Differences in Posttest Scores between Groups Controlling for Pretest Scores

DV	*M (SD)*		F	Sig	Partial η2
	Sleep Tech	Mantram	(1, 32)		
Perceived Stress	12.58 (7.26)	11.87 (6.09)	7.062	.012*	.181[a]
Sleep Quality (global)	8.95 (3.29)	8.69 (4.59)	3.200	.083	.091[b]
Subjective Sleep Quality	1.42 (.61)	1.25 (.77)	6.728	.014*	.174[a]
Sleep Latency	1.47 (1.12)	1.25 (.86)	4.692	.038*	.128[b]
Sleep Duration	1.37 (.83)	1.25 (.86)	.339	.564	.010
Habitual Sleep Efficiency	1.16 (1.07)	1.31 (1.35)	.138	.712	.004
Sleep Disturbances	1.53 (.61)	1.56 (.63)	.351	.558	.011

Frequency in use of Sleep aid	.68 (1.11)	.94 (1.12)	.231	.634	.007
Daytime Dysfunction	.89 (.99)	1.19 (.89)	3.506	.070	.099[b]

a=large effect size
b=medium effect size

Hypothesis 2.1. This section will present the results of the analysis of change scores in the two intervention groups to examine if there was a greater positive change in sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress in the group that received Mantram training as compared to the group that received sleep technique education controlling for age and gender.

Change scores were computed from the pretest and posttest in sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress. The change scores were analyzed using two-way ANCOVA controlling for gender and age, with the intervention group membership as the independent variable. Results with a positive value indicated a change in a beneficial direction.

The Mantram group showed a significant change in a beneficial direction in perceived stress (*M* =5.6, *SE* =1.5; see Table 9). The sleep technique group did not demonstrate any change in perceived stress (*M* = -.002, *SE* = 1.8). There was a significant difference in the mean change scores between the two intervention groups (Mantram and sleep technique) with a large effect size *(F* (1, 30) = 5.6, *p* = .025, partial eta squared =.16; see Table 10). The

group who had Mantram repetition training had a substantial improvement in perceived stress compared to the group that did not.

Table 9

Change Scores Mean (Pretest minus Posttest)

DV	Group	*M*	*SE*	95% CI
Perceived Stress Level	Sleep Technique	-.002	1.788	[-3.654, 3.650]
	Mantram	5.596*	1.544	[2.442, 8.751]
Sleep Quality (global)	Sleep Technique	-.782	.985	[-2.79, 1.23]
	Mantram	1.730	.851	[-.007, 3.47]
Frequency in use of Sleep aid	Sleep Technique	-.037	.206	[-.456, .383]
	Mantram	.444*	.178	[.081, .806]
Sleep duration	Sleep Technique	-.244	.34	[-.939, .450]
	Mantram	.184	.294	[-.415, .784]
Sleep efficiency	Sleep Technique	-.139	.347	[-.848, .570]
	Mantram	.170	.3	[-.442, .783]
Daytime Dysfunction	Sleep Technique	.006	.288	[-.583, .595]
	Mantram	-.518	.249	[-1.026, -.009]
Sleep Disturbance	Sleep Technique	.282	.198	[-.123, .687]
	Mantram	.277	.171	[-.072, .627]
Sleep Latency	Sleep Technique	-.364	.329	[-1.036, .307]
	Mantram	.564	.284	[-.015, 1.144]
Subjective Sleep Quality	Sleep Technique	-.364	.231	[-.836, .108]
	Mantram	.391	.200	[-.017, .798]

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Table 10

Difference in Mean Change Scores Between Mantram and Sleep Technique Groups

DV	Type III *SS*	*MS*	*F* (1, 30)	Sig.	Partial η2
Perceived Stress	126.933	126.933	5.566	.025*	.157[a]
Sleep Quality (global)	25.568	25.568	3.697	.064	.110[b]
Sleep Duration	.745	.745	.903	.350	.029
Sleep Disturbance	.000082	.000082	.000	.986	.000
Sleep Latency	3.494	3.494	4.537	.041*	.131[b]
Daytime Dysfunction	1.111	1.111	1.874	.181	.059
Sleep Efficiency	.388	.388	.452	.506	.015
Subjective Sleep Quality	2.307	2.307	6.054	.020*	.168[a]
Frequency in use of sleep aid	.935	.935	3.103	.088	.094[b]

a=large effect size
b=medium effect size

The global sleep quality score revealed a change in a beneficial direction in the Mantram group (*M* =1.7, *SE* =.85), but not in the sleep technique group (*M* = -.78, *SE* = .98). Although it did not reach statistical significance $(F (1, 30) = 3.7, p = .06$, partial eta squared =.11), there was a detectable difference between the two groups in the global sleep quality change scores with the Mantram group demonstrating improvement in global sleep quality while the sleep technique group had none. Decrease in the frequency of sleep aid use was found in the Mantram group. Examination of the 95% confidence intervals around each mean indicated that the decrease in the reported use of sleep aid of subjects in the Mantram group was significant (*M* =.44, *SE* =.18). There was no positive change in the frequency of sleep aid use in the sleep technique group (*M* = -.04, *SE* =.21). A direction of improvement

in sleep latency was found in the Mantram group (M =.39, SE =.2), but not in the sleep technique group (M = -.36, SE =.33). There was a significant difference between Mantram and sleep techniques groups in sleep latency (F (1, 30) = 4.54, p =.04, partial eta squared =.13) with sleep latency improvement observed in the Mantram group. Subjective sleep quality score showed a positive change after Mantram training. No change in the subjective sleep quality score was found in the sleep technique group (M = -.36, SE = .23). A significant difference between the two groups with a large effect size was found in the subjective sleep quality change scores (F (1, 30) = 6.05, p =.02, partial eta squared =.17 indicating that the Mantram group had a better subjective sleep quality, post-training, compared to the sleep technique group. There was a small movement towards a beneficial direction in sleep duration (M =.18, SE =.29) and sleep efficiency (M =.17, SE =.3) in the Mantram group but not in the sleep technique group. Both Mantram ((M =.28, SE =.17) and sleep technique groups (M =.28, SE =.2) showed improvement in sleep disturbance. No beneficial change in the daytime dysfunction score was seen in both the Mantram group and the sleep technique group.

RQ2.2. What are the differences in sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and sleep technique education and the group that received sleep education across time controlling for age?

A one-way repeated measures analysis of covariance controlling for age was conducted to assess change across time (pre-post) and compared within and between groups

on sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress. There was a statistically significant effect for time in perceived stress level, with a large effect size indicating a considerable change in perceived stress post-intervention. Global sleep quality also revealed a significant effect for time with a medium effect size demonstrating a change in global sleep quality within the groups after training. A change in subjective sleep quality, sleep latency, and daytime dysfunction post-training was also found (Table 11).

Table 11

Change across Time within Groups

	Wilks' Lambda	F (1,32)	Sig	Partial η2
Subjective sleep quality	.73	11.7	*.002	.27[a]
Sleep latency	.79	8.5	*.006	.21[a]
Daytime dysfunction	.87	4.57	*.04	.125[b]
Sleep disturbance	.98	.65	.425	.02
Sleep duration	.92	2.59	.118	.075[b]
Sleep efficiency	.98	.50	.483	.015
Frequency in use of sleep-aid	.97	1.08	.307	.033
Perceived stress	.87	4.81	.036	.13[b]

*Significant effect for time
a=large effect size
b=medium effect size

There were no statistically significant differences between the Mantram group and the sleep technique group in the global sleep quality score (F (1, 32) =.35, p =.56, partial eta squared = .011) and in the perceived stress score (F (1, 32) =.75, p =.39, partial eta squared = .023). No significant difference between the Mantram group and the sleep technique group

was found among the seven sleep quality domains (Table 12). A power analysis using G-power was performed. It demonstrated that a sample size of 98 subjects was needed to increase the probability of reaching significant difference at a 2-tailed, alpha level of .05, a power of .80, and detect a medium effect size. The post hoc power analysis indicated a .09 to .3 power attained with the study sample size.

Table 12

Difference between Groups

DV	F (1,32)	Sig	Partial η2
Subjective sleep quality	.623	.436	.019[c]
Sleep latency	.644	.551	.011[c]
Daytime dysfunction	.005	.945	.00
Sleep disturbance	.413	.525	.013[c]
Sleep duration	1.96	.171	.058[c]
Sleep efficiency	.735	.398	.022[c]
Frequency in use of sleep-aid	.798	.378	.024[c]

c= small effect size

RQ 2.3. Do men and women differ in their response to the intervention via sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress within and between the group that received Mantram training and sleep education and the group that received sleep education across time controlling for age?

A two-way repeated measures analysis of covariance was used to identify if men and women differ in their response to the interventions via sleep quality (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime

dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication) and perceived stress controlling for age. There was no significant interaction effect between gender and intervention group membership in all of the dependent variables. There was no statistically significant effect for time within the male and female groups in sleep quality, perceived stress, and the seven sleep quality indicators (Table 13). Examination of the main effect for time collapsing across the sleep technique and Mantram groups revealed a significant change (pretest-posttest) in perceived stress, sleep quality, and sleep latency scores.

Table 13

Change Across Time Within Gender Groups

	Wilks' Lambda	F (1, 30)	Sig	Partial η^2
Perceived stress level	.98	.47	.498	.015
Sleep Quality (global)	.39	.76	.39	.025
Subjective sleep quality	.985	.441	.512	.015
Sleep latency	.985	.465	.5	.015
Daytime dysfunction	.998	.057	.813	.002
Sleep disturbance	.966	1.049	.314	.034
Sleep duration	.972	.868	.359	.028
Sleep efficiency	.98	.62	.437	.020
Frequency in use of sleep-aid	.945	1.752	.196	.055

There was no main effect difference between men and women in their response to intervention via perceived stress and sleep quality and the seven indicators (subjective sleep quality, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, the frequency of use of prescribed or over-the-counter sleep-promoting medication; see Table 14). Limitations of this analysis were the unequal

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gender group size and small male sample size. The post hoc power analysis showed that the test reached only a .14 power.

Table 14

Difference Between Gender Groups

DV	F (1, 30)	Sig	Partial η2
Subjective sleep quality	.348	.559	.011
Sleep latency	.644	.154	.067[b]
Daytime dysfunction	3.398	.075	.102[b]
Sleep disturbance	.513	.479	.017
Sleep duration	.5	.485	.016
Sleep efficiency	1.330	.258	.042
Frequency in use of sleep-aid	2.011	.167	.063[b]

b=medium effect size

RQ 2.4. Do marital groups differ in their response to the intervention via sleep quality (subjective sleep quality, the frequency of use of prescribed or over-the-counter sleep-promoting medication, sleep disturbances, sleep latency, sleep duration, habitual sleep efficiency, and daytime dysfunction), and perceived stress between the group that received Mantram training and sleep education and the group that received sleep education across time controlling for age?

A two-way repeated measure analysis of covariance was used to assess whether marital groups (married or not married) differed in their response to the intervention via sleep quality (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication, and daytime dysfunction) and perceived stress controlling for age. There was no interaction effect between intervention

group membership and marital status. Upon examination of the main effects, no significant change across time (pre-post) on all variables within marital groups was found. Examination of the main effect for time collapsing across the sleep technique and Mantram groups revealed a significant change (pretest-posttest) in sleep latency, perceived stress, and sleep quality.

The main effect demonstrates a significant difference between the groups who are married and not married in the global sleep quality (F (1, 30) = 5.2, p =.03, partial eta squared=.15) and sleep latency (F (1, 30)= 5.55, p =.025, partial eta squared=.16) with large effect size. Although statistical significance was not reached *(p =.087)*, the difference between the marital groups exhibited a medium effect size in subjective sleep quality (partial eta squared = .094). No difference was found between the marital groups in sleep duration, habitual sleep efficiency, sleep disturbances, the frequency of use of sleep-promoting medication, and daytime dysfunction (Table 15).

Table 15

Difference between Marital Groups

DV	F (1, 30)	Sig	Partial η2
Perceived Stress	1.643	.210	.052
Global Sleep Quality	5.200	.030*	.148[a]
Subjective sleep quality	3.127	.087	.094[b]
Sleep latency	5.546	.025*	.156[a]
Daytime dysfunction	.358	.554	.012
Sleep disturbance	.745	.395	.024
Sleep duration	1.414	.244	.045
Sleep efficiency	1.820	.187	.057
Frequency in use of sleep-aid	1.662	.207	.052

a=large effect size
b=medium effect size

Aim 3: Predictors of Sleep Quality

RQ 3.1. What is the best set of predictors of sleep quality from age, gender, marital status, intervention group membership, frequency of sleep training use and perceived stress?

A backward and forward multiple linear regression was calculated to determine the best predictor set for sleep quality and six of the seven sleep quality indicators based on age, gender, marital status, intervention group membership, frequency of sleep training use, and perceived stress. Tables 16 to 21 display the unstandardized and standardized regression coefficient (*b* and *b**), adjusted R^2, and semi-partial correlation.

Sleep quality (global). In the forward regression, no variable was entered into the equation reflecting the failure of any of the predictor set to uniquely predict sleep quality. However, in backward regression in which all variables are included initially and then removed sequentially based on least impact out first, the model retain one marginally significant variable, marital status, explaining 5.1% of the variance in the sleep quality .

Table 16

Backward Regression of Predictors on Sleep Quality (global)

Model	*b*	*SE*	*b**	Part
Marital Status	2.19	1.30	.281	.281
Adjusted R^2	.051			
F (1, 33)	2.826			
P	.1			

Criteria to include in forward regression = PIN (.05); Criteria to exclude in backward regression=POUT (.1)

Sleep Duration.   No variable was entered in the model in the forward regression again reflecting the low correlation between the predictors and the criterion. In the backward regression, intervention group membership was the only variable retained, explaining 8.3% variance in sleep quality.

Table 17

Backward Regression of Predictors on Sleep Duration

Model	b	SE	b*	Part
6				
Intervention group membership	.602	.299	-.331	-.331
Adjusted R^2	.083			
F (1, 33)	4.058			
p	.052			

Criteria to include in forward regression = PIN (.05); Criteria to exclude in backward regression=POUT (.1)

Sleep Disturbance.   There was no variable entered into the equation in the forward regression for prediction of sleep disturbance. For backward regression, a marginally significant model was found with perceived stress accounting for 5.6% the variability in sleep disturbance (Table 18).

Table 18

Backward Regression of Predictors on Sleep Disturbance

Model	b	SE	b*	Part
6				
Perceived stress	.027	.015	.290	.290
Adjusted R^2	.056			
F (1, 33)	3.029			
p	.09			

Sleep Latency. In the forward regression, there was no variable entered into the equation. In the backward regression, perceived stress was the only marginally significant predictor, exhibiting an adjusted R^2 of .052 (Table 19) accounting for 5.2% of the variance in sleep latency.

Table 19

Backward Regression of Predictors on Sleep Latency

Model	b	SE	b*	Part
Perceived stress	.571	.337	.283	.283
Adjusted R^2	.052			
F (1, 33)	2.880			
p	.099			

Daytime Dysfunction. In the forward regression, no variable was entered in the model. In backward regression, the only predictor was perceived stress (adjusted R^2 = .054) again accounting for 5.2% of the variance in daytime dysfunction.

Sleep Efficiency. In the both forward and backward regressions, only age was entered in the model ($F (1, 33) = 4.9$, $p =.03$). It accounted for 10% of the variability in sleep efficiency (adjusted $R^2 =.10$)(Table 20).

Table 20

Backward Regression of Predictors on Sleep Efficiency

Model	b	SE	b*	Part

6					
	Age	.059	.027	.360	.360
	Adjusted R^2	.103			
	F (1, 33)	4.905			
	p	.034			

Criteria to include in forward regression = PIN (.05); Criteria to exclude in backward regression=POUT (.1)

Subjective Sleep Quality. In the forward regression, only marital status was entered in the model, accounting for .11% of the variance in subjective sleep quality (*p* =.032). In the backward regression, two variables were retained (Table 21), marital status and gender, accounting for 17% of the overall variance. Being married was more predictive of higher subjective sleep quality scores and accounted for 47 percent of the explained variance. Being male was negatively predictive of subjective sleep quality and accounted for 31% of the explained variance. From the model, the predictor that had a statistically significant contribution and strongest predictor was marital status.

Table 21

Backward Regression of Predictors on Subjective Sleep Quality

Model		*b*	*SE*	*b**	Part
5					
	Marital Status	.643	.228	.467	.441
	Gender	-.6	.319	-.312	-.294
	Adjusted R^2	.170			
	F (2, 32)	4.474			
	p	.019			

Criteria to include in forward regression = PIN (.05); Criteria to exclude in backward regression=POUT (.1)

Summary of Findings

The results showed that the Mantram group and the sleep technique group significantly differed in their perceived stress, sleep latency, and subjective sleep quality scores post training, when pretest scores are controlled, with the Mantram group demonstrating decreased perceived stress level and improved sleep latency and subjective sleep quality. In the change score analysis, the Mantram group demonstrated a beneficial change in perceived stress level, sleep quality (global), frequency of sleep-aid use, sleep latency, and subjective sleep quality. Both the sleep technique and Mantram training exhibited a positive effect on sleep disturbance. Men and women did not differ in their response to the intervention in either group. In addition, the response to the interventions was not affected by marital status (married or not married). Multiple regression analysis indicated that marital status and gender were the strongest predictors of global sleep quality and subjective sleep quality. Age was a significant predictor of sleep latency. Perceived stress exhibited important predictive value on sleep latency and sleep disturbance. Intervention group membership was the strongest predictor for sleep duration.

CHAPTER 5: CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Introduction

This study evaluated the efficacy of a 5-week Mantram repetition program on sleep quality and perceived stress using a sample of healthy older adults. It also explored the general feasibility of the Mantram program outside of the Veterans' Affairs medical system and community. Chapter Five discusses results from the study and relates them to the relevant literature and the use of the theory of mind and body interaction as the conceptual framework. Important aspects of feasibility are measured and discussed. Clinical implications, limitations, and recommendations of the study are also provided. The chapter will close with final remarks and personal insights gained from conducting the study.

Study Summary

Pharmacological sleep aids are the most commonly used treatment for poor sleep. Although these sleep-aids may provide relief, their efficacy is small, and there is an increased risk of adverse events (Chung & Lee, 2002; Glass et al., 2005; McGregor et al., 1989; Rickels et al., 1983). Effective nonpharmacological interventions can decrease the use of prescription and over-the-counter sleep aids, reducing the risk of side effects. This study assessed the comparative effectiveness of two nonpharmacological interventions, Mantram and sleep technique, at improving sleep in healthy older adults, aged 50 and above, using a quasi-experimental pre- and posttest design. The study used 35 subjects, 16 of whom were in the Mantram intervention group and 19 who were in the sleep technique group. The purpose of the study was to evaluate the feasibility of providing a

5-week Mantram repetition program consisting of 60-90-minute weekly training classes to a sample of healthy older adults living in the community, following a Mantram training program developed from the VA San Diego Health Care System. The sleep technique class also involved five weekly sessions. Both classes utilized pre-recorded power point presentations to minimize investigator bias. Sleep experience was recorded in the sleep diary to improve recall. Collection of data was accomplished using Pittsburgh Sleep Quality Instrument, Perceived Stress Scale, and demographic questionnaire (Buysse et al., 1989; Cohen & Janicki-Deverts, 2012).

Discussion of Major Findings

The conceptual framework for the study, the mind and body interaction, posits that mind and body are distinct entities that have causal associations (Sousa, 1984). According to the theory, one affects the other. Dysfunctional thoughts, negative mental processes such as impatience, and negative behavior patterns such as "hurry sickness" or the continual rushing and overwhelming sense of urgency, can lead to psychological distress and maladaptive physiological responses (Ackerstedt, et al., 2007; Bormann & Carico, 2009). Sleep disturbance is a maladaptive physiological response that is often precipitated by stressful life events and the preoccupation with worries (Ackerstedt, et al., 2007; Bastien, Vallieres, & Morin, 2004). In this study, subjects' sleep diaries listed worry, preoccupation with sleep, and the busyness of the day or the next day, as factors that have affected sleep.

Mantram intervention can pause the mind and refocus attention to the present and to a state of calm with relaxation as a goal (Bormann, 2014; Bormann et al., 2005). It can raise the awareness of negative and maladaptive responses to undesired experiences and

everyday nuisance, and provide an opportunity to choose an adaptive or a positive response. For example, one subject shared that upon awakening and seeing two o'clock AM on the clock, worry about inability to fall back to sleep and irritability were the usual reactions. Mantram can bring awareness to the reaction, remove attention from the clock, and focus on other options such as a relaxing activity. Findings of the study suggested improvement in perceived stress, subjective sleep quality, and sleep latency in the Mantram group when pretest scores were controlled. The result supported the findings on the efficacy of frequent Mantram repetition on reducing stress and improving sleep in studies conducted with veterans, caregivers of veterans with dementia, and Veteran Affairs employees (Bormann et al., 2005; Bormann et al., 2006; Bormann et al., 2008; Bormann, Hurst, & Kelly, 2013). The findings in the change score analysis also support observations of the benefit of Mantram on sleep and perceived stress. There was a beneficial change detected in perceived stress, sleep quality, sleep latency, sleep disturbance, and sleep efficiency in the Mantram group.

Perceived stress was the strongest predictor of daytime dysfunction and sleep disturbance and a good predictor of sleep duration, supporting evidence of the link between stress and sleep (Akerstedt et al., 2002; Akerstedt et al., 2007; Morin et al., 2003). Previous studies indicated that sleep efficiency declines with age (Bixler et al., 2005; Ohayon, 2004; Vitiello, Larsen, & Moe, 2004). Aligned with other studies, the result of the regression analysis in this study found that age was the strongest predictor of sleep efficiency, with the indication that as age increases sleep efficiency worsens. Previous studies have found that gender is an indicator of disturbed sleep, with women at higher risk than men are (Ackerstedt, et al., 2002; Leger et al., 2000; Roth, 2007). The

regression analysis found that being male is predictive of better sleep quality as compared to being female, supporting other studies.

Limitations and Recommendations

Interpretation of the findings of this study should be made within the confines of the study limitations. An important limitation in the data analysis was the Pittsburgh Sleep Quality Index (PSQI) method of scoring. It may have decreased the sensitivity of the tool as questions were combined and rescored to 0-3. For example, sleep disturbance had a range score of 0-27. The range of score was reduced to 0-3 when rescored.

The small sample size reduced the power of the correlational and repeated measure ANCOVA analysis (RQ 2.2 and RQ 2.3) decreasing the probability of detecting intervention effect if it is present. The correlational analysis was not able to statistically support current evidence on the link between stress and poor sleep, which can be attributed to the underpowered analysis due to the small sample size. The current study was not able to find a significant difference between men and women in sleep quality, sleep latency, sleep disturbance, daytime dysfunction, sleep efficiency, frequency of use of sleep promoting medications, and sleep duration, likely due to the small and unbalanced sample size, reducing the power in the analysis. The low power of the analysis was not able to detect a statistically significant difference between the Mantram and the sleep technique group when the pretest scores were not controlled, however, when pretest scores were controlled, significant outcomes were found.

The self-reported measures may be prone to inaccuracy of information provided by the subjects. Recall difficulty may have affected the quality of the responses and decreased the magnitude of the true effect. The risk of under-reporting or over-reporting

of historical information is also a possibility. The use of a sleep diary in this study had likely improved the accuracy of the posttest; however, the pretest responses remained susceptible to inaccuracies.

The findings cannot be generalized to other healthy older adults due to the small convenience sample. In addition, there were more women who volunteered to participate in the study. Even though there were men who showed interest in the topic, only a few consented to participate.

Future Research Recommendations

It is well known that the physiological changes that occur with ageing, chronic illnesses, and medications can affect sleep; however, other factors may be in play in the healthy older adults. Repeated comments written in the sleep diary under factors affecting sleep included stress and busyness of the day or the following day. Other comments written and expressed during class included anxiety due to unsatisfying sleep and worry about "feeling tired" even with seven hours of sleep. Subjects have indicated in their sleep diary that they used Mantram repetition in a variety of circumstance. For example, those who awaken prematurely during the night have used Mantram. One subject used Mantram to resist opening the computer to check the stock market. A few shared that they have used it to help with jet lag or sleep difficulty related to travel. Qualitative data from the sleep diary should be examined in future studies to recognize other important factors that negatively affect sleep in healthy older adults and to understand the usefulness of Mantram intervention in managing those factors. Future study should include sleep quality and perceived stress measurements at 3 months and 6 months, post training, to determine longitudinal efficacy of Mantram intervention.

Sample size determination and power analysis is an essential part of an experimental design to be able to detect an effect when present (Lachin, 1981). The estimated sample size obtained from a power analysis will be utilized in the future study design. To increase the number of subjects, recruitment areas should be expanded geographically. In addition, quota sampling may be utilized as an option to ensure recruitment of male subjects.

To increase sensitivity of the PSQI tool in analyzing each element of sleep quality, a possible approach is to examine the score of each item in the tool independent of the global sleep quality scoring guideline. For example, sleep disturbance will not be rescored; instead, the raw score of 27 will be used in the analysis. Distribution of the sleep diary to subjects well in advance of the first week of training and pretest may improve accuracy of the responses.

Implications for Practice

The clinical application of Mantram repetition is in health promotion with efforts to improve sleep and management of stress, and support healthier habits and life style. Mantram training can be integrated in the practice of physicians, nurse practitioners, nurses, psychologists, and social workers. Health care providers can teach Mantram repetition to older adults with simple sleep complaints or as part of a treatment plan for those with more complex sleep disturbances. The use of Mantram repetition can lead to a decrease in the use of sleep aids and the attainment of better sleep without the side effects of pharmacological remedies. In addition, Mantram training can be part of a treatment strategy for those with depression and anxiety. Mantram repetition can be taught to those with chronic illnesses who experience pain, fear, frustration, anger, and disruptions in

their daily lives. It can be prescribed to manage stress and worry related to challenges caused by biological, emotional, financial, and lifestyle changes experienced by the older adults. Better sleep and stress management will improve functional capabilities, decrease the need for health services, and ultimately improve the overall quality of life in older adults.

Conclusion

The findings demonstrate the feasibility and acceptability of the five-week Mantram training program to older adults living in the community. The study was instructive in identifying areas of modification for future studies. The study results suggest that Mantram repetition could benefit older adults seeking ways to improve sleep and decrease stress. The results are preliminary and will need a larger study to confirm the findings. Nevertheless, the findings are promising and support the acceptability and feasibility of a nonpharmacological, mind-body intervention.

Improving the sleep quality of older adults requires a holistic approach, which includes not only the integration of health promotional practices such as healthy diet and exercise, but also acceptance of what cannot be controlled, and choosing to respond, not react. Finding the balance within the mind and body requires a conscientious effort. The aim is to make better choices and adjustments to areas of everyday life that may be affecting sleep.

Appendix A: Pittsburgh Sleep Quality Index

ID#_____   Group _____

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month <u>only</u>. Your answers should indicate the most accurate reply for the <u>majority </u>of days and nights in the past month.
Please answer all questions.

1.   During the past month, what time have you usually gone to bed at night?

<p align="center">BED TIME _____</p>

2.   During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

<p align="center">NUMBER OF MINUTES _____</p>

3.   During the past month, what time have you usually gotten up in the morning?

<p align="center">GETTING UP TIME _____</p>

4.   During the past month, how many hours of <u>actual sleep </u>did you get at night? (This may be different than the number of hours you spent in bed.)

<p align="center">HOURS OF SLEEP PER NIGHT _____</p>

*For each of the remaining questions, check the one best response. Please answer <u>**all**</u> 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   Less than   Once or twice   Three or more
past month_____   once a week_____   a week_____   times a week_____

b)   Wake up in the middle of the night or early morning

Not during the   Less than   Once or twice   Three or more
past month_____   once a week_____   a week_____   times a week_____

c)   Have to get up to use the bathroom

Not during the   Less than   Once or twice   Three or more
past month_____   once a week_____   a week_____   times a week_____

d) Cannot breathe comfortably

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

e) Cough or snore loudly

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

f) Feel too cold

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

g) Feel too hot

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

h) Had bad dreams

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

i) Have pain

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ 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   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ 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 to help you sleep (prescribed or "over the counter")?

    Not during the   Less than   Once or twice   Three or more
    past month_____   once a week_____   a week_____   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   Less than   Once or twice   Three or more
    past month_____   once a week_____   a week_____   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 _____

10. Do you have a bed partner or room mate?

    No bed partner or room mate _____

    Partner/room mate in other room _____

    Partner in same room, but not same bed _____

    Partner in same bed _____

If you have a room mate or bed partner, ask him/her how often in the past month you have had . . .

a) Loud snoring

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

b) Long pauses between breaths while asleep

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

c) Legs twitching or jerking while you sleep

Not during the   Less than   Once or twice   Three or more
past month_____ once a week_____ a week_____ times a week_____

d)   Episodes of disorientation or confusion during sleep

Not during the   Less than   Once or twice   Three or more
past month_____   once a week_____   a week_____   times a week_____

e)   Other restlessness while you sleep; please describe_____

_____

Not during the   Less than   Once or twice   Three or more
past month_____   once a week_____   a week_____   times a week

---

Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: Psychiatry Research, 28:193-213, 1989.

Appendix B: PSQI Scoring

PSQI Scoring

Form Administration Instructions

The range of values for questions 5 through 10 are all 0 to 3.

Questions 1 through 9 are not allowed to be missing except as noted below. If these questions are missing then any scores calculated using missing questions are also missing. Thus it is important to make sure that all questions 1 through 9 have been answered.

In the event that a range is given for an answer (for example, '30 to 60' is written as the answer to Q2, minutes to fall asleep), split the difference and enter 45.

Scores – reportable in publications

On May 20, 2005, on the instruction of Dr. Daniel J. Buysse, the scoring of the PSQI was changed to set the score for Q5J to 0 if either the comment or the value was missing. This may reduce the DISTB score by 1 point and the PSQI Total Score by 1 point.

PSQIDURAT	**DURATION OF SLEEP** IF Q4 $\geq$ 7, THEN set value to 0 IF Q4 < 7 and $\geq$ 6, THEN set value to 1 IF Q4 < 6 and $\geq$ 5, THEN set value to 2 IF Q4 < 5, THEN set value to 3 Minimum Score = 0 (better); Maximum Score = 3 (worse)
PSQIDISTB	**SLEEP DISTURBANCE** IF Q5b + Q5c + Q5d + Q5e + Q5f + Q5g + Q5h + Q5i + Q5j (IF Q5JCOM is null or Q5j is null, set the value of Q5j to 0) = 0, THEN set value to 0 IF Q5b + Q5c + Q5d + Q5e + Q5f + Q5g + Q5h + Q5i + Q5j (IF Q5JCOM is null or Q5j is null, set the value of Q5j to 0) $\geq$ 1 and $\leq$ 9, THEN set value to 1 IF Q5b + Q5c + Q5d + Q5e + Q5f + Q5g + Q5h + Q5i + Q5j (IF Q5JCOM is null or Q5j is null, set the value of Q5j to 0) > 9 and $\leq$ 18, THEN set value to 2 IF Q5b + Q5c + Q5d + Q5e + Q5f + Q5g + Q5h + Q5i + Q5j (IF Q5JCOM is null or Q5j is null, set the value of Q5j to 0) > 18, THEN set value to 3 Minimum Score = 0 (better); Maximum Score = 3 (worse)
PSQILATEN	**SLEEP LATENCY** **First, recode Q2 into Q2new thusly:** IF Q2 $\geq$ 0 and $\leq$ 15, THEN set value of Q2new to 0 IF Q2 > 15 and $\leq$ 30, THEN set value of Q2new to 1 IF Q2 > 30 and $\leq$ 60, THEN set value of Q2new to 2 IF Q2 > 60, THEN set value of Q2new to 3 **Next** IF Q5a + Q2new = 0, THEN set value to 0 IF Q5a + Q2new $\geq$ 1 and $\leq$ 2, THEN set value to 1 IF Q5a + Q2new $\geq$ 3 and $\leq$ 4, THEN set value to 2

IF Q5a + Q2new $\geq$ 5 and $\leq$ 6, THEN set value to 3

Minimum Score = 0 (better); Maximum Score = 3 (worse)

PSQIDAYDYS   **DAY DYSFUNCTION DUE TO SLEEPINESS**
IF Q8 + Q9 = 0, THEN set value to 0
IF Q8 + Q9 $\geq$ 1 and $\leq$ 2, THEN set value to 1
IF Q8 + Q9 $\geq$ 3 and $\leq$ 4, THEN set value to 2
IF Q8 + Q9 $\geq$ 5 and $\leq$ 6, THEN set value to 3
Minimum Score = 0 (better); Maximum Score = 3 (worse)

PSQIHSE   **SLEEP EFFICIENCY**
Diffsec = Difference in seconds between day and time of day Q1 and day
Q3

Diffhour = Absolute value of diffsec / 3600
newtib =IF diffhour > 24, then newtib = diffhour – 24
      IF diffhour $\leq$ 24, THEN newtib = diffhour
(NOTE, THE ABOVE JUST CALCULATES THE HOURS BETWEEN
GNT (Q1) AND GMT (Q3))
tmphse = (Q4 / newtib) * 100

IF tmphse $\geq$ 85, THEN set value to 0
IF tmphse < 85 and $\geq$ 75, THEN set value to 1
IF tmphse < 75 and $\geq$ 65, THEN set value to 2
IF tmphse < 65, THEN set value to 3
Minimum Score = 0 (better); Maximum Score = 3 (worse)

PSQISLPQUAL   **OVERALL SLEEP QUALITY**
Q6
Minimum Score = 0 (better); Maximum Score = 3 (worse)

PSQIMEDS   **NEED MEDS TO SLEEP**
Q7
Minimum Score = 0 (better); Maximum Score = 3 (worse)

PSQI   **TOTAL**
DURAT + DISTB + LATEN + DAYDYS + HSE + SLPQUAL + MEDS
Minimum Score = 0 (better); Maximum Score = 21 (worse)
Interpretation: TOTAL $\leq$ 5 associated with good sleep quality
                      TOTAL > 5 associated with poor sleep quality

Reference

Buysse D.J., Reynolds, C.F., Monk, T.H,, Berman, S.R., & Kupfer, D.J. (1989) The Pittsburgh
    Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry
    Research* 28:193-213.

Appendix C: Perceived Stress Scale

PSS

INSTRUCTIONS:
The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH.   In each case, please indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way.

	Never 0	Almost Never 1	Sometimes 2	Fairly Often 3	Very Often 4
In the last month, how often have you been upset because of something that happened unexpectedly?	○	○	○	○	○
In the last month, how often have you felt that you were unable to control the important things in your life?	○	○	○	○	○
In the last month, how often have you felt nervous and "stressed"?	○	○	○	○	○
In the last month, how often have you felt confident about your ability to handle your personal problems?	○	○	○	○	○
In the last month, how often have you felt that things were going your way?	○	○	○	○	○
In the last month, how often have you found that you could not cope with all the things that you had to do?	○	○	○	○	○
In the last month, how often have you been able to control irritations in your life?	○	○	○	○	○
In the last month, how often have you felt that you were on top of things?	○	○	○	○	○
In the last month, how often have you been angered because of things that were outside your control?	○	○	○	○	○
). In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	○	○	○	○	○

Appendix D: PSS Scoring

PSS Scoring

Directions:
• First, reverse the scores for questions 4, 5, 7, and 8. On these 4 questions, change the scores like this:
0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.
• Now add up the scores for each item to get a total. The total score is _____.
• Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.
The PSS is not a diagnostic instrument, so there are no cut-offs. There are only comparisons between people in your own sample.

Reference

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States.

In S. Spacapan & S. Oskamp (Eds.), The social psychology of   health: Claremont

Symposium on applied social psychology. Newbury Park, CA: Sage.

Appendix E: Permission to Use PSQI

RE: Request Permission to Use PSQI for Dissertation Project
Buysse, Daniel [BuysseDJ@upmc.edu]

Sent: Wednesday, November 27, 2013 7:26 AM
To: Kay, Jade P.

Dear Jade,

You have my permission to use the PSQI for your research study. You can find the instrument, scoring instructions, the original article, links to available translations, and other useful information at www.sleep.pitt.edu under the Instruments tab. Please ensure that the PSQI is accurately reproduced in any on-line version (including copyright information). Please be sure to cite the 1989 paper in any publications that result.

Please note that Question 10 is not used in scoring the PSQI. This question is for informational purposes only, and may be omitted during data collection per requirements of the particular study.

This copyright in this form is owned by the University of Pittsburgh and may be reprinted without charge only for non-commercial research and educational purposes. You may not make changes or modifications of this form without prior written permission from the University of Pittsburgh. If you would like to use this instrument for commercial purposes or for commercially sponsored research, please contact the Office of Technology Management at the University of Pittsburgh at 412-648-2206 for licensing information.

Good luck with your research.

Daniel J. Buysse, M.D.
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buyssedj@upmc.edu

Appendix F: Demographic Questionnaire

ID _____   Group_____

Demographic Questionnaire

It is important to know some background information about our participants.

1. What is your gender?
    1. Male
    2. Female
2. What is your age?   _____ years

3. How would you classify yourself?
    1. Caucasian/White
    2. Hispanic
    3. Latino
    4. Black or African American
    5. Asian / Pacific Islander
    6. Other

4. What is the highest level of education you have completed?

    1. Grammar/Elementary school
    2. High school
    3. Vocational/technical school (2 year)
    4. Bachelor's degree
    5. Master's degree
    6. Professional or doctoral degree (MD, JD, etc.)

5. Do you have a religious affiliation?
    1. Yes
    2. No

6. If **YES, w**hat is your religious affiliation?

    1 - Buddhism
    2 - Catholicism (Christianity)
    3 - Hinduism
    4 - Islam
    5 - Judaism
    6 - Protestantism (Christianity)
    7 - Non-denominational Christianity
    8 - Other _____

7. Do you classify yourself as:
1. Religious
2. Spiritual
3. Not religious
4. Not spiritual

8. What is your current marital status?

1. Divorced
2. Living with another
3. Married
4. Separated
5. Single
6. Widowed

9. Have you been diagnosed with Dementia or some kind of memory loss?

1. Yes
2. No

10. Have you been diagnosed with Obstructive Sleep Apnea?

1. Yes
2. No

11. Do you have insomnia?
1. No
2. Yes

If **YES**, do you take any medications to help you sleep?
1. No
2. Yes

If **YES,** what medications do you take?
1. over the counter (example- melatonin, etc.)
2. prescribed medication (example-Ambien, etc.)

12. Do you take other medications?
1. No
2. Yes

If **YES**, what are the medications for?

Appendix G: Consent Form

You are being asked to participate as a subject in the research project entitled, **"Effect of Mantram repetition on sleep quality and perceived stress of healthy older adults living in the community"** to be conducted by Ms. Jade Kay, a PhD in Nursing student from the University of Texas, Medical Branch for her dissertation.

PURPOSE OF THE STUDY

The purpose of this study is to examine and compare the effectiveness of Mantram repetition and sleep education in improving the quality of sleep in older adults in the community. In addition, the study will determine whether Mantram repetition is an effective strategy for decreasing stress in older adults. You are being asked to participate because you are a healthy older adult living in the community with no diagnosis of obstructive sleep apnea and dementia.

PROCEDURES RELATED TO THE RESEARCH

If you decide to participate you will be assigned to either a Mantram training class or a sleep education class. The sleep education group will have five 60-minute classes. The Mantram repetition group will also have five classes, each of which is approximately 60-90 minutes. All classes are once a week. Participants will be asked to fill-out sleep and stress questionnaires before and after the 5-week classes and keep a sleep diary. Participants will be given a general reminder via mail or phone for submission of the post-class questionnaire if needed. The classes will have presentations, learning activities, and discussions.

You will be assigned a number to maintain confidentiality. The assigned number will be accessible only to me, the investigator. There will be no personal identifier on the questionnaires.

RISKS OF PARTICIPATION

The potential risk from participation in the study is loss of confidentiality.

NUMBER OF SUBJECTS PARTICIPATING AND THE DURATION OF YOUR PARTICIPATION

The anticipated total number of subjects involved in the study will be 60. The length of time for your participation is 5 weeks.

BENEFITS TO THE SUBJECT

The direct benefits to you may include improvement in the quality of your sleep and decreased stress levels.

SAFE WITHDRAWAL FROM THE STUDY

Your participation is voluntary and you may refuse to participate or stop your participation in this project at any time without consequences. If you choose to leave, all data collected up to that time will be used.

REIMBURSEMENT FOR EXPENSES

You will be reimbursed for the expense and time in the form of a $15.00 gift card that will be given upon submission of the second questionnaire.

COSTS OF PARTICIPATION

There is no cost for participating.

USE AND DISCLOSURE OF YOUR HEALTH INFORMATION

Study records that identify you will be kept confidential as required by law. Federal privacy regulations provided under the Health Insurance Portability and Accountability Act (HIPAA) provide safeguards for privacy, security, and authorized access of your records. These regulations require University of Texas Medical Branch (UTMB) to obtain an authorization from you for the use and disclosure of your health information. By signing this consent form, you are authorizing the use and disclosure of your health information related to the research study. Except when required by law, you will not be identified by name, social security number, address, telephone number, or any other direct personal identifier in study records disclosed outside of the UTMB. For records disclosed outside of UTMB, you will be assigned a unique code number. The key to the code will be kept in a locked file in Ms. Jade Kay's (Investigator) office.

As part of the study, Ms. Kay's (Investigator) will report the results of the responses on the questionnaires to UTMB.

If you change your mind later, you need to contact the researcher listed on this consent form by telephone. You need to say that you have changed your mind about participating in the study. You may also need to leave the research study if we cannot collect any more information needed for the study. We may still use the information we have already collected. We need to know what happens to everyone who starts a research study, not just those people who stay in it. The results of this study may be published in scientific journals without identifying you by name.

ADDITIONAL INFORMATION

If you have any complaints, concerns, input or questions regarding your rights as a subject participating in this research study or you would like more information, you may contact the Institutional Review Board Office, at (409) 266-9475.

The purpose of this research study, procedures to be followed, risks and benefits have been explained to you. You have been allowed to ask questions and your questions have been answered to your satisfaction. You have been told who to contact if you have additional questions.
You have read and understand this consent form and voluntarily agree to participate as a subject in this study. You are free to withdraw your consent. You may withdraw your consent by notifying Jade Kay at 714-3108588.   You will be given a copy of the consent form you have signed.

Informed consent is required of all persons in this project.

_____   _____
Signature of Subject   Date

_____   _____
Date   Signature of Person Obtaining Consent

Appendix H: Sleep Diary

DAY	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
SLEEP DIARY **Sleep Technique Group**							
Please record your experience during the DAY by choosing YES or NO and by writing your answer to the questions below.							
1. Did you nap? a. For how long?	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____ _____	Yes No _____	Yes No _____
2. Did you have any caffeine* after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
3. Did you drink alcohol after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
4. Did you use nicotine after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
5. Did you exercise?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
6. Did you eat a heavy meal or snack after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
7. **Did you take any sleeping medication?** **a. At what time?**	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____
Were you sleepy during the day?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
NIGHT							
1. How long were you in bed before you fell asleep?							

2. How many times did you wake up during the night?							
3. How many total hours did you sleep?							
4. When I woke up, I felt: **A.** Refreshed **B.** Somewhat refreshed **C.** Fatigued	A B C	A B C	A B C	A B C	A B C	A B C	A B C
5. Rate the quality of your sleep: scale of 1 to 5 with 1=poor and 5=excellent	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6. Do you feel you got enough sleep?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
NOTES: Write any factors that may affect your sleep including stress, noise, lights, pets, allergies, temperature, discomfort or pain, etc.							
Did you use techniques you learned to help with sleep?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No

On an average, how many times did you use sleep techniques this week?	

Caffeine = coffee, tea, caffeinated soda, chocolate, energy drinks, certain medications.

ID #_____   WEEK # _____

SLEEP DIARY **Mantram Group**							
Please record your experience during the DAY by choosing YES or NO and by writing your answer to the questions below.							
DAY	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1. Did you nap? a. For how long?	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____
2. Did you have any caffeine* after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
3. Did you drink alcohol after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
4. Did you use nicotine after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
5. Did you exercise?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
6. Did you eat a heavy meal or snack after 6pm?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
7. **Did you take any sleeping medication?** **a. At what time?**	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____	Yes No _____
Were you sleepy during the day?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No

NIGHT							
1. How long were you in bed before you fell asleep?							
2. How many times did you wake up during the night?							
3. How many total hours did you sleep?							
4. When I woke up, I felt: **A.** Refreshed **B.** Somewhat refreshed **C.** Fatigued	**A** **B** **C**	**A** **B** **C**	**A** **B** **C**	**A** **B** **C**	**A** **B** **C**	**A** **B** **C**	**A** **B** **C**
5. Rate the quality of your sleep: scale of 1 to 5 with 1=poor and 5=excellent	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**	**1** **2** **3** **4** **5**
6. Do you feel you got enough sleep?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
NOTES: Write any factors that may affect your sleep including stress, noise, lights,							

pets, allergies, temperature, discomfort or pain, etc.						
How many times did you practice Mantram Repetition today?	_____	_____	_____	_____	_____	_____	_____

Caffeine = coffee, tea, caffeinated soda, chocolate, energy drinks, certain medications.

Appendix I: Mantram Repetition Training

MANTRAM REPETITION

Welcome

Recommendations

To get the most from this program, complete all 5 sessions which include 4 self-modules.
Each session should be completed in sequence before moving on to the next session.
This is all about "training attention" . . .
Practice-to-Habit Strategies

This is an "experiential" training program.
Set aside personal doubts & skepticism temporarily!
Do readings, exercises, homework.
Practice, practice, practice!
Next Sessions

Session 2:
"Mantram Repetition and Relaxation Response"

Session 3:

Integrating Mantram Repetition into Life (Discussion with participants)

Sessions 4

"Slowing Down with Mantram Repetition"

"One-Pointed Attention with Mantram Repetition"

Session 5:

"Putting It All Together"

Objectives: Session 1

1. Discuss sleep, its importance, and factors that affects sleep.
2. Define the distinctions between "mantram" and mantra."
3. Outline common myths about this program.
4. Describe the origins and development of a mantram intervention for stress reduction.
5. Identify ways to choose and use a mantram for training attention.
6. Answer some frequently asked questions (FAQ's).

Being in a hurry!
Multi-tasking!

Time Pressure = Hurry Sickness
Creates a sense of "being threatened"
Triggers the stress response
Creates constant, low grade stress to daily life
Information overload
Constant interruptions
Inability to finish one task at a time

What is a Mantram?

Mantram =
Sanskrit root word "mantra"
    manas = "mind"
    trai = "to set free from"
       "to set free from the mind"
"a thought that liberates and protects"

(Radha, 1996)

a *sacred or holy* word or phrase
    We use "mantram" instead of "mantra" to distinguish this program from the common, secularized usage of the word "mantra" to repeat anything.

Common Myths About Program
Completely "religious" in nature, dogmatic
Eastern background, "strange" or "foreign"
Form of chanting out loud in groups
A cult, involves "brain washing"- dangerous
Anti-Christian, pagan
Teaches "mysticism"
Same as Transcendental Meditation (T M)™
Chanting non-sensible syllables
Chanting and dancing (Hare Krishnas)
Only for hippies

Problem?
HIV patients who were taught sitting meditation and Mantram repetition,

few maintained sitting meditation despite it helping   them . . .
   BUT, nearly **all** stated:

   "I still use my mantram"…

Training Attention
"Rapid" Relaxation Response

1. **Mantram Repetition**
2. **Slowing Down**
3. **One-Pointed Attention**

Ancient Universal Practice
_

Mantram Examples
Om Mani Padme Hum
O Wakan Tanka
Shalom or Om Shanti
So Hum

Why not *any*
word or phrase?
"We are what we think."
History & tradition
Research evidence

Why not? (Give it a try—test it for yourself).
How it is usually taught . . .
8 sessions, 1 per week
60 – 90 minutes per session
        (depending on size of class)
Monthly "refreshers"
2 facilitators who:
   •   *practice themselves**
   •   have clinical experience
   •   teaching/group experience
  *key requirement

Mantram Curriculum
1 - What is a mantram
2 - How to choose and use a mantram
        Tracking mantram practice
3 - Mantram repetition and the stress response
4 - Slowing down
5 - One-pointed attention
6 - Making healthy choices
7 - Making mantram a part of your life
8 - Putting it all together

Our Curriculum
1 – What is a mantram?
    How to choose and use a mantram

110

2 – Mantram repetition and the stress response
3 – Integrating Mantram Repetition into Life.
4 – Slowing down
     One-pointed attention
5 --Putting it all together.

How to Choose a Mantram

Choose a traditional mantram.
Sometimes best to choose what is unfamiliar—fewer associations.
Don't make up your own. Choose words derived from ancient wisdom.
Take your time, then don't change it.
Let a mantram choose you.
If you have difficulty, try "Rama" or "One" to begin.
You need not identify as religious or spiritual.
You need not understand the meaning to have an effect.

How to Use a Mantram

1. **Choose a mantram word or phrase.**
2. **Repeat it silently.**
3. **Passively ignore other thoughts.**

When to practice. . .

1. Practice repeating as much as possible.

Phases of Practice

1. **Mind-Body Conditioning**
2. **Experiential Awareness**
3. **Habitual**

Example of Training Attention

"Rama Rama Rama"

What makes it portable?

HOMEWORK for Session 2
Read chapter 1, 2, and 3 in manual
Read *Strength in the Storm*
          pages 7-34, and 82-134
Select a mantram from list (p. 10 in manual)
List of things you want to improve (p. 11)
List of annoying things (p17)
List of stressful events that keep you awake.
Practice using your mantram
                              Thank you!

Welcome to
Practice-to-Habit Strategies
This is an "experiential" training program.
Set aside personal doubts & skepticism temporarily!

Do readings, exercises, and homework.
Practice, practice, practice!

Objectives: Session 2

Describe the relationships among the stress response, mantram repetition and the relaxation response.

Describe ways to use a mantram for training attention and emotional self-regulation.

Describe when to use a mantram and when NOT to use a mantram.

Mantram and sleep.

The Problem and Power
of the Mind

- **Too much speed and too little direction.**
- **Our thoughts do not follow the fixed, logical patterns we'd like them to.**

Anxiety and Depression

Insomnia is both a symptom and a cause of depression and anxiety. Since the brain uses the same neurotransmitters for sleep and mood, it's often hard to know which starts first. Stressful situations or events, such as money or marital problems, often kick off insomnia that can become a long-term problem.

Poor Sleep

Many cases are caused by underlying but very treatable causes. While emotional issues such as stress, anxiety, and depression can lead to poor sleep, other common causes in adults over 50 are a poor sleep environment and poor sleep and daytime habits.

Try to identify things that may affect your sleep or things that keep you awake so you can tailor treatment accordingly.

Questions to ask yourself:

Are you under a lot of stress?

Are you depressed? Do you feel emotionally flat or hopeless?

Do you struggle with chronic feelings of anxiety or worry?

Have you recently gone through a traumatic experience?

Are you taking any medications that might be affecting your sleep?

Do you have any health problems that may be interfering with sleep? Pain?

Mind is like a 2-year old!

Did you choose a Mantram?

Choose a traditional mantram (see p. 10 in manual).

Sometimes best to choose what is unfamiliar—fewer associations.

Don't make up your own. Words derived from ancient wisdom.

Take your time, then don't change it.

Let a mantram choose you.

If you have difficulty, try "Rama" or "One" to begin.

You need not identify as religious or spiritual.

You need not understand the meaning to have an effect.

I want to make sure I pick the *"right"* one.
I can't make up my mind. I like many of them.
I need to know the "meaning" of the words.
I don't like *ANY* of the words on the list.
I can't remember to repeat it.
I don't know how to pronounce it.

I feel silly repeating these words.
I notice my mind is *very scattered*.
I have a lot of doubts about this whole thing.
Isn't this like brainwashing?
When will I notice any difference?

Did you use a Mantram?

The Stress Response

The Stress Response

Defined as an **acute physiologic reaction**
that prepares the organism for fighting or
fleeing (Friedman et al., 1996).

Physiology reacts faster than our mental capacity, but our mental self-talk can help calm us down.

Physiological Chain Reaction…

1. Hypothalamus directs the adrenal medulla to release catecholamines and trigger the autonomic nervous system.
2. Catecholamine release: alpha and beta adrenergic receptor activation.
3. Pituitary gland stimulation results in release of cortisol and aldosterone (stress hormones).

Autonomic Nervous System

Parasympathetic "rest and digest" functions to

conserve energy and restore the resources of the

body: Prepares us for calmness and inactivity.

Sympathetic "fight or flight" mobilizes the

body during emergency and stress situations: Prepares us for action and survival.

Stress vs. Relaxation Response

Fight or Flight
↑Heart Rate

↑Breathing
↑Blood Pressure
↑Metabolism
↑Hyperactivity of the
 brain
Relaxation
↓Heart Rate
↓Breathing
↓Blood Pressure
↓Metabolism
↓Slower Brain waves

Modern Stress

- Fight-or-Flight is necessary for survival when confronted by danger!
- HOWEVER, this response designed to help us, can actually harm us (70% of illness is related to stress)!
- Modern day stressors, that are <u>not</u> possible to <u>fight or flee</u> from, can cause excessive and chronic activation of the stress response!

STRESS

Stress impacts sleep.

Sleep influences stress

Sleep and Stress

Try not to stress over the fact that you can't get back to sleep, because that very stress encourages your body to stay awake.

Make relaxation your goal, not sleep.

Do a quiet, non-stimulating activity. Choose a relaxing bedtime ritual.

Postpone worrying.

Do your mantram.

Practice Mantram in
Non-Stressful Moments

Repeat Mantram when relaxed or experiencing something pleasant.

Mantram	Beach
Mantram	Hot shower
Mantram	Sunset

This is like building a muscle.
More use means more strength.

Then, Use Mantram
When Stressed

During stressful times, (pain, worry, etc) repeat mantram to
re-focus attention and "pause" to gain perspective.

The muscle is stronger and can lift a heavier weight.

Practice, Practice, Practice!
Use the mantram
as much as possible

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Samples of When to Use a Mantram
- Every night before falling asleep
- While walking or jogging
- Waiting (for anything)
- During a phone call while "on hold"
- While relaxing on the sofa
- ....

When NOT to Use Mantram
- Problem solving
- When making lists or planning
- Using dangerous machinery
- Cutting with knives in the kitchen
- When you need to concentrate FULLY on the task at hand
- Driving in heavy traffic *

   *(may be person specific)

Tracking Mantram Practice
Why track?
- Reminds you to practice
- Gives you a goal each day
- Helps you see progress
- Writing it down increases accountability

Tracking Mantram Practice
Other Ways to Prompt Practice and Help Tracking
- Set a cell phone alarm.
- Screen saver reminder.
- While booting up computer.
- Sticky notes in easy places to see:
  - alarm clock
  - bathroom mirror
  - kitchen appliances

List of Things You
Want to Improve (p. 10)
List your personal goals or things you want to improve.
Use this to chart your progress.

List of Annoying Things (p. 17)
Traffic
People who are late
Waiting on "hold"
Rude people
Cell phones in public

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Others?

Welcome to

Practice-to-Habit Strategies
This is an "experiential" training program.
Hopefully, by now, you are experiencing the benefits of this program.
Do readings, exercises, and homework.
Practice, practice, practice!
Recommendations
By now, you ought to have some comfort
with practicing mantram repetition. These next
sessions will focus on ways to slow
down, develop one-pointed attention, and
integrate all 3 tools into your life.
This is still all about "training attention"
Today's Objectives

1.   Identify the symptoms of **"hurry sickness"** and how it
relates to health and wellbeing.
2.   Identify ways to use a mantram for slowing down and
staying in the present moment.
3.   Describe at least 2 benefits of "slowing down" versus
"automatic pilot" for stress reduction or symptom
management.

HOMEWORK for this Session
- Read chapter 4 in manual (slowing down)
- Read *Strength in the Storm* pp. 34-58
- Complete "slowing down" exercises in
manual—pp. 36,37,38 BEFORE
- Practice using your mantram when you
don't need it….and during annoying things
- Try writing the mantram
- Go for a "mantram walk"

**Do you practice
slowing down?**
Have too much to do!
I will get behind!
I simply forget!
Everyone around me is in a hurry.
Too much to do!
Too little time!

Vanishing Pause

**Hurry Sickness
& Time Pressure
Slowing Down Awareness**

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In what areas are you most "speeded-up?"

Driving   *Eating*

Slowing Down Awareness
In what areas are you most "speeded-up?"

Communication Style

Slowing Down Awareness
In what areas are you most "speeded-up?"
Leisure Activity/ Pace of Life

Slowing Down Awareness
In what areas are you most "speeded-up?"
Feelings within . . .

burnout/compassion fatigue
Are You a Speedaholic?
0 – 15: Bravo—moderate pace
16 – 23: Borderline speedaholic
24 – 32: Likely compromising your health
Tips for Slowing Down

1. Recognize the cost of hurry sickness – awareness.
2. Start the day earlier by going to bed earlier.
3. Drive a little slower; don't run yellow lights.
4. Use mantram to help stay in present moment.
5. Notice when you start speeding up.
6. Reflect and identify priorities,   the MOST important things (everyday).

Mantram as "Pause Button"
Priority Exercise
Time for reflection, evaluation . . .
Are you living life the way you want?

<div align="center">Are you doing what brings value and meaning?</div>

<div align="center">**"I don't have time"**</div>

6.5 years watching TV

6 years eating

5 years waiting in line

4 years cleaning house

3 years in meetings

1 year looking for lost keys

8 months opening junk mail

6 months sitting at red lights

"The Systems Thinker" Pegasus Communications August 2005, p. 5

<div align="center">## What We Hate Most About Traffic</div>

Doing Work Near Bed Time

Sleep Strategies

Humans have an internal clock that mirrors nature's cycles of day and night.

Artificial light after dark can send wake-up messages to the brain, suppressing the production of the sleep-inducing hormone melatonin and making it harder to fall asleep and stay asleep.

Survey your room for any other sources of artificial light at night.

<div align="center">**Can you practice**</div>

<div align="center">**slowing down?**</div>

<div align="center">*If not, why not?*</div>

<div align="center">**Practice Practice Practice**</div>

<div align="center">**Use the mantram & *slow down***</div>

<div align="center">**as much as possible.**</div>

<div align="center">**Use mantram when you don't need it,**</div>

<div align="center">so it is there for you</div>

<div align="center">when you **do need it**.</div>

<div align="center">**Benefits of Slowing Down**</div>

Potential to make fewer mistakes

Less toll on physiology and lowered stress response

Awareness of surroundings

Improved relationships

Opportunity to develop patience, tolerance

Greater quality of life –being "present"

<div align="center">**Experiments for next time**</div>

Identify ways you are "speeded up or stimulated in the evening

Practice "slowing down"

Identify life priorities/what is important?

- Use mantram as a "pause button" to slow & focus
- Write the mantram as a slowing down exercise before bedtime.
- Go for a "mantram walk"

- Experiments: Choose one thing & practice intentionally
slowing down – next 2 weeks:
- stop running yellow lights
- put fork down between bites at mealtime
- write the mantram every day

Questions?

Welcome to

Practice-to-Habit Strategies

This is an "experiential" training program.

Hopefully, you are experiencing the benefits mantram & slowing down.

Do readings, exercises, and homework.

Practice, practice, practice!

Slowing Down?

Have you identified ways you are speeded up?

Have you used your mantram to
help slow down?

Today's Objectives

1. **Identify ways to use a mantram to improve concentration
and do one thing at a time.**
2. **Demonstrate how one-pointed attention and slowing down
complement each other for making healthy choices.**
3. **Describe at least two benefits of one-pointed attention versus multitasking for
stress reduction or symptom management.**

Multi-tasking

Our culture values doing more in less time.

Are **YOU** a proud multi-tasker?

MYTH: "Multi-tasking saves time!"

FACTS: Multi-tasking

According to research on multi-tasking:
- Actually *takes longer*
- "Switch time" = time for brain to go from
one task to another
- Uses *more energy*
- Contributes to *more mistakes*
- Multi-taskers are just "mediocre"

One-Pointed Attention

One-pointed attention is the **opposite** of
multi-tasking. It is "mono-tasking!"
Practicing one thing at a time conserves
energy & enhances quality of life.

"Time flies when…
we are having fun."

Being one-pointed is being **fully absorbed** in the moment, something we do easily with activities we enjoy!

<div align="center">

2 Definitions of "Boredom"

. . . Wishing you were some place else.

. . . Having divided attention.

2 Types of One-Pointedness

INTERNALLY

Silently repeating the mantram

EXTERNALLY

Full attention on any chosen task at hand

Both use same focusing skill . . .

Practice, practice, practice

Why Practice Works

Bring full attention to mantram repetition

Transfer full attention to any task at hand

When mind wanders, bring attention

back to task, as if redirecting attention to mantram

Example of Training Attention

</div>

"Focus attention on one TASK"

<div align="center">

Similar Refocusing in Dealing with Obsessions

When ruminating or worrying,

give those thoughts **less** attention

and give task at hand or mantram

MORE attention.

One-Pointed Attention

Experiments

</div>

p. 42

Relationships

Mealtime

Procrastination

Difficult Projects

Driving or riding

In the workplace

<div align="center">

Assignment

</div>

1. Bring full attention <u>when listening</u> to others

<div align="center">

Goal of Assignment

</div>

Not necessarily to finish your project!

Experience what it feels like to focus on

   only ONE thing at a time, with undivided

<div align="center">

120

</div>

attention
Share experience in next session.

Next Session Live Meeting
6th of 6-session series:
Mantram and
Putting it All Together

HOMEWORK for Session 5
- Read chapter 6 in manual
- Read *Strength in the Storm* pp. 135-167
- Do your "one-pointed attention" project
- Use "one-pointed attention" with all communication
(patients, colleagues, family, friends, everyone)
- Practice "one-pointedness" at work
- Notice how slowing down and one-pointedness complement each other
- Keep using mantram as much as possible

Practice Practice Practice
Use the mantram
as much as possible
when you don't need it ~
so it is there for you
when you ***do need it*.**
Last Session

Session 6: Interactive LIVE MEETING
Last Session is LIVE MEETING
"Putting It All Together"
You will receive information on how to register.
Be prepared to share your experiences.
Any question, please email: jill.bormann@va.gov
Questions?
Welcome to

Practice-to-Habit Strategies
This is an "experiential" training program.
Hopefully, you are experiencing the benefits mantram & slowing down.
Do readings, exercises, and homework.
Practice, practice, practice!
Slowing Down?
Have you identified ways you to slow down ?
Have you used your Mantram at bedtime?
Today's Objectives
By the end of this session, you will be able to:
1. To understand good sleep quality
2. Explain how mantram repetition, one-pointed attention, and slowing down
complement each other.

3. To identify how our likes and dislikes can drain energy or conserve energy.

4. To understand how mantram repetition can neutralize our negative reactions to circumstances we dislike, and how this conserves valuable energy resources.

Myths and Facts about Sleep

Myth 1: Getting just one hour less sleep per night won't affect your daytime functioning. You may not be noticeably sleepy during the day, but losing even one hour of sleep can affect your ability to think properly and respond quickly. It also compromises your cardiovascular health, energy balance, and ability to fight infections.

Myth 2: Your body adjusts quickly to different sleep schedules. Most people can reset their biological clock, but only by appropriately timed cues—and even then, by one–two hours per day at best. Consequently, it can take more than a week to adjust after traveling across several time zones or switching to the night shift.

cont

Myth 3: Extra sleep at night can cure you of problems with excessive daytime fatigue. The quantity of sleep you get is important, sure, but it's the *quality* of your sleep that you really have to pay attention to. Some people sleep eight or nine hours a night but don't feel well rested when they wake up because the quality of their sleep is poor.

Myth 4: You can make up for lost sleep during the week by sleeping more on the weekends. Although this sleeping pattern will help relieve part of a sleep debt, it will not completely make up for the lack of sleep. Furthermore, sleeping later on the weekends can affect your sleep-wake cycle so that it is much harder to go to sleep at the right time on Sunday nights and get up early on Monday mornings.

Adapted from: *Your Guide to Healthy Sleep (PDF) The National Institutes of Health*

Common causes of insomnia and sleep problems in older adults

The most common causes of insomnia and sleep problems in older adults include:

Poor sleep habits and sleep environment. These include irregular sleep hours, consumption of alcohol before bedtime, and falling asleep with the TV on.

Pain or medical illness. Pain can keep you from sleeping well. In addition, many health conditions such as a frequent need to urinate, arthritis, asthma, diabetes, osteoporosis, nighttime heartburn, menopause, and Alzheimer's can interfere with sleep.

Medications. Older adults tend to take more medications than younger people and the combinations of drugs, as well as their side-effects, can impair sleep.

Lack of exercise. If you are too sedentary, you may never feel sleepy or feel sleepy all of the time. Regular aerobic exercise during the day, at least three hours before bedtime, can promote good sleep.

Psychological stress or psychological disorders. Significant life changes like the death of a loved one or moving from a family home can cause stress. Anxiety or sadness can also keep you awake, which can, in turn, cause more anxiety or depression.

Sleep disorders. Restless Legs Syndrome (RLS) and sleep-disordered breathing—such as snoring and sleep apnea—occur more frequently in older adults.

Learned response. People with a legitimate cause for having trouble sleeping—after suffering a loss, for example—may lie in bed and try to force themselves to sleep. Eventually their bodies learn not to sleep. Even after your original reason for sleep disruption has passed, the learned response can remain.

How much sleep do I need?

Take a sleep vacation

During a two-week period, when you have a flexible schedule or perhaps are on vacation, pick a consistent bedtime and do not use an alarm clock to wake up to allow your body to wake up on its own.

Make Sleep a Priority

The next step is to make sure that you make sleep a priority and find ways to protect your sleep time.

Good Night's Sleep

You'll feel energetic and alert all day long, from the moment you wake up until your regular bedtime.

Think six hours of sleep is enough?

Think again. Researchers at the University of California, San Francisco discovered that some people have a gene that enables them to do well on six hours of sleep a night. This gene, however, is very rare, appearing in less than 3% of the population. For the other 97% of us, six hours doesn't come close to cutting it.

Sleep Technique Checklist

Getting back to sleep at night

Getting back to sleep at night

It's normal to wake briefly during the night but if you're having trouble falling back asleep, the following tips may help:

Don't stress. Try not to stress over the fact that you can't get back to sleep, because that very stress encourages your body to stay awake. Focus on the feelings and sensations in your body instead.

Use mantram…

Make relaxation your goal, not sleep. Try mantram, deep breathing, meditation, which can be done without getting out of bed. Remind yourself that although they're not a replacement for sleep, rest and relaxation can still help rejuvenate your body.

Do a quiet, non-stimulating activity. If you've been awake for more than 15 minutes, try getting out of bed and doing a non-stimulating activity, such as reading a book. Keep the lights dim so as not to cue your body clock that it's time to wake up, and avoid TV and computer screens.

Postpone worrying. If you wake during the night feeling anxious about something, use your mantram. You can also make a brief note of it on paper and postpone worrying about it until the next day when you are fresh and it will be easier to resolve.

If You're Still Having Problems with Sleep

You should consider consulting a sleep specialist who can help you set up a better sleep environment, provide support for making behavioral changes that may be interfering with sleep

Speak with your health care provider to determine possibility of sleep disorder.

Reflection

We can't change our behavior, attitudes, and habits unless we are aware of what needs changing.

So by taking a moment for "detached" reflection, we can evaluate what we liked and didn't like about our choices each day.

Ask yourself how you did this week….

Mantram repetition requires one-pointedness and helps to slow down our thoughts, so that we may think about our choices and their consequences.

It is important to realize that there are "choice points" from moment to moment. We can choose what is good for us—which might mean delayed gratification or we can choose what is not good for us—which often comes from habits or automatic behaviors.

Each day, ask the following questions:

a) What did I do well?

b) What areas can I improve upon?

c) Could I have used my mantram and reacted differently?

d) Am I able to wind down at bed time?

CONTROL

We don't have CONTROL over many things in life, yet we spend a lot of energy trying to avoid our "dislikes" and move closer toward our "likes."

The goal of this program is teach you some tools like mantram repetition, that can help "neutralize" reactions, or dislikes about the things we don't have control over.

By doing this, we conserve our energy for the things we LIKE! We can relax and wind-down in preparation for sleep.

We can control how we react…

We can improve our day time habits.

Remember:

The only thing we really have control over is our REACTION.

We can't control the events and circumstances outside of ourselves, but WE CAN ALWAYS CONTROL OUR REACTIONS TO THEM.

Consider learning to "let go" of your frustration and accept the situation, by using your mantram.

Keep It Going
- One-pointed-attention, and slowing down are 3 out of 8 tools taught by Eknath Easwaran, a meditation teacher at the Blue Mountain Center of Meditation. If people want to deepen their spiritual practice, we recommend they visit the website, sign up for the free newsletter, and find other books by Easwaran.

www.easwaran.org

Practice Practice Practice
Use the mantram
as much as possible
when you don't need it ~
so it is there for you
when you **do need it**.
Questions?

Appendix J: Sleep Technique

Sleep Technique

WEEK ONE

What happens when I don't sleep well?
- Impaired mood, memory, and concentration.
- Dampened immune system
- Increased risk of accidents
- Stressed relationships.
- Sleeping Well
- When we sleep well:
    - Our brain works properly.
    - Our body heals.
    - We wake up feeling refreshed and alert for our daily activities.
    - It is not just quantity that is important, but quality as well.
- How much sleep do I need?
- A general guideline for adults is 7-8 hours of sleep a night.
- Older adults need a similar amount, but the sleep may be lighter and may include a brief nap during the day.

HOW CAN WE IMPROVE SLEEP?
- Sleep "Hygiene"?

Sleep hygiene refers to the habits, environmental factors, and practices that may influence the length and quality of one's sleep. These include bedtime, nighttime rituals, and disruptions to one's sleep.
Coined by Peter Hauri.
- General Areas to Sleep Hygiene
- Our circadian rhythm, or 24-hour cycle
- Aging
- Psychological stressors -- those factors can cause difficulty falling asleep and disturb the quality of your sleep
- Common social or recreational drugs like nicotine, caffeine, and alcohol
- Circadian Rhythm
Greatly influences when we sleep and the quantity and the quality of our sleep.

The more stable and consistent our circadian rhythm is, the better our sleep.

AGING
    After the age of 40 our sleep patterns change, and we have many more nocturnal awakenings than in our younger years. These awakenings not only directly affect the quality of our sleep, but they also interact with any other condition that may cause arousals or awakenings, like the withdrawal syndrome that occurs after drinking alcohol close to bedtime.
- Psychological Stressors

- Psychological stressors like deadlines, exams, marital conflict, and job crises may prevent us from falling asleep or wake us from sleep throughout the night. It takes time to "turn off" all the noise from the day.
- How to deal with stressors
- Develop some kind of pre-sleep ritual to break the connection between all the stress and bedtime.
- Combining this with a period of relaxation, perhaps by reading something light, meditating, or taking a hot bath can also help you get better sleep. And don't look at that clock!

BEDTIME
Stick to the same bedtime and wake up time, even on the weekends and holidays.

- NAPPING

Bedtime Ritual
- Practice a relaxing bedtime ritual.
- Sleep Strategies
- Wind down. Your body needs time to shift into sleep mode, so spend the last hour before bed doing a calming activity as part of your bedtime ritual.
- If you can't sleep, go into another room and do something relaxing until you feel tired.
- Exercise daily.
- Design your sleep environment to establish the conditions you need for sleep.

FOOD

- Americans between the ages of 18-64 drink an average of three 12 ounce caffeinated beverages on a weekday, according to the National Sleep Foundation's 2011 Sleep in America poll.
- What you eat and drink before bed can affect your sleep.
  Ex. sleep promoting food-tryptophan

Avoid:
- Alcohol
- Caffeine
- Fatty or fried food
- Traditional sleep-promoting foods:
- Cow's milk
- Traditional sleep-promoting foods:
- Herbal products and certain fruits
- Traditional sleep-promoting foods:
- B vitamins and magnesium

THE END

References

Adam, K. (1979). Nutrition and sleep. *Nutrition Bulletin*, *5*(3), 129-136.

Bloom, H. G., Ahmed, I., Alessi, C. A., Ancoli-Israel, S., Buysse, D. J., Kryger, M. H., ... & Zee, P. C. (2009). Evidence-based recommendations for the assessment and management of sleep disorders in older persons. *Journal of the American Geriatrics Society*, *57*(5), 761-789.

Oswald, I., Tones, H. S., & Mannerheim, J. E. (1972). Nutrition and Sleep. *British Medical Journal*, 419.

Prinz, P. N., Vitiello, M. V., Raskind, M. A., & Thorpy, M. J. (1990). Sleep disorders and aging. *New England Journal of Medicine*, *323*(8), 520-526.

Food and Sleep (2009, December) Retrieved from https://sleepfoundation.org/sleep-topics/food-and-sleep/page/0/1National Sleep Foundation

WEEK TWO

TOUCH AND SMELL
- Sleep Technique
- Effect of smell and touch on sleep.
- 71% of Americans said they get a more comfortable night's sleep on sheets with a fresh scent, according to the National Sleep Foundation's 2011 Bedroom Poll.
- Don't leave your nose out of the picture.
- Certain smells may have an effect on your sleep
- Surrounding yourself with the scent you like could help you drift off and, in fact, one study found that smells (both good and bad) influence our dreams.

- Scents

Allergies
You can decrease allergen exposure by:
- Washing your sheets in hot water once a week and your blankets regularly.
- Keeping your windows closed
- Using air purifier
- Vacuuming regularly
- Cleaning the surface of your mattress with an upholstery cleaner or sprinkle baking soda to draw out moisture and vacuum it the next day.

Touch
According to the National Sleep Foundation's 2012 Bedroom Poll, 93% of Americans rated a comfortable mattress, 91% rated comfortable pillows and 86% rated a comfortable feel of sheets and bedding as important to good sleep.
- Body and Room Temperature

Many sleep experts say that a cool room, somewhere around 65 degrees, makes for the best sleep, and research supports this information.
- COOL THE ROOM IN THE SUMMER
- Mattress, Pillows, and Sheets

The feel of your mattress, pillows, sheets, and pajamas affects the quality of your sleep

THE END
Questions?

References:

Barrett, J., Lack, L., & Morris, M. (1993). The sleep-evoked decrease of body temperature. *Sleep*, *16*(2), 93-99.

Field, T., Field, T., Cullen, C., Largie, S., Diego, M., Schanberg, S., & Kuhn, C. (2008). Lavender bath oil reduces stress and crying and enhances sleep in very young infants. *Early human development*, *84*(6), 399-401.

Goel, N., Kim, H., & Lao, R. P. (2005). An olfactory stimulus modifies nighttime sleep in young men and women. *Chronobiology international*, *22*(5), 889-904.

Lack, L. C., Gradisar, M., Van Someren, E. J., Wright, H. R., & Lushington, K. (2008). The relationship between insomnia and body temperatures. *Sleep medicine reviews*, *12*(4), 307-317.

Léger, D., Annesi-Maesano, I., Carat, F., Rugina, M., Chanal, I., Pribil, C., ... & Bousquet, J. (2006). Allergic rhinitis and its consequences on quality of sleep: an unexplored area. *Archives of internal medicine*, *166*(16), 1744-1748.

Pien, G. W., Sammel, M. D., Freeman, E. W., Lin, H., & DeBlasis, T. L. (2008). Predictors of sleep quality in women in the menopausal transition.*Sleep*, *31*(7), 991.

Pien, G. W., Sammel, M. D., Freeman, E. W., Lin, H., & DeBlasis, T. L. (2008). Predictors of sleep quality in women in the menopausal transition.*Sleep*, *31*(7), 991.

WEEK THREE

SOUND
- 74% of Americans say a quiet bedroom is important to a good night's sleep.
- Noise can interrupt your slumber causing you to wake, move, shift between stages of sleep, or experience a change in heart rate and blood pressure—so briefly that you don't remember the next morning.
- Interestingly, the effect of sound on sleep, whether it bothers your sleep, depends in part on that sound's personal meaning: researchers have seen that people are more likely to wake when a sound is relevant or emotionally charged.

Noises
- Noises at levels as low as 40 decibels or as high as 70 decibels can keep us awake.
- Managing Noise Pollution

- White Noise
- White noise can be created by a sound conditioner, a fan or an air purifier, anything that is a consistent and soothing backdrop throughout the night.

Celestial sound:

https://www.youtube.com/watch?v=vcJ-o_fh1B4

Rain

https://www.youtube.com/watch?v=lasWefVUCsI

Nature and Water

https://www.youtube.com/watch?v=eKFTSSKCzWA

Water Fall

https://www.youtube.com/watch?v=fAns8GJzYeQ

Relaxing Music

https://www.youtube.com/watch?v=_R4-eL3IdhE

SIGHT
- Humans have an internal clock that mirrors nature's cycles of day and night.
- Artificial light after dark can send wake-up messages to the brain, suppressing the production of the sleep-inducing hormone melatonin and making it harder to fall asleep and stay asleep.
- Survey your room for any other sources of artificial light at night.
- Bedroom Lights and Work

THE BEDROOM
- Your bedroom as a haven for sleep.

THE END

References

Chellappa, S. L., Steiner, R., Blattner, P., Oelhafen, P., Götz, T., & Cajochen, C. (2011). Non-visual effects of light on melatonin, alertness and cognitive performance: can blue-enriched light keep us alert?. *PloS one*,*6*(1), e16429.

Dang-Vu, T. T., McKinney, S. M., Buxton, O. M., Solet, J. M., & Ellenbogen, J. M. (2010). Spontaneous brain rhythms predict sleep stability in the face of noise. *Current Biology*, *20*(15), R626-R627.

Figueiro, M. G., Bierman, A., Plitnick, B., & Rea, M. S. (2009). Preliminary evidence that both blue and red light can induce alertness at night. *BMC neuroscience*, *10*(1), 1.

Hume, K. I. (2011). Noise pollution: a ubiquitous unrecognized disruptor of sleep?. *Sleep*, *34*(1), 7.

Leproult, R., Colecchia, E. F., L'Hermite-Balériaux, M., & Van Cauter, E. (2001). Transition from Dim to Bright Light in the Morning Induces an Immediate Elevation of Cortisol Levels 1. *The Journal of Clinical Endocrinology & Metabolism*, *86*(1), 151-157.

Gooley, J. J., Chamberlain, K., Smith, K. A., Khalsa, S. B. S., Rajaratnam, S. M., Van Reen, E., ... & Lockley, S. W. (2010). Exposure to room light before bedtime suppresses melatonin onset and shortens melatonin duration in humans. *The Journal of Clinical Endocrinology & Metabolism*, *96*(3), E463-E472.

Portas, C. M., Krakow, K., Allen, P., Josephs, O., Armony, J. L., & Frith, C. D. (2000). Auditory processing across the sleep-wake cycle: simultaneous EEG and fMRI monitoring in humans. *Neuron*, *28*(3), 991-999.

Stanchina, M. L., Abu-Hijleh, M., Chaudhry, B. K., Carlisle, C. C., & Millman, R. P. (2005). The influence of white noise on sleep in subjects exposed to ICU noise. *Sleep medicine*, *6*(5), 423-428.

WEEK FOUR
EXERCISE
- Exercise releases chemicals in your body that promote more restful sleep.

TYPES OF EXERCISE
- Aerobic activities
- Strength exercises
- Stretching exercises
- Balance exercises

- Aerobic exercise helps older adults sleep better.
- Adding exercise to your life does not necessarily mean signing up for a gym membership. There are countless activities you can do to increase strength, improve aerobic capacity, burn calories, and prepare yourself for a good night's sleep at the end of the day. Always consult your doctor before embarking on any new fitness program.
  - Swim
  - Dance
  - Play with ball
  - Golf
  - Cycle
  - Run

(Source: National Sleep Foundation)

- Mobility Issues

You can exercise from one position-standing, sitting, or lying down.

- Other Tips…..

Exercise buddy
Distract yourself…

STRESS
- **Stress impacts sleep**.

- **Sleep influences stress**
- What can you do about it?

Stress management
- Practice yoga, listen to music, meditate, get a massage, or learn relaxation techniques. Stepping back from the problem helps clear your head.

- Don't stress. Try not to stress over the fact that you can't get back to sleep, because that very stress encourages your body to stay awake.
- Make relaxation your goal, not sleep.
- Do a quiet, non-stimulating activity.
- Postpone worrying.

THE END

References

King, A. C., Pruitt, L. A., Woo, S., Castro, C. M., Ahn, D. K., Vitiello, M. V., ... & Bliwise, D. L. (2008). Effects of moderate-intensity exercise on polysomnographic and subjective sleep quality in older adults with mild to moderate sleep complaints. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *63*(9), 997-1004.

King, A. C., Oman, R. F., Brassington, G. S., Bliwise, D. L., & Haskell, W. L. (1997). Moderate-intensity exercise and self-rated quality of sleep in older adults: a randomized controlled trial. *Jama*, *277*(1), 32-37.

Âkerstedt, T. (2006). Psychosocial stress and impaired sleep. *Scandinavian journal of work, environment & health*, 493-501.

Haynes, S. N., Adams, A., & Franzen, M. (1981). The effects of presleep stress on sleep-onset insomnia. *Journal of Abnormal Psychology*, *90*(6), 601.

Caldwell, K., Harrison, M., Adams, M., Quin, R. H., & Greeson, J. (2010). Developing mindfulness in college students through movement-based courses: effects on self-regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health*, *58*(5), 433-442.

Stress and Insomnia (2001) Retrieved from https://sleepfoundation.org/ask-the-expert/stress-and-insomnia/page/0/2

WEEK FIVE
- How much sleep do I need?

Take a sleep vacation

During a two-week period, when you have a flexible schedule or perhaps are on vacation, pick a consistent bedtime and do not use an alarm clock to wake up to allow your body to wake up on its own.

- **Make Sleep a Priority**

The next step is to make sure that you make sleep a priority and find ways to protect your sleep time.

- **If You're Having Problems with Sleep**
- You should consider consulting a sleep specialist who can help you set up a better sleep environment, provide support for making behavioral changes that may be interfering with sleep
- Speak with your health care provider to determine possibility of sleep disorder.
- For the women- MENOPAUSE
- Hot flashes are very common for women in menopause and can make sleep difficult as well.
- Menopause
- Wear light cotton pajamas or those designed to wick away moisture, and consider keeping an extra set near your bed.
- Have a cold facecloth and a glass of ice water on hand and follow tips for keeping your room cool.

Yoga and exercise
- Consult health care provider if no relief.
- **Improve daytime habits for better sleep**
- Be engaged.
- Improve your mood.
    - Sleep affect mood, but mood and mental states can also affect sleep.

REVIEW SLEEP HYGIENE
- Stick to the same bedtime and wake up time, even on the weekends.
- Practice a relaxing bedtime ritual.
- Wind down.
- If you can't sleep, go into another room and do something relaxing until you feel tired.
- Exercise
- Increase light exposure during the day.
- Evaluate room
- Limit caffeine late in the day
- Avoid alcohol before bedtime
- Satisfy your hunger prior to bed
- Avoid big meals or spicy foods just before bedtime
- Minimize liquid intake before sleep
- **Quit smoking

References:
Carlson, L. E., Speca, M., Patel, K. D., & Goodey, E. (2004). Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress and levels of cortisol, dehydroepiandrosterone sulfate (DHEAS) and melatonin in breast and prostate cancer outpatients. *Psychoneuroendocrinology*, 29(4), 448-474

Xu, M., Bélanger, L., Ivers, H., Guay, B., Zhang, J., & Morin, C. M. (2011). Comparison of subjective and objective sleep quality in menopausal and non-menopausal women with insomnia. *Sleep medicine*, *12*(1), 65-69.

Afonso, R. F., Hachul, H., Kozasa, E. H., de Souza Oliveira, D., Goto, V., Rodrigues, D., ... & Leite, J. R. (2012). Yoga decreases insomnia in postmenopausal women: a randomized clinical trial. *Menopause*, *19*(2), 186-193.

Llanas, A. C., Hachul, H., Bittencourt, L. R., & Tufik, S. (2008). Physical therapy reduces insomnia symptoms in postmenopausal women. *Maturitas*,*61*(3), 281-284.

Reid, K. J., Baron, K. G., Lu, B., Naylor, E., Wolfe, L., & Zee, P. C. (2010). Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. *Sleep Medicine,* 11(9), 934-940. doi: 10.1016/j.sleep.2010.04.014

Sleep Hygiene (2003) Retrieved from https://sleepfoundation.org/ask-the-expert/sleep-hygiene/page/0/1

Bibliography

Akerstedt, T. (2006). Psychosocial stress and impaired sleep. *Scandinavian Journal of Work, Environment & Health*, 32, (6), 493-501.

Åkerstedt, T., Kecklund, G., & Axelsson, J. (2007). Impaired sleep after bedtime stress and worries. *Biological Psychology*, 76(3), 170-173. doi: http://dx.doi.org/10.1016/j.biopsycho.2007.07.010

Åkerstedt, T., Fredlund, P., Gillberg, M., & Jansson, B. (2002). Work load and work hours in relation to disturbed sleep and fatigue in a large representative sample. *Journal of Psychosomatic Research*, 53(1), 585-588. doi: http://dx.doi.org/10.1016/S0022-3999(02)00447-6

Ancoli-Israel, S., & Roth, T. (1999). Characteristics of insomnia in the United States: results of the 1991 National Sleep Foundation Survey.I. *Sleep*, *22*, S347-53.

Ayas, N. T., White, D. P., Manson, J. E., Stampfer, M. J., Speizer, F. E., Malhotra, A., & Hu, F. B. (2003). A prospective study of sleep duration and coronary heart disease in women. *Archives of Internal Medicine,* 163(2), 205-209.

Balbo, M., Rachel, L., & Cauter, E. V. (2010). Impact of sleep and its disturbances on hypothalamo-pituitary-adrenal axis activity. *International Journal of Endocrinology*, 2010. doi: 10.1155/2010/759234

Barger, M. K., Weinrich, S., Bormann, J. E., Bouvier, M., & Hardin, S. B. (2015). Mantram repetition program decreases insomnia among homeless women: A pilot study. *Journal of Psychosocial Nursing and Mental Health Services*, *53*(6), 44-49.

Barrett, L. F., Mesquita, B., Ochsner, K. N., & Gross, J. J. (2007). The experience of
emotion. *Annual Review of Psychology*, *58*, 373.

Baskett, J. J., Broad, J. B., Wood, P. C., Duncan, J. R., Pledger, M. J., English, J., &
Arendt, J. (2003). Does melatonin improve sleep in older people? A randomised
crossover trial. *Age and Ageing*, *32*(2), 164-170.

Bastien, C. H., Vallieres, A., & Morin, C. M. (2004). Precipitating factors of
insomnia. *Behavioral Sleep Medicine*, *2*(1), 50-62.

Bixler, E. O., Vgontzas, A. N., Lin, H. M., Calhoun, S. L., Vela-Bueno, A., & Kales, A.
(2005). Excessive daytime sleepiness in a general population sample: The role of
sleep apnea, age, obesity, diabetes, and depression. *The Journal of Clinical
Endocrinology & Metabolism*, *90*(8), 4510-4515.

Björkelund, C., Bondyr-Carlsson, D., Lapidus, L., Lissner, L., Månsson, J., Skoog, I., &
Bengtsson, C. (2005). Sleep disturbances in midlife unrelated to 32-Year diabetes
incidence: The prospective Population Study of Women in Gothenburg. *Diabetes
Care*, *28*(11), 2739-2744.

Blackwell, T., Yaffe, K., Ancoli-Israel, S., Schneider, J.L., Cauley, J.A., Hillier, T.A.,
Fink, H.A. and Stone, K.L., (2006). Poor sleep is associated with impaired
cognitive function in older women: the study of osteoporotic fractures. *The
Journals of Gerontology,* 61(4), 405-410.

Bormann, J. E. (2012). Mantram Repetition for Relaxation. Retrieved November 12,
2012, from http://jillbormann.com/index.html

Bormann, J. E., & Carrico, A. W. (2009). Increases in positive reappraisal coping during

    a group-based Mantram intervention mediate sustained reductions in anger in HIV-

    positive persons. *International Journal of Behavioral Medicine, 16*(1), 74-80.

Bormann, J.E., Hurst, S., & Ann Kelly, M. S. (2013). Responses to Mantram repetition

    program from veterans with posttraumatic stress disorder: A qualitative

    analysis. *Journal of Rehabilitation Research and Development, 50*(6), 769.

Bormann, J. E., Smith, T. L., Becker, S., Gershwin, M., Pada, L., Grudzinski, A. H., &

    Nurmi, E. A. (2005). Efficacy of frequent Mantram repetition on stress, quality of

    life, and spiritual well-being in veterans. *Journal of Holistic Nursing*, 23(4), 395-

    414. doi: 10.1177/0898010105278929

Bormann, J. E., Thorp, S., Wetherell, J. L., & Golshan, S. (2008). A spiritually based

    group intervention for combat veterans with posttraumatic stress disorder. *Journal*

    of Holistic Nursing, 26(2), 109-116. doi: 10.1177/0898010107311276

Buttner, M. M., Bormann, J. E., Weingart, K., Andrews, T., Ferguson, M., & Afari, N.

    (2016). Multi-site evaluation of a complementary, spiritually-based intervention for

    Veterans: The Mantram Repetition Program. *Complementary Therapies in Clinical*

    Practice, 22, 74-79.

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The

    Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and

    research. *Psychiatry Research*, 28(2), 193-213.

Cao, Y. J., Mager, D. E., Simonsick, E. M., Hilmer, S. N., Ling, S. M., Windham, B. G.,

    Crentsil, V., Yasar, S., Fried, L.P., & Abernethy, D. R. (2007). Physical and

cognitive performance and burden of anticholinergics, sedatives, and ACE

Inhibitors in older women. *Clinical Pharmacology Therapy*, 83(3), 422-429.

Carlson, L. E., Speca, M., Patel, K. D., & Goodey, E. (2004). Mindfulness-based stress

reduction in relation to quality of life, mood, symptoms of stress and levels of

cortisol, dehydroepiandrosterone sulfate (DHEAS) and melatonin in breast and

prostate cancer outpatients. *Psychoneuroendocrinology*, 29(4), 448-474.

Chung, K. F., & Lee, C. K. (2002). Over-the-counter sleeping pills: a survey of use in

Hong Kong and a review of their constituents. *General Hospital Psychiatry*, 24(6),

430-435.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd Ed.). New

Jersey: Lawrence Erlbaum.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the

United States. In S. Spacapan & S. Oskamp (Eds.), The social psychology of

health: Claremont Symposium on applied social psychology. Newbury Park, CA:

Sage.

Daley, M., Morin, C. M., LeBlanc, M., Gregoire, J. P., & Savard, J. (2009). The

economic .burden of insomnia: direct and indirect costs for   individuals with

insomnia syndrome, insomnia symptoms, and good sleepers. *Sleep*, *32*(1), 55-64.

Daley, M., Morin, C. M., LeBlanc, M., Gregoire, J. P., Savard, J., & Baillargeon, L.

(2009). Insomnia and its relationship to health-care utilization, work absenteeism,

productivity, and accidents. *Sleep Medicine*, *10*(4), 427-438.

Dew, M.A., Hoch, C.C., Buysse, D.J., Monk, T.H., Begley, A.E., Houck, P.R., Hall, M.,

Kupfer, D.J. and Reynolds III, C.F., 2003. Healthy older adults' sleep predicts all-

cause mortality at 4 to 19 years of follow-up. .*Psychosomatic Medicine*, *65*(1), pp.63-73.

Ekstedt, M., Åkerstedt, T., & Söderström, M. (2004). Microarousals during sleep are associated with increased levels of lipids, cortisol, and blood pressure. *Psychosomatic Medicine*, 66(6), 925-931.

Ferrie, J.E., Shipley, M.J., Cappuccio, F.P., Brunner, E., Miller, M.A., Kumari, M., & Marmot, M.G. (2007). A prospective study of change in sleep duration: Associations with mortality in the Whitehall II cohort. *Sleep*, 30(12):1659–1666.

Fliege, H., Rose, M., Arck, P., Walter, O. B., Kocalevent, R.-D., Weber, C., & Klapp, B. F. (2005). The Perceived Stress Questionnaire (PSQ) reconsidered: Validation and reference values from different clinical and healthy adult samples. *Psychosomatic Medicine*, 67(1), 78-88.

Fraser, R., Ingram, M. C., Anderson, N. H., Morrison, C., Davies, E., & Connell, J. M. (1999). Cortisol effects on body mass, blood pressure, and cholesterol in the general population. *Hypertension*, 33(6), 1364-1368.

Gangwisch, J. E., Feskanich, D., Malaspina, D., Shen, S., & Forman, J. P. (2013). Sleep duration and risk for hypertension in women: results from the Nurses' Health Study. *American journal of hypertension*, *26*(7), 903-911.

Gangwisch, J. E., Heymsfield, S. B., Boden-Albala, B., Buijs, R. M., Kreier, F., Pickering, T. G., Rundle, A.G., Zammit, G.K., & Malaspina, D. (2006). Short sleep duration as a risk factor for hypertension analyses of the first national health and nutrition examination survey. *Hypertension*, *47*(5), 833-839.

Gangwisch, J. E., Heymsfield, S. B., Boden-Albala, B., Buijs, R. M., Kreier, F.,

    Pickering, T. G., Rundle, A.G., Zammit, G.K., Pickering, T.G., Rundle,   A.G.,

    Zammit, G.K., & Malaspina, D. (2007). Sleep duration as a risk factor for diabetes

    incidence in a large US sample. *Sleep*, 30(12), 1667.

Gangwisch, J. E., Malaspina, D., Babiss, L. A., Opler, M. G., Posner, K., Shen, S.,

    Turner, J.B. Zammit, G.K., Henry N. & Ginsberg, H. N. (2010). Short sleep

    duration as a risk Factor for hypercholesterolemia: Analyses of the National

    Longitudinal Study of adolescent health. *Sleep*, 33(7), 956-961.

Gangwisch, J. E., Malaspina, D., Boden-Albala, B., & Heymsfield, S. B. (2005).

    Inadequate sleep as a risk factor for obesity: analyses of the NHANES

    I. *Sleep*, *28*(10), 1289.

Gangwisch, J. E., Heymsfield, S. B., Boden-Albala, B., Buijs, R. M., Kreier, F., Opler,

    M. G., Pickering, T.G., Rundle, A.G., Zammit, G.K., &   Malaspina, D. (2008).

    Sleep duration associated with mortality in elderly, but not middle-aged, adults in a

    large US sample. *Sleep*, *31*(8), 1087.

Garfinkel, D., Laudon, M., & Zisapel, N. (1997). Improvement of sleep quality by

    controlled-release melatonin in benzodiazepine-treated elderly

    insomniacs. *Archives of Gerontology and Geriatrics*, *24*(2), 223-231.

Gehrman, P. R., Connor, D. J., Martin, J. L., Shochat, T., Corey-Bloom, J., & Ancoli-

    Israel, S. (2009). Melatonin fails to improve sleep or agitation in double-blind

    randomized placebo-controlled trial of institutionalized patients with Alzheimer

    disease. *The American Journal of Geriatric Psychiatry*, *17*(2), 166-169.

Gellis, L. A., & Lichstein, K. L. (2009). Sleep hygiene practices of good and poor

    sleepers in the United States: an internet-based study. *Behavior Therapy*, 40(1), 1-9.

Glass, J., Lanctôt, K. L., Herrmann, N., Sproule, B. A., & Busto, U. E. (2005). Sedative

    hypnotics in older people with insomnia: meta-analysis of risks and benefits. *British*

    Medical Journal. doi:10.1136/bmj.38623.768588.47.

Gooneratne, N. S., Weaver, T. E., Cater, J. R., Pack, F. M., Arner, H. M., Greenberg, A.

    S., & Pack, A. I. (2003). Functional outcomes of excessive daytime sleepiness in

    older adults. *Journal of the American Geriatrics Society*, 51(5), 642-649.

Gottlieb, D. J., Redline, S., Nieto, F. J., Baldwin, C. M., Newman, A. B., Resnick, H. E.,

    & Punjabi, N. M. (2006). Association of usual sleep duration with hypertension: the

    Sleep Heart Health Study. *Sleep*, *29*(8), 1009.

Gray, S. L., LaCroix, A. Z., Hanlon, J. T., Penninx, B. W. J. H., Blough, D. K., Leveille,

    S. G., Artz, M. B., Guralnik, J. M. and Buchner, D. M. (2006), Benzodiazepine use

    and physical disability in community-dwelling older adults. *Journal of the*

    American Geriatrics Society, 54: 224–230. doi: 10.1111/j.1532-5415.2005.00571.x

Harvey, A. G., Stinson, K., Whitaker, K. L., Moskovitz, D., & Virk, H. (2008). The

    subjective meaning of sleep quality: a comparison of individuals with and without

    insomnia. *Sleep*, 31(3), 383.

Hoch, C.C., Reynolds III, C.F., Buysse, D.J., Monk, T.H., Nowell, P., Begley, A.E., Hall,

    F. and Dew, M.A. (2001). Protecting sleep quality in later life a pilot study of bed

    restriction and sleep hygiene. *The Journals of Gerontology Series B: Psychological*

    Sciences and Social Sciences, 56(1), 52-59.

Hughes, R. J., Sack, R. L., & Lewy, A. J. (1998). The role of melatonin and circadian phase in age-related sleep-maintenance insomnia: assessment in a clinical trial of melatonin replacement. *Sleep*, *21*(1), 52-69.

Irwin, M., Olmstead, R., & Motivala, S. (2008). Improving sleep quality in older adults with moderate sleep complaints: A randomized controlled trial of Tai chi chih. *Sleep,* 31(7), 1001-1008.

Jacobs, G. D. (2001). The physiology of mind-body interactions: the stress response and the relaxation response. *The Journal of Alternative & Complementary Medicine*, *7*(1), 83-92.

Jevning, R., Wilson, A., & Smith, W. (1978). The transcendental meditation technique, adrenocortical activity, and implications for stress. *Cellular and Molecular Life Sciences*, 34(5), 618-619.

Jevning, R., Wilson, A. F., & Davidson, J. M. (1978). Adrenocortical activity during meditation. *Hormones and Behavior*, 10(1), 54-60. doi:
http://dx.doi.org/10.1016/0018-506X(78)90024-7

Kaneita, Y., Uchiyama, M., Yoshiike, N., & and Ohida, T. (2008). Associations of usual sleep duration with serum lipid and lipoprotein levels. *Sleep,* Vol. 31, No. 5, 645-652.

King A., Oman R. F., Brassington G. S., Bliwise D. L., & Haskell W. L. (1997). Moderate-intensity exercise and self-rated quality of sleep in older adults: A randomized controlled trial. *The Journal of the American Medical Association*, 277(1), 32-37. doi: 10.1001/jama.1997.03540250040029.

Kline, D. C. (2013). Sleep Duration. In Encyclopedia of Behavioral Medicine (pp. 1808-1810). New York: Springer New York.

Kripke, D. F., Garfinkel, L., Wingard, D. L., Klauber, M. R., & Marler, M. R. (2002). Mortality associated with sleep duration and insomnia. *Archives of General Psychiatry*, 59(2), 131-136.

Kumari, M., Badrick, E., Ferrie, J., Perski, A., Marmot, M., & Chandola, T. (2009). Self-reported sleep duration and sleep disturbance are independently associated with cortisol secretion in the Whitehall II study. *Journal of Clinical Endocrinology & Metabolism*, 94(12), 4801-4809.

Krystal, A. D., & Edinger, J. D. (2008). Measuring sleep quality. *Sleep Medicine*, 9, Supplement 1(0), S10-S17. doi: http://dx.doi.org/10.1016/S1389-9457(08)70011-X

Lachin, J. M. (1981). Introduction to sample size determination and power analysis for clinical trials. Controlled clinical trials, 2(2), 93-113.

Lai, H., & Good, M. (2005). Music improves sleep quality in older adults. *Journal of Advanced Nursing*, *49*(3), 234-244. doi:10.1111/j.1365-2648.2004.03281.x

Lacks, P., & Rotert, M. (1986). Knowledge and practice of sleep hygiene techniques in insomniacs and good sleepers. *Behaviour Research and Therapy*, 24(3),   365-368.

Leger, D., Guilleminault, C., Dreyfus, J. P., Delahaye, C., & Paillard, M. (2000). Prevalence of insomnia in a survey of 12,778 adults in France. *Journal of Sleep Research*, *9*(1), 35-42.

Lehman, N. L., & Johnson, L. N. (1999). Toxic optic neuropathy after concomitant use of melatonin, zoloft, and a high-protein diet. *Journal of Neuro-ophthalmology*, *19*(4), 232-234.

Levenson, R. W. (2003). Blood, sweat, and fears. *Annals of the New York Academy of Sciences*, *1000*(1), 348-366.

Li, F., Fisher, K. J., Harmer, P., Irbe, D., Tearse, R. G., & Weimer, C. (2004). Tai chi and self-rated quality of sleep and daytime sleepiness in older adults: A randomized controlled trial. *Journal of the American Geriatrics Society*, 52(6), 892-900. doi: 10.1111/j.1532-5415.2004.52255.x

Locke, D. E. (2011). Sleep Disturbance. In Encyclopedia of Clinical Neuropsychology (pp. pp 2307-2310). New York: Springer New York.

MacLean, C. R., Walton, K. G., Wenneberg, S. R., Levitsky, D. K., Mandarino, J. P., Waziri, R., Hills, S.L., &Schneider, R. H. (1997). Effects of the transcendental meditation program on adaptive mechanisms: Changes in hormone levels and responses to stress after 4 months of practice. *Psychoneuroendocrinology*, 22(4), 277-295. doi: http://dx.doi.org/10.1016/S0306-4530(97)00003-6

Malik, S., Wong, N. D., Franklin, S., Pio, J., Fairchild, C., & Chen, R. (2005). Cardiovascular disease in US patients with metabolic syndrome, diabetes, and elevated C-reactive protein. *Diabetes Care*, 28(3), 690-693.

Middleton, B. A., Stone, B. M., & Arendt, J. (1996). Melatonin and fragmented sleep patterns. *The Lancet,* 348(9026), 551-552.

Morgenthaler, T., Kramer, M., Alessi, C., Friedman, L., Boehlecke, B., Brown, T., Coleman, J., Kapur, V., Lee-Chiong, T., Owens, J. and Pancer, J. (2006). Practice

parameters for the psychological and behavioral treatment of insomnia: an update. *Sleep, 29*(11), 1415.

Morin, C. M., Rodrigue, S., & Ivers, H. (2003). Role of stress, arousal, and coping skills in primary insomnia. *Psychosomatic Medicine,* 65(2), 259-267.

Newman, A.B., Enright, P.L., Manolio, T.A., Haponik, E.F. and Wahl, P.W., 1997. Sleep disturbance, psychosocial correlates, and cardiovascular disease in 5201 older adults: the Cardiovascular Health Study. *Journal of the American Geriatrics Society*, *45*(1), pp.1-7.

Nummenmaa, L., Glerean, E., Hari, R., & Hietanen, J.K., (2014). Bodily maps of emotions. *Proceedings of the National Academy of Sciences,* 111 (2) 646-651. doi:10.1073/pnas.1321664111

Ohayon, M. M., Carskadon, M. A., Guilleminault, C., & Vitiello, M. V. (2004). Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normative sleep values across the human lifespan. *Sleep*, 27, 1255-1274.

Ong, J. C., Shapiro, S. L., & Manber, R. (2008). Combining mindfulness meditation with cognitive-behavior therapy for insomnia: a treatment-development study. *Behavior Therapy*, *39*(2), 171-182.

Pai, J.K., Pischon, T., Ma, J., Manson, J.E., Hankinson, S.E., Joshipura, K., Curhan, G.C., Rifai, N., Cannuscio, C.C., Stampfer, M.J. and Rimm, E.B., (2004). Inflammatory markers and the risk of coronary heart disease in men and women. *New England Journal of Medicine,* 351(25), pp.2599-2610.

Pal, P. K., Thennarasu, K., Fleming, J., Schulzer, M., Brown, T., & Calne, S. M. (2004). Nocturnal sleep disturbances and daytime dysfunction in patients with Parkinson's disease and in their caregivers. *Parkinsonism & Related Disorders,* 10(3), 157-168.

Park, L. T., Matthews, J. D., Maytal, G., & Stern, T. A. (2007). Evaluation and treatment of poor sleep. *Primary Care Companion to the Journal of Clinical Psychiatry*, 9(3), 224.

Patel, S.R., Blackwell, T., Redline, S., Ancoli-Israel, S., Cauley, J.A., Hillier, T.A., Lewis, C.E., Orwoll, E.S., Stefanick, M.L., Taylor, B.C. & Yaffe, K. (2008). The association between sleep duration and obesity in older adults. *International Journal of Obesity*, *32*(12), pp.1825-1834.

Rickels, K., Morris, R. J., Newman, H., Rosenfeld, H., Schiller, H., & Weinstock, R. (1983). Diphenhydramine in insomniac family practice patients: A double-blind study. *The Journal of Clinical Pharmacology*, *23*(5-6), 234-242.

Ridker, P. M., Paynter, N. P., Rifai, N., Gaziano, J. M., & Cook, N. R. (2008). C-reactive protein and parental history improve global cardiovascular risk prediction The Reynolds risk score for men. *Circulation*, 118(22), 2243-2251.

Reid, K. J., Baron, K. G., Lu, B., Naylor, E., Wolfe, L., & Zee, P. C. (2010). Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. *Sleep Medicine,* 11(9), 934-940. doi: 10.1016/j.sleep.2010.04.014

Roth, T. (2007). Insomnia: definition, prevalence, etiology, and consequences. *Journal of Clinical Sleep Medicine*, 3(5 Suppl), S7.

Shankar, A., Koh, W. P., Yuan, J. M., Lee, H. P., & Mimi, C. Y. (2008). Sleep duration and coronary heart disease mortality among Chinese adults in Singapore:

A population-based cohort study. *American Journal of Epidemiology*, *168*(12), 1367-1373.

Sheldon, S. H. (1998). Pro-convulsant effects of oral melatonin in neurologically disabled children. *Lancet*, *351*(9111), 1254-1254.

Smyth, C. (Producer). (2008, September 5). The Pittsburgh Sleep Quality Index (PSQI). *Annals of Long Term Care*. Retrieved from http://www.annalsoflongtermcare.com/article/8103

Sorock, G. S., & Shimkin, E. E. (1988). Benzodiazepine sedatives and the risk of falling in a community-dwelling elderly cohort. *Archives of Internal Medicine*, *148*(11), 2441-2444.

Sosa, E. (1984). Mind-body interaction and supervenient causation. *Midwest Studies in Philosophy*, *9*(1), 271-281.

Spira, A. P., Friedman, L., Aulakh, J. S., Lee, T., Sheikh, J. I., & Yesavage, J. A. (2008). Subclinical anxiety symptoms, sleep, and daytime dysfunction in older adults with primary insomnia. *Journal of Geriatric Psychiatry and Neurology*, 21(2), 149-153.

Stepanski, E. J., & Wyatt, J. K. (2003). Use of sleep hygiene in the treatment of insomnia. *Sleep Medicine Reviews*, 7(3), 215-225.

Strine, T. W., & Chapman, D. P. (2005). Associations of frequent sleep insufficiency with health-related quality of life and health behaviors. *Sleep Medicine,* 6(1), 23-27. doi: 10.1016/j.sleep.2004.06.003

Sudsuang, R., Chentanez, V., & Veluvan, K. (1991). Effect of Buddhist meditation on serum cortisol and total protein levels, blood pressure, pulse rate, lung volume and

reaction time. *Physiology & Behavior,* 50(3), 543-548. doi: http://dx.doi.org/10.1016/0031-9384(91)90543-W

Tanaka, H., Shirakawa, S., Kaji, M., Takase, M., Nakajima, T., & Kamei, Y. (1999). The examination of sleep-life habits and sleep-health from the viewpoint of age, gender and area difference*. Japanese Journal of Geriatric Psychiatry*, 10, 327–335.

Tanaka, H., & Shirakawa, S. (2004). Sleep health, lifestyle and mental health in the Japanese elderly: ensuring sleep to promote a healthy brain and mind. *Journal Of Psychosomatic Research,* 56(5), 465-477.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53.

Tinetti, M. E., Speechley, M., & Ginter, S. F. (1988). Risk factors for falls among elderly persons living in the community. *New England Journal of Medicine*, 319(26), 1701-1707. doi:10.1056/NEJM198812293192604.

Vitiello, M. V., Larsen, L. H., & Moe, K. E. (2004). Age-related sleep change: gender and estrogen effects on the subjective–objective sleep quality relationships of healthy, noncomplaining older men and women. *Journal of Psychosomatic Research*, *56*(5), 503-510.

Wallace, R. K., Benson, H., & Wilson, A. F. (1971). A wakeful hypometabolic physiologic state. *American Journal of Physiology--Legacy Content*, 221(3), 795-799.

Wingard, D.L. & Berkman, L.F. (1983). Mortality risk associated with sleeping patterns among adults. *Sleep,* 6(2):102–107.

Yaggi, H. K., Araujo, A. B., & McKinlay, J. B. (2006). Sleep duration as a risk factor for the development of type 2 diabetes. *Diabetes Care*, *29*(3), 657-661.

Zhdanova, I. V., Wurtman, R. J., Regan, M. M., Taylor, J. A., Shi, J. P., & Leclair, O. U. (2001). Melatonin treatment for age-related insomnia. *The Journal of Clinical Endocrinology & Metabolism,* 86(10), 4727-4730.

Vita

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