Spring 2023

Implementing Cognitive Behavioral Therapy for Insomnia with Motivational Interviewing in the Mental Health Setting

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Implementing Cognitive Behavioral Therapy for Insomnia with Motivational Interviewing in the Mental Health Setting

A Scholarly Project Presented to the Faculty of the School of Nursing

Boise State University

In partial fulfillment of the requirements

For the Degree of Doctor of Nursing Practice

By

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Executive Summary

Problem Description

Insomnia impacts approximately one third of adults and is considered the most prevalent of all sleep disorders. Insomnia like symptoms are also part of other mental health diagnostic criteria. When humans don't obtain quality sleep, the brain and body do not function as well, and systems are negatively impacted. This can include a lack of clearing metabolic waste, impacts to memory, baseline cognition, and attention. With a lack of consistent, quality sleep, there are significant negative consequences to insomnia that impact a person's overall mental wellbeing.

Setting

An urban for-profit outpatient community mental health clinic in Portland, Oregon. The clinic serves approximately 5,500 patients and treats many of the common mental health diagnoses including depression, anxiety, post-traumatic stress disorder, and attention-deficit disorder with typical and atypical treatment modalities. Insomnia symptoms can impact all of these diagnoses as sleep disturbances are part of the diagnostic criteria for all of them.

Rationale

Implementing Cognitive Behavioral Therapy for Insomnia (CBT-I) allows patients to reduce or eliminate insomnia or insomnia like symptoms without the need to utilize potentially habit-forming medications to obtain quality and consistent sleep. CBT-I is considered a first line treatment modality for insomnia and is becoming more widely used. CBT-I consists of stimulus control, sleep restriction, sleep compression, and cognitive reset of current ideals related to sleep. CBT-I is a flexible treatment option, in that it can be implemented in a one-on-one basis, a group setting, over the phone, in person, or via telehealth. CBT-I has a success rate of 70-80% for reducing or eliminating insomnia symptoms and is shown to reduce symptoms of co-occurring mental health diagnosis like depression and anxiety.

Specific Aims, Implementation & Evaluation Plan

The specific aims of this project were to increase patient's quality of sleep, reduce insomnia symptoms, reduce depression and anxiety symptoms, and continuously motivate patients to continue CBT-I implementation through Motivational Interviewing (MI) techniques. Eight project outcomes were developed that align with the project aims. Initially it was expected that the project would be implemented with 10 patients, however only five were able to commit to the weekly group sessions for the duration of the project. Patients were informed of project outline, CBT-I treatment goals, evaluation plan pre and post project implementation and consent were obtained. Patients were evaluated by using standardized tools to assess pre and post project implementation, a weekly sleep diary, and two non-standardized assessment tools to determine patient's sleep confidence and level of motivation throughout implementation.

Project Outcomes & Results

The results of the project were overwhelmingly positive, likely in part to implementing CBT-I with MI. Of the eight project outcomes, seven were met and/or exceeded and one project outcome was partially met. Alternatively, an additional outcome was achieved that was not part of the original eight outcomes that were measured, but also was a positive result. Of the five patient's that participated in the entire project, one patient was consistently non-compliant with project parameters, however, that patient also had a positive outcome related to an increase to their overall sleep efficiency despite this. The association between project implementation of CBT-I with MI and this project outcomes, further support research associated with CBT-I in that there was a significant positive impact to participants insomnia symptoms, as well as their measured depressive symptoms pre and post project measurements. Additionally, patients stayed engaged throughout treatment regardless of setbacks and frustrations during project implementation due to the continued use of MI beginning in week one.

Interpretation & Conclusions

CBT-I is an extremely useful tool to aid patients in reduction or resolution of insomnia and insomnia like symptoms. CBT-I is evidence based, and when partnered with MI, this project supports continued patient engagement throughout project implementation as all five patients participated during the entire project. The positive outcomes that resulted from project implementation were very encouraging to the project leader as they align with the researched outcomes pre-project implementation.

Keywords: insomnia, CBT-I, sleep, motivational interviewing, depression

Implementing Cognitive Behavioral Therapy for Insomnia with Motivational Interviewing in the Mental Health Setting

Why is it necessary that we sleep? Researchers have found that without sleep, the human brain does not clear metabolic waste products from the brain which accumulate during waking hours (Eide et al., 2021). This accumulation can occur after a single night of sleep deprivation. Additionally, sleep deprivation after a single night impacts several cognitive functions like memory, emotional processing, attention span, and overstimulation. Approximately ten percent of people suffer from chronic insomnia (Williams et al., 2013). Evidence has also emerged that a major risk factor for Alzheimer's disease is chronic sleep deprivation (Eide et al., 2021). Chronic insomnia can be correlated with medical comorbidities as well as an increase in mental health comorbidities like depression, anxiety, and poor satisfaction and quality of life (Bhaskar et al., 2016). Many people turn to sleep aids; however, they carry risks such as dependency, cognitive and psychomotor impairment, interactions with other medications, and can cause rebound insomnia once the patient stops taking the sleep aid (Williams et al., 2013). Nonpharmacological strategies such as Cognitive Behavioral Therapy for Insomnia (CBT-I) has become a significant factor in behavioral health practices. CBT-I is an evidence-based intervention to help people sleep better and longer without the use of medication interventions. CBT-I has been reported as effective at reducing insomnia symptoms in 70-80% of patients who complete therapy (Okajima et al., 2011). Additionally, research has shown that patients with co-occurring behavioral health diagnoses like depression and anxiety also reap the benefit of CBT-I at reducing symptoms for those conditions as well (Siebern & Manber, 2011). The goal of this project is to implement CBT-I with a group of mental health patients within this writer's practice, to determine feasibility and describe the efficacy of CBT-I in addition to Motivational Interviewing (MI)

intervention on insomnia symptoms, as well as depressive symptoms, throughout and post therapeutic intervention. While CBT-I is an effective intervention for insomnia on its own, patients can initially struggle with the necessary changes, and MI can potentially bridge the gap for an overall effective treatment plan.

Problem Description

Problem Background

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which is the handbook used by mental health professionals for diagnosis of mental health disorders, provides very structured and complete symptoms associated with insomnia (American Psychiatric Association, 2013). These symptoms are defined as:

A. A predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms:
    1. Difficulty initiating sleep.
    2. Difficulty maintaining sleep.
    3. Early-morning awakening with inability to return to sleep.
B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.
C. The sleep difficulty occurs at least 3 nights per week.
D. The sleep difficulty is present for at least 3 months.
E. The sleep difficulty occurs despite adequate opportunity for sleep.

F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).
G. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication)
H. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia. (American Psychiatric Association, 2013)

Insomnia is and has been prevalent enough across society to have its own diagnosis outlined in one of the most widely used references. The DSM-5 indicates that approximately one-third of adults report some form of insomnia like symptoms, and that insomnia is the most prevalent of all sleep disorders. Further, women seem to report more symptoms than men. While insomnia can be an independent disorder, it is more often seen correlated with other medical or mental health disorders, such as Generalized Anxiety Disorder (GAD), Major Depressive Disorder (MDD) and Post Traumatic Stress Disorder (PTSD) (American Psychiatric Association, 2013). There are significant, negative consequences of insomnia that impact a person's overall mental wellbeing, and this is especially true of mental health patients. There is approximately a 40% correlation between patients with insomnia and a comorbid mental health diagnosis, particularly depression (Roth, 2007). Research supports that symptoms of insomnia and symptoms of depression share commonality that make patients susceptible to both conditions (Roth, 2007). The above information supports the development of the overall problem statement: Patients at an outpatient mental health clinic in Portland, Oregon often report symptoms associated with insomnia. Currently, the facility practice is to prescribe a sleep aid medication which are shown to be habit forming and should only be used short term. Due to a lack of alternative treatment

options at the clinic, and in the Portland metro area, patients are left on these medications for extended periods of time in contradiction to the current evidence, thus potentially mismanaging patients' reported sleep concerns.

Local Problem

The identified urban for-profit outpatient community mental health clinic in Portland, Oregon is a private mental health practice that has been in operation since 2018 in the Salem, Oregon area and since 2019 in Portland, Oregon. The clinic was founded by two working couples. Currently, there are approximately thirty clinicians that are employed throughout the company, with intent to hire more in the coming months due to population demand and the increased need for mental health services. The clinic currently serves approximately 5,500 patients with several treatment modalities that include psychotherapy, psychiatric medication management, child psychiatric services, neuropsychiatric evaluations, genetic testing, Eye Movement Desensitization and Reprocessing (EMDR) and Transcranial Magnetic Stimulation (TMS). The most common mental health conditions that are treated at the clinic are depression, anxiety, post-traumatic stress disorder, and attention-deficit disorder. While these are the most common mental health diagnoses that are seen throughout the company, the DSM-5 indicates most of them have one or more symptoms that are associated with insomnia. Patients with MDD have the highest percentage of sleep disturbance with upwards of 90% of patients reporting insomnia symptoms that they consider disruptive to their regular sleep pattern, and the DSM-5 indicates insomnia is a core symptom of depression (Seow et al., 2018). Additionally, patients with diagnosis of GAD, or PTSD also report symptoms of insomnia, as the DSM-5 has indicated sleep disturbances are part of the core diagnostic criteria for both diagnoses as well (Seow et al., 2018).

Available Knowledge

Literature Review

The PICO format (P = mental health patients with diagnosed or reported insomnia symptoms; I = cognitive behavioral therapy for insomnia (CBT-I); O = patient's insomnia symptoms) was used to develop the question, "In mental health patients with insomnia, what is the effect of cognitive behavioral therapy for insomnia (CBT-I) with motivational interviewing techniques (MI) on sleep duration and quality over 10 weeks?" The databases PsychINFO, PubMed, Elsevier, Medline, and Google Scholar were searched using the following keywords: *Cognitive Behavioral Therapy, CBT-I, insomnia, behavioral sleep medicine, sleep aid, sleep disorders, sleep initiation, and maintenance disorders.* The titles and/or abstracts from 57 articles were returned, with a total of 11 being relevant to the identified problem resulting in eight level one, two level two, one level four articles in regard to the level of evidence. Refer to Appendix A for further information.

Synthesis of the Evidence

Sleep is considered a necessary, restorative part of physical and mental well-being. When people do not sleep, or have a lack of quality sleep, side effects begin to appear like lack of focus, poor memory, or mood changes. In mental health, these symptoms can manifest in lack of ability to cope, lack of stress tolerance, or chronic fatigue. According to the Center for Disease Control, one in eight patients try medications to manage sleep disorders (Chong et al., 2013), but there is a different approach in CBT-I.

What is CBT-I

Cognitive therapy aids in reducing patient's trepidations about sleep interference. The goal is to focus on identifying the patient's beliefs and automatic thoughts about sleep and

replace them with more adaptive beliefs and attitudes (Williams et al., 2013). Research shows support for CBT-I as a first line treatment of choice for insomnia and that support has grown significantly over the past several years as the treatment modality has been more widely implemented in lieu of sleep aid medication (Wu et al., 2015). CBT-I consists of several implemented components to collectively enhance the likelihood that one or all of the components target the patient's contributing factors of poor sleep (Williams et al., 2013). These components include cognitive talk therapy, sleep restriction, sleep hygiene, sleep education, stimulus control, sleep compression, and relaxation techniques (Williams et al., 2013). Sleep restriction aids to reduce the patient's time in bed, which is a measured metric for statistical research of the efficacy of CBT-I, to match what the patient reports as their overall sleep duration. The goal is to reduce the patient's total time in bed to promote sleep during the core sleep requirement parameters (Kyle et al., 2015). Sleep hygiene is likely the most commonly known component to those unfamiliar with other part of CBT-I to aid in increasing sleep time and quality. It includes reducing or eliminating habits that interrupt the initiation of sleep or continuation of a sleep cycle. Sleep hygiene is tailored to each patient as each patient's habits are likely to be different (Williams et al., 2013). Sleep education includes educating patients with the goal to reduce their sleep disruptions. Whether the disruption is attributed to a medical condition, or a psychiatric condition, patients may feel alone or unusual in their symptoms. Sleep education can reduce the patient's concerns and aid in engagement of CBT-I (Williams et al., 2013). Stimulus control is likely one of the most important components of CBT-I intervention. This technique aims to reduce stimuli through reduction of arousing activities like watching television, using cell phones or tablets in bed, or sources of ambient light. Stimulus control works to strengthen the relationship between the patient's association with the bed and bedtime facilitating sleep opposed

to interfering with sleep (Williams et al., 2013). Sleep compression works parallel to sleep restriction in that it is an alternative approach to restriction for patients that restriction may not be appropriate. Sleep compression is a more gradual approach to restriction that still reinforces a consolidated block of expected sleep time and works to lessen the association between being in bed and the patient being awake (Williams et al., 2013). Finally, relaxation techniques are widely used outside of CBT-I but are very beneficial for use while implementing CBT-I. Relaxation techniques can be deep breathing, imagery, meditation, progressive muscle relaxation, mental body scanning, or calming sound incorporation. The goal with this component is to reduce the patient's cognitive and physiological arousal (Williams et al., 2013).

Implementation of CBT-I with MI

CBT-I can be implemented on an individual patient basis, a self-administered basis, or in a group setting. Researched delivery methods have ranged from in person, to over the telephone, via telehealth, or through electronic communication like electronic mail (Arnedt et al., 2013; Koffel et al., 2015). The treatment duration is typically delivered over eight to ten weeks. The goal of implementation for this project will be weekly group telehealth delivery to allow face to face interaction with the clinician and other patients in the group, as well as electronic delivery of motivational support and treatment implementations through electronic mail or text message in written format. Motivational interviewing (MI) techniques such as reflective listening, asking open ended questions, and affirming patient experiences have been shown to aid in behavioral change and help patients resolve ambivalence. MI can be very useful for patients who are reluctant to change, and MI is considered a supportive intervention that aids the patient's own motivation for change rather than having change forced upon them (Rubak et al., 2005). Additionally, MI implementation in short interventions were shown to be as effective as longer

MI interventions at enhancing patient treatment attendance (Lawrence et al., 2017). While CBT-I and MI are independent therapeutic techniques, the goal of using them together is to improve patient participation and therapy continuation throughout project implementation.

Effects of CBT-I

CBT-I has been shown to be effective for improving symptoms of insomnia in 70-80% of patients, as well as showing long term results in prevention of relapse of symptoms (Morin et al., 1999; Okajima et al., 2011). CBT-I has a positive statistical effect on sleep across comorbid conditions like chronic pain conditions or cancer, but CBT-I has stronger positive statistical effects on comorbid symptoms in psychiatric conditions like anxiety and depression compared to medical conditions. The long-term positive effects only strengthen the claim that CBT-I outperforms pharmacotherapy when treating sleep and insomnia symptoms (van der Zweerde et al., 2019). Patients who completed six to eight weekly sessions of CBT-I, most patients no longer met the definition or screening criteria for a diagnosis of insomnia. CBT-I alone was effective for improving symptoms of insomnia, and these results are consistent with previous research studies that demonstrate it is possible to rapidly and effectively treat insomnia in patients without utilizing sleep aid medication (Hofmann et al., 2012; Taylor et al., 2007). Additionally, patients who completed CBT-I had substantial behavioral improvements early on in treatment and continued to see benefit from both the behavioral and cognitive aspects through the conclusion of their treatment (Dolan et al., 2010). Ultimately, CBT-I has been found to be highly efficacious at treating insomnia symptoms, especially in patients with comorbid mental health conditions, and is considered the first line therapy for treatment of chronic insomnia and insomnia related symptoms.

Rationale

Theoretical Model

The theoretical model that will be useful in guiding this project development and implementation is Prochaska and DiClemente's Transtheoretical Model of Change (TTM) (LaMorte, 2019). See Appendix B. The basic assumptions and key concepts of the TTM are that once patients decide to change habits or lifestyles, there is a cyclical progression or regression that occurs before, during, and after desired change (LaMorte, 2019). TTM focuses on the decision-making process of the patient and supports the assumption that patient's do not make behavioral change quickly, instead it occurs through a somewhat predictable cycle of intentional change. TTM has been shown to increase the efficacy of intervention programs that tailor their constructs around it, as TTM focuses on the decision making of the patient and where the patient is at in the cycle of TTM (Velicer et al., 1998). This shift of focus based on where the patient is at in their own cycle of change, compared to forcing the patient into a standardized process to attempt to promote change. TTM subsequently aids in organic development of interventions for patients, which patients ultimately tend to feel are matched to their specific needs, thus patients are further engaged in behavioral change and are less likely to drop out of a behavioral intervention program (Velicer et al., 1998).

Project Framework

Utilizing the Kellogg Logic Model template, a logic model was created for this project to outline overall short-term and long-term goals of achievement. Short term outcomes were representative of changes in knowledge, attitudes, or beliefs that could be impacted over the project implementation time of eight weeks. Long term outcomes were representative of changes

in status, condition, or well-being and were observed or evaluated over three to five years after the project was implemented (W.K. Kellogg Foundation, 2004).

Specific Aims

The primary aim of this project will be to provide patients who have a new or existing sleep disorder diagnosis, a safer and more effective treatment modality for sleep dysregulation by implementing CBT-I by using motivational interviewing techniques. A secondary aim is to positively impact depression and anxiety symptoms through CBT-I. A third aim is to reinforce and encourage patient engagement in CBT-I using motivational interviewing techniques and electronic patient contact between weekly group therapy sessions.

Context

Population

Insomnia affects approximately 10% of the adult population and has been documented as the most common sleep disorder according to the American Sleep Association (American Sleep Association, 2021).The Centers for Disease Control (CDC) and Prevention (Centers for Disease Control and Prevention, 2017) states that in 2014, 31.3% of adults in Oregon report they typically sleep less than seven hours in a 24-hour period. The main targeted population for implementation of this project are existing patients at the clinic that are receiving therapy or medication management and are 18 years of age and older. Patients will have any diagnosis of insomnia, depression, anxiety, or that are screened to have a sleep disturbance that could benefit from treatment with Cognitive Behavioral Therapy for Insomnia (CBT-I). Sleep disturbance complaints from patients are commonly heard during appointments for medication management, as well as during therapy sessions. Approximately 30% of the patients at the clinic are already on

some form of medication management that targets sleep, and few find medication effective long term or do not like the side effects of sleep medication.

Local Care Environment

Many patients at the clinic with sleep disturbance complaints have been prescribed sleep aid medication. While some of the evidence supports short term use of these types of medication, it also shows that these medications are habit forming and come with many undesirable side effects. Additionally, sleep aid medication is no longer considered first line treatment. CBT-I is now considered first line therapy for treatment of insomnia as its effects and implementation have long lasting positive effects on patient's sleep, does not create rebound insomnia that can happen with stopping sleep aid medication, and is typically more effective at treating insomnia symptoms (McCall, 2018). There are currently four other clinics in the Portland Metro area that offer CBT-I. There are approximately five clinicians that hold certification for CBT-I, and many are not currently taking new patients, or are booked out several months. Additional clinicians offering CBT-I are currently in need throughout the community, and the demand will only grow with the resulting mental health effects of the COVID-19 pandemic (Gramigna, 2020). Additionally, no information could be found regarding the local Portland area of clinicians using CBT-I and MI together to further encourage patient compliance and motivation to continue throughout therapy implementation. In a study completed in May 2021, 32.4% of adults in Oregon reported symptoms of anxiety and/or depression, which can include associated sleep disturbance (Kaiser Family Foundation, 2021). As of March 2021, Oregon is only meeting the mental health care needs of patients at a rate of 24% (Kaiser Family Foundation, 2021). This rate speaks to the need to increase the mental health provider force to meet the demands of patients that require mental health services.

Relevant Elements of Project Setting

This project will be implemented at an urban, for profit, outpatient mental health clinic with volunteer participants, who are existing patients of the clinic. While most major insurances are accepted throughout the company, like Medicaid, Medicare, Blue Cross Blue Shield, United Health Care, and Providence, this project implementation will be a non-billed service at no financial obligation to the patient. The clinic provides mental health services for approximately 5,500 patients across the State of Oregon and parts of Washington. At the time of project implementation, the company employs one Psychiatrist, 14 Psychiatric Mental Health Nurse Practitioners, two Psychologists, and nine therapists. With the previous need to convert their mental health format from in person delivery to entirely virtual due to COVID-19 (Gramigna, 2020), the clinic invested in state-of-the-art communication systems and platforms that are stable to ensure patients are getting the best possible service. There are about 600 patients seen monthly between both clinic locations. Approximately 37% of the companies' patients have a depression diagnosis, 31% have an anxiety diagnosis, 16% have an attention deficit diagnosis, 6% has a sleep disturbance diagnosis, 5% have a PTSD diagnosis, 5% have a bipolar diagnosis, and 0.3% have a significant persistent mental illness diagnosis like schizoaffective disorder. Some patients do have more than one mental health diagnosis. Patient diagnoses that will be included in the project will be: MDD, GAD, PTSD, and Insomnia. There are no current foreseeable impacts to implementation currently.

Organizational Culture and Readiness for Change

The company is invested in supporting all employee's growth and providing resources and tools to make that growth attainable. The company is continuously seeking new opportunities to provide quality care to their patients. This includes being open to suggestions

from their staff to provide alternative options that may better benefit the practice. This leadership investment and interest in patients and staff only enhances the relationships that are so important for a thriving business. The initiation of CBT-I at the company also falls in line with their vision to provide alternative and evidence based mental health modalities such as EMDR, TMS, and CBT-Trauma therapy to their patients and currently, there is not another clinician that is providing this treatment option.

Needs Assessment/Strengths and Weaknesses

There are several strengths and weaknesses determined with implementing CBT-I. While the need is overwhelmingly great as evidenced above, engagement in CBT-I can become frustrating to the patient, particularly in the beginning of treatment. Utilizing a SWOT Analysis to outline strengths and weaknesses of the project implementation, the top strength that was identified is CBT-I has researched efficacy long term, beyond provider/patient implementation. The top weakness that was identified is patients may not be willing to commit or devote the time to CBT-I that is needed for positive results to happen.

Memorandum of Understanding

A memorandum of understanding (MOU) was reviewed and signed by the organization director of Psychiatric Services and the Doctor of Nursing Practice (DNP) student in January 2022. The MOU outlined the DNP student project purpose, intended project outcomes, project duration, and project reporting. This document has been withheld at the request of the partnering organization for privacy purposes, as it contains identifiable information. The DNP project manager has retained a signed copy for recordkeeping.

Interventions

Logic Model

The logic model developed by Kellogg (W.K. Kellogg Foundation, 2004) was used to cultivate an outline to guide the project needs to promote the outcomes of the implementation of CBT-I. See Appendix C. The short-term outcome goals were developed with the evidence basis of CBT-I in mind and consider a smaller patient group. The long-term outcome goals were also developed based on the long-term evidence of the efficacy of CBT-I after the patient has completed treatment and continues to improve.

For this project, the short-term outcomes include improving patients' sleep through the implementation of CBT-I. CBT-I will be offered to 10 existing patients of the clinic. Patients will be referred from their existing therapist or Psychiatric Nurse Practitioner and after screening for patient interest and correlating diagnosis, patients will be invited to participate and attend eight weekly CBT-I sessions via virtual platform. Only patients that can consent for themselves will be selected to participate. The weekly CBT-I group meetings will be led by a Psychiatric Mental Health Nurse Practitioner (PMHNP) that has completed training on CBT-I implementation. Eight short term outcomes were identified to establish implementation criteria, standards, and success against which program performance will be determined.

1. 80% of the selected group of patients completed CBT-I treatment by attending 8 weekly group implementation sessions that were held between May 2022-August 2022.
2. Participants in CBT-I reduced their Pittsburg Sleep Quality Index (PSQI) score by a mean reduction of 10% after completion of 8 weeks of therapy between May 2022-August 2022

3. Patients who completed 8 weeks of CBT-I implementation therapy reported a 15% increase in restorative sleep patterns as evidenced by the measured mean between initial survey in May 2022 and a repeat survey in August 2022 of the Insomnia Severity Index (ISI).
4. During their 8-week CBT-I implementation therapy, patients that used sleep aid medication were able to reduce nightly use of sleep aid medication by 10% overall per weekly self-report of their sleep aid administration between May 2022- August 2022.
5. Patients who completed 8 weeks of CBT-I implementation therapy were able to increase their total sleep time by 20% as evidenced by their weekly sleep diary measured between May 2022-August 2022.
6. Patients with a co-occurring depressive diagnosis, who participated in 8 weeks of CBT-I implementation therapy, reported a mean reduction in depressive symptoms by 10% as evidenced by the use of the PHQ-9 measurement tool initially in May 2022 and repeated in August 2022.
7. Patients who completed 8 weeks of CBT-I implementation therapy reported a 20% increase to their level of confidence related to the patient's ability to sleep as evidenced by the patient's self-report comparing reported from May 2022 and August 2022.
8. At least 50% of patients indicated throughout group sessions and email contacts they felt motivated by the group leader to continue through the CBT-I implementation process as evidenced by the patient's self-report via post implementation Likert scale answers of "agree" or "strongly agree".

Correlation of interventions with the Theoretical Model elements/phases

The Transtheoretical Model of Change (LaMorte, 2019) is used as a correlating framework to guide the interventions of CBT-I throughout project implementation. The overall correlation involves understanding and supporting the patient where they are currently at in the TTM and developing and encouraging their engagement and individual behavioral change process. Additionally, TTM is used in the MI process to aid in more successful behavior modification (Prochaska et al., 2008). While the implementation structure of CBT-I is established and outlined through the certification course, it is possible to implement and tailor interventions on a case-by-case basis if it is needed. Patients will likely already have processed through the Precontemplation and Contemplation phases prior to agreeing to participate in CBT-I as evidenced by the TMM. Patients who have processed through the Precontemplation and Contemplation phase have already begun to recognize their problem and have concluded that there is a change option available to them. They have also likely weighed the pros and cons of their problem and potential solutions. Serious consideration of problem resolution has occurred (Prochaska et al., 1993). Patients presumably would begin treatment in the Preparation phase where the selection process will take place and pre-screening will begin. Throughout CBT-I implementation, patients will work through the Action phase and begin on some Maintenance phase work. This leaves the patient to work through the Maintenance phase and potentially have relapses in their sleep issues, in which they will have the knowledge base to re-enter the TMM at any stage to begin supporting themselves to resolve the relapse.

Measures

Project data for five outcomes will be measured using standardized measurement tools to ensure project data reliability and validity. The remaining three outcomes will be measured using

basic attendance tracking and Likert scale surveys. Each numbered measurement description below correlates to the previously numbered outcomes.

Outcome 1: Patient attendance will be tracked and documented via a digital spreadsheet. Attendance is an important part of CBT-I intervention. This data will aid the project to support tracking of patient participation in weekly meetings to further support the evidence-based efficacy of CBT-I. Patient's will be educated at the start of implementation that attendance will be tracked, and consent will be obtained.

Outcome 2: The Pittsburg Sleep Quality Index (PSQI) is a 19-item self-report standardized assessment questionnaire developed to measure sleep quality and disturbances in clinical populations. For each question, patients rate their level of agreement to the questions which are then calculated to obtain a combined score. The total score ranges from 0-21 with higher scores indicating most severe difficulties associated with sleep. Reliability of the PSQI is considered "good" with Cronbach's alpha of 0.83 for the total score (Buysse et al., 1988). The PSQI is free to use, and permission to utilize this tool has been obtained from Daniel J. Buysse, a professor of Psychiatric and Clinical Translational Science at the University of Pittsburgh School of Medicine.

Outcome 3: The Insomnia Severity Index (ISI) is a seven-item self-report standardized assessment questionnaire used to identify individuals with clinically significant insomnia in primary care settings. For each question, patients rate the severity of their sleep difficulties on a scale of 0 – 4 (0=None; 4=Very Severe). The total score ranges from 0-28 with higher scores indicating severe clinical insomnia. Reliability of the scale is considered "excellent" with Cronbach's alpha of 0.92 (Gagnon et al., 2013). The ISI is

free to use, and permission to utilize this tool has been obtained from the copyright holder, Charles M. Morin.

Outcomes 4 & 5: A Sleep Diary is not considered a reliable or valid tool; however, sleep diaries provide valuable information about a patient's sleep habits, lifestyle habits, and potential hindrances to sleep quality. Patients will be expected to fill out a sleep diary every day while engaging in CBT-I. The Sleep Diary used for this project is free to use, and permission to utilize this tool was obtained from the contacts at SleepFoundation.org.

Outcome 6: The Patient Health Questionnaire (PHQ-9) is a nine item self-report standardized assessment questionnaire used to identify depressive symptom severity related to the diagnostic criteria of Major Depressive Disorder in the DSM-5. For each question, patients rate their level of feeling on a scale of 0 – 3 (0=Not at all; 3=Nearly every day). The total score ranges from 0-27 with higher scores indicating more severe depression. Reliability of the scale is considered "excellent" with Cronhach's alpha of 0.89 (Kroenke et al., 2001). The PHQ-9 is free to use, and no permission is required to reproduce, translate, display, or distribute.

Outcome 7: A self-developed Likert scale survey will be conducted to assess participating patient's confidence surrounding independent ability to initiate sleep, maintain sleep, and obtain restful sleep pre and post CBT-I intervention. This survey is not independently valid or reliable, however, valid, or reliable questions will be redeveloped to be applicable to this project. No standardized data collection tool will be used, as such, no permissions are necessary.

Outcome 8: A Likert scale questionnaire will be developed and used to assess participating patient's motivation surrounding initiation, continuing, and completing

CBT-I based on project leader's contact throughout the program and ability to motivate participants. This survey is not independently valid or reliable, however, valid, or reliable questions will be redeveloped to be applicable to this project. No standardized data collection tool will be used, as such, no permissions are necessary.

Analysis

Project data for all eight outcomes will be analyzed and have been determined to be either qualitative data or quantitative data. See Appendix D. Each numbered measurement description below correlates to the previously numbered outcomes.

Outcome 1: Analysis goal is to generate quantitative data to document patient attendance aiding support of continued patient engagement related to efficacy of CBT-I. Attendance will be tracked weekly and scored as a percentage of sessions attended.

Outcome 2: Analysis goal is to generate quantitative data to evaluate patient sleep improvement or lack of over time, through the intervention of CBT-I using a standardized scale. This will be determined by analyzing the patient's PSQI score before and after CBT-I implementation to determine if there was a 10% mean reduction in patient's scores.

Outcome 3: Analysis goal is to generate quantitative data to evaluate patient's resolution or lack of resolution related to symptoms of insomnia through the intervention of CBT-I by measuring the mean difference between patient's initial ISI survey score and post intervention score.

Outcome 4 & 5: Analysis goal is to generate qualitative data that provides descriptions of patient's identifiable local contexts related to sleep, environment, disturbing factors, medication interventions, and subsequent impact to their sleep.

Outcome 6: Analysis goal is to generate quantitative data to evaluate the patient's improvement or lack of improvement specifically related to symptoms of depression based on the mean difference of pre and post PHQ-9 scores through the intervention of CBT-I using a standardized scale.

Outcome 7: Analysis goal is to generate quantitative data that is specific to current project implementation that accesses patient confidence surrounding sleep pre and post CBT-I implementation.

Outcome 8: Analysis goal is to generate quantitative data that is specific to current project implementation supporting the use of MI to encourage patient engagement and continued participation throughout the project timeline.

Timeline

The timeline for this project spans June 2021 to May 2023, see Appendix E. Throughout this length of time, several important benchmarks are expected to be met. The timeline is divided into four phases: planning, project implementation & data collection, data analysis, and dissemination. The planning phase is indicated on the timeline in pink, implementation & data collection in blue, data analysis in purple, and dissemination in green.

Ethical Considerations

Ethical considerations and protection of participants

This project does include the use of human subjects for implementation of CBT-I. Respect for persons, justice, and beneficence will all be applied throughout the project (Robinson Bailey, 2018). Patients must volunteer to participate in the CBT-I project and provide their consent for group treatment, prior to implementation. Patients may withdraw at any time from the project without penalties or risk of being terminated by their treating mental health provider

at the clinic. This project outline and implementation plan will be submitted through Boise State Internal Review Board (IRB) to ensure there are no breaches to ethical standards when working with human subjects, and any subsequent changes that are required during project implementation will be resubmitted to Boise State IRB prior to implementation in the project. The biggest identified risk of CBT-I implementation is likely with patients who are consistently taking sleep aid medication. These patients may experience some withdrawal-like symptoms, or more significant rebound insomnia than expected, and this interruption could possibly impact the efficacy of CBT-I for the first half of their implementation phase.

Conflicts of Interest

Currently, there are no identified conflicts of interest. There are no other CBT-I programs offered at the clinic, the provider implementing CBT-I is not being financially compensated for project time, and patient participation is on a voluntary basis.

Biases

The provider identifies a bias against habit forming sleep medications. Due to the overwhelming evidence associated with the addictive properties of sleep aid medication (Peacey et al., 2012), and the potential for rebound insomnia once medications are stopped, this writer has determined a bias exists. This provider recognizes that it will be necessary for her to check her bias when completing implementation.

Threats to Quality

A few threats to the quality of this project were identified. Patients may be unable or unwilling to complete the outlined CBT-I course either due to conflicts in their personal lives or program requirements are too strenuous. Patients may become frustrated, desiring immediate results, thus patient dissatisfaction results in a lack of engagement. While every effort will be

made to avoid it, some patients may suffer side effects from stopping sleep aid medication, especially if they have been administered long term. Finally, patients may reduce the priority of telehealth group visits through the project implementation or face household distractions that limit session engagement.

Project Budget

This project includes essential financial expenses covering personnel, materials & supplies, equipment, IT, assessment tools, and marketing. Many of the expenses are fixed amounts, except for personnel and assessment tools to account for potential changes to hours required to complete the project or purchase of assessment tools that may be necessary. Unlike many projects, this one does not require the use or expense of a designated space, as it is conducted virtually using online platforms for communication. See Appendix F for outlined and detailed project expenses, future year projections, and overall statement of operations. Changes seen in the project financial outline in subsequent years beyond year one are expense amounts adjusted to accommodate yearly inflation and increased expenses for certification of additional providers implementing CBT-I into their practice. This project does not generate revenue for the organization, and all financial revenue contributions are in-kind. Thus, the final operating income is $0.

Sustainability

This project has the capacity for sustainability, and certainly on a larger scale should more providers obtain a CBT-I certification in the clinic. CBT-I trained clinicians are of great need in the local area and providing expanded services will allow more patients to receive treatment, and financially benefit the clinic by providing CBT-I to patients who need it. This writer has CBT-I certification, so continued services could be provided to patients on an ongoing

basis, creating project sustainability in that regard, but the overall project sustainability would be greater with more certified clinicians.

Results

Steps of the Intervention

CBT-I was implemented with 5 patients of an urban for-profit outpatient community mental health clinic in Portland, Oregon. Patients were educated about the attendance requirements of one weekly session per week for 10 weeks between May 23, 2022, through July 28, 2022. Of the 17 patients that were initially contacted for participation, 5 patients were able to commit to the program time requirements as well as the pre/post assessments and the weekly sleep diary. Barriers to participation were technology concerns, lack of consistent email communication, conflict of scheduled meetings vs. work or personal life schedules, and lack of response to solicitation. Weekly meetings took place over a virtual telehealth format that allowed for two-way video and audio communication. Each week, patients were required to email in the previous weeks sleep diary for review and calculation of sleep prescription (TIB). This calculation is done by adding the time the patient got into bed and what time they woke up in the morning, and then subtracting the amount of time it took them to fall asleep and how long they were awake throughout the night, thus calculating their total sleep time (TST). An average TST is calculated and the TIB prescription is based largely on the TST. Patient concerns about TIB implementation were discussed during each weekly meeting and recalculation of TIB prescriptions, using the same method, were completed during week four and nine to see if TIB prescriptions could be extended. For TIB prescriptions to be extended, sleep efficiency (SE) must have increased and been maintained at least a 90% average for the week. During week one, two, seven, and eight there were structured presentations surrounding expectations, beginning

TIB prescriptions, barriers to CBT-I, chronic pain conditions and evidence-based improvements, and relapse preventions. Alternative weeks three, four, five, six, and nine addressed patient concerns, barriers to implementing TIB prescriptions, sleep quality, and other factors that interrupted sleep during the previous week. Week one and ten allowed for time to complete pre and post assessment questionnaires through Qualtrics. See Appendix G for outlined structured presentations of content.

Details of the process measures and outcomes

Patients who decided to participate in CBT-I signed a consent form (See Appendix H) and completed pre and post implementation assessments that aided in determining if project outcomes were met or not met. Pre and post assessments were completed during week one and week ten session to aid in patient participation and data collection. Goals for project implementation were developed and of the eight project outcomes, seven were met and one was partially met.

- Outcome 1 was met: All participants had at least 80% attendance over the 10 sessions. Three patients attended all sessions, one patient missed one session, and one patient missed two sessions.
- Outcome 2 was met: Pre CBT-I implementation, the group mean PSQI score was 13.6, post CBT-I implementation, the group mean score was 9, which calculates to an overall group mean reduction of 33.82%.
- Outcome 3 was met: Pre CBT-I implementation, the group mean ISI score was 19.2, post CBT-I implementation, the group mean score was 8.8, which calculates to an overall group mean reduction of 54.17%.

- Outcome 4 was met: Initially the goal was to track sleep medication administration via weekly sleep diaries and reduce administration of sleep aids by 10%, however, more accurate tracking was found in one of the assessment questions in the PSQI screening tool. Pre CBT-I implementation, 1 patient indicated they did not use sleep aid medication in the past month, 1 patient indicated they used sleep aid medication less than once weekly, 2 patients indicated use of once or twice a week, and 1 patient indicated use three or more times weekly. Post CBT-I implementation, 1 patient indicated use three or more times weekly, while 4 patients indicated they did not use sleep aid medication in the past month.
- Outcome 5 was partially met: Originally, this outcome goal was to measure an increase in patients total sleep time (TST) based on weekly diary information. It was identified that while TST is an important component of CBT-I, it is not what drives changes to sleep prescriptions throughout implementation. The original goal of a 20% increase in TST was not met, however when assessing patient sleep efficiency (SE), it was found that 4 of the 5 patients increased their overall sleep efficiency enough to increase their sleep prescription during implementation. Pre CBT-I, patients mean sleep efficiency was 73%, and post CBT-I mean sleep efficiency increased to 88%, which is an overall group mean increase of 20.5%.
- Outcome 6 was met: Pre CBT-I implementation, the group mean score was 12.8, post CBT-I implementation, the group mean score was 6.4, which calculates to an overall group mean reduction of 50%.

- Outcome 7 was met: Pre CBT-I implementation, the group mean score was 1.67, post CBT-I implementation, the group mean score was 2.9, which calculates to an overall group mean increase of 73.65%.
- Outcome 8 was met: All patients indicated they "agree" or "strongly agree" to three measured Likert scale questions.

Outcome	Outcome Description	How collected/measured	Outcome met/ not met
1	80% of the selected group of patients completed CBT-I treatment by attending 8 weekly group implementation sessions that were held between May 2022-August 2022.	Weekly patient attendance documented via spreadsheet	Met
2	Participants reduced their Pittsburg Sleep Quality Index (PSQI) score by a mean reduction of 10% after completion of 8 weeks of therapy between May 2022-August 2022	Mean score of pre and post PSQI results	Met
3	Patients who completed 8 weeks of CBT-I implementation therapy reported a 15% increase in restorative sleep patterns from May to August 2022.	Mean score of pre and post Insomnia Severity Index (ISI) results	Met
4	During their 8-week CBT-I implementation therapy, patients that used sleep aid medication reduced nightly use of sleep aid medication by 10% overall per weekly self-report of their sleep aid administration from May 2022 to August 2022.	Measure of Frequency indicated on PSQI	Met
5	Patients who completed 8 weeks of CBT-I implementation therapy were able to increase their total sleep time by 20% as	TST calculation SE calculation	Partially Met

	evidenced by their weekly sleep diary measured between May 2022 to August 2022.		
6	Patients with a co-occurring depressive diagnosis, who participated in 8 weeks of CBT-I implementation therapy, reported a mean reduction in depressive symptoms by 10% from May to August 2022.	Mean score of pre and post PHQ-9 results	Met
7	Patients who completed 8 weeks of CBT-I implementation therapy reported a 20% increase to their level of confidence related to the patient's ability to sleep from May to August 2022.	3 question Likert scale related to sleep confidence	Met
8	At least 50% of patients indicated throughout group sessions and email contacts they felt motivated by the group leader to continue through the CBT-I implementation process.	3 question Likert scale related to motivation	Met

Contextual elements that interacted with the interventions

Initially the goal for implementation of CBT-I was to work with 10 patients. Ultimately, only 5 were able to make the time commitment and agree to the pre and post assessments, and weekly documentation that was required. This reduction in participant base was likely a positive contextual element to implementation as the data and problem-solving skills that were necessary for participants was more than expected during the first three weeks of implementation. Having a smaller group of participants allowed this writer to devote the time and attention that participants needed to feel heard, understood, implement suggestions for change, and ultimately continue with CBT-I. With a larger participant base, this writer is unsure if all participants would have

continued as originally expected. In addition, having a smaller participant group allowed the group leader to create and devote time through weekly electronic communication methods, as well as in group meetings, to incorporate MI skills to ensure positive participant engagement and continued commitment to implementing change using CBT-I and this writer was glad for the smaller patient group.

Associations between outcomes, interventions, and contextual elements

The participant attendance rate was likely as high as it was for several reasons. COVID-19 precautions allowed participants to already be comfortable using a virtual care delivery format, all participants had previously tried alternative sleep interventions that either were ineffective or not effective enough to continue, and with the smaller participant base of 5 participants, this allowed the project manager the opportunity to build positive, supportive rapport with each participant encouraging ongoing participation throughout the duration of the project. Participant PSQI, ISI, PHQ-9, sleep aid medication reduction, increasing total sleep time and sleep confidence all are expected to improve with CBT-I implementation based on researched evidence and results. Patient motivation is expected to increase and be maintained throughout implementation as the group leader utilized motivational interviewing techniques specific to CBT (Naar & Safren, 2017) to support patients in an effective and motivating way. Communication included twice weekly email blasts sent to participants to encourage and motivate participation throughout project implementation, building participant motivation for addressing the desired symptom reduction by utilizing a collaborative discussion, reinforcing rationale for treatment plans, allowing open conversation about participants input into treatment planning, and emphasizing participant autonomy. MI techniques were utilized to support, encourage, and empower participants throughout project implementation.

Unintended consequences

One of the identified unexpected, but positive consequence was a reduction in chronic pain levels for three of the five patients. Two of the patients did not provide information related to their chronic pain levels pre and post CBT-I implementation. The three patients were asked to rate their overall level of chronic pain on a scale of 1-10, where 10 is the highest level of pain.

Patient	Pre-chronic pain rating	Post-chronic pain rating
1	5	1
2	7	3
3	6	3-4

Additionally, one patient was non-compliant with treatment throughout project implementation. The patient would have likely had higher positive outcomes, compared to the other participants, had they been more compliant with the treatment interventions. However, even without adhering to their sleep prescription, they still experienced a higher increase to their overall sleep efficiency comparing pre-CBT-I intervention to post CBT-I intervention. This outcome further supports the use of CBT-I specifically for insomnia symptoms.

Missing Data

Missing data that can be identified is the missing chronic pain ratings of two patients due to non-response from the participants.

Actual Project Revenue/Expenses

See Appendix F for outlined and detailed projected project expenses. The majority of the project expenses were in line with the projected amounts, however, the personnel expense and hours dedicated to project implementation were much higher than projected. Initially, hours projected were 20 hours of facilitation of meetings, and 40 hours of content preparation,

assessment tool development, data analysis, etc. Ultimately, it was calculated that these two areas of implementation utilized more than the 60 hours of projected time. The actual calculated project time was 104 hours, thus increasing the personnel cost from $4900.00 to $8420.00.

Interpretation

Association Between Interventions and Outcomes

The association between the CBT-I and MI interventions and the project outcomes are clear in that used in conjunction, they aid in sleep improvement and participant motivation to continue through rigorous a treatment modality. Almost all project outcome goals were met, and typically well over the anticipated goal. See Appendix I for visual project outcome figures 1, 2, 3, 4, 5, 6, and 7.

Comparison of Results with Previous Findings

Previous findings associated with PSQI, ISI, SE, & PHQ-9 results were scattered. PSQI researched results were measured in statistical differences with significant improvement (Van der Zweerde et al., 2019; Van Straten et al., 2018; Zhou et al., 2020). Project PSQI results were measured in mean change and showed a mean reduction of 33.82% overall. ISI researched results had an approximate mean improvement of 56% (Forma et al., 2022), and comparing this projects ISI mean improvement results of 54.17% the findings of this project are consistent with previous research. SE researched results had a wider range of between 18.07%-36.77% (Koffel et al., 2015; Okajima et al., 2011) mean improvement, and comparing this project's SE mean improvement results of 20.5%, the results are in range of expected outcome. PHQ-9 researched results had a mean change of 38.8% (Manber et al., 2011) and comparing this project's PHQ-9 mean reduction results of 50%, the findings of this project are higher than the researched results.

A significant area of difference in project results versus previous researched findings for CBT-I implementation is the project attrition rate. Studies have shown that electronically derived CBT-I has an average study dropout rate of 24.7% (Zachariae et al., 2016). Dropout rates are typically measured by those patients that did not complete post-assessments, not necessarily those who did not complete interventions throughout CBT-I. Additionally, face-to-face CBT-I has a reported attrition rate of 0.0% to 33% (Zachariae et al., 2016). For this project, there were no patient dropouts, even though it was electronically derived and had a face-to-face component simultaneously. A few reasons may have been due to the small group size, the longer project implementation duration (Zachariae et al., 2016), and/or the group leaders' expertise with motivating the patients throughout the entire project implementation. MI techniques were an important part of this project implementation as CBT-I is notoriously hard for participants to implement, specifically in the first 2-4 weeks. Incorporating MI throughout project implementation, but specifically from the beginning of the project was likely one of the biggest reasons participants continued to work on CBT-I skills and reduced overall group attrition rate.

Impact of Project on People and Systems

Overall, this project had a positive impact on the participants and the group leader. All patients were able to identify positive outcomes they benefited from, mainly sleep improvement. Those that were very engaged, implemented necessary changes to their habits and were compliant with the program found greater impact on their sleep and other measured outcomes. The group leader learned much about working with patients in a group setting, was able to delineate the project results in a visual manner that was exciting to discover and explain to those who have shown interest in this project outcome.

Reasons for Differences Between Observed and Anticipated Outcomes

Ultimately, this project was anticipated to have successful outcomes. The research supports positive outcomes for a high percentage of patients who engage in CBT-I. Those anticipated positive outcomes are supported in the post project results but were likely increased due to the addition of MI throughout project implementation. Although there was not data collected on each participant, 60% of participants did report a positive impact to their chronic pain levels.

Costs and Strategic Trade-Offs

While the cost of this initial project implementation was greater than projected, moving forward the project cost should be more aligned with the initial projected project cost. Much of the increased cost was associated with time spent for project creation, weekly power points that were used, creation of motivating communications, and reviewing content from training to ensure accurate dissemination. Now that the initial project development has been created by the group leader based on her preferences, to implement the project again, the initial project cost should be more accurate. It may cost less to run another project implementation now that all the information has been developed.

Policy Implications

No policy implications were found.

Conclusions

Usefulness of the Work and Sustainability

Implementation of CBT-I is extremely useful for management or resolution of insomnia symptoms in patients. CBT-I is an evidence-based treatment modality and showing through this project implementation that it can be pared with MI to further increase patient engagement and

sustainability throughout project duration is valuable to the mental health field. While this project did reinforce the usefulness of CBT-I, it additionally showed that this treatment modality can be altered to fit an alternative care delivery by utilization of telehealth and electronic communications.

Potential for Spread to Other Contexts

CBT itself has been utilized since the 1960s (Chand et al., 2022). Since then, there have been multiple branches from basic CBT into specialized areas such as trauma, addiction, insomnia, and depression. While there is always potential for spread into other focused areas of mental health treatment, it is likely that most of them have been explored and specific treatment established.

Implications for Practice and Further Study

An implication for this writers practice is to further implement CBT-I throughout her patient base to provide greater impact to those who suffer from insomnia. Insomnia symptoms are often associated with other mental health diagnosis like depression and anxiety (Manber et al., 2008) and this project implementation has supported the use of CBT-I to also positively impact those diagnosis as well. Further study will likely be prudent to ensure that this writer is aware of new and/or improved implementation modalities that could possibly be more effective or efficient.

Next Steps and Dissemination

Next steps for this writer are to coordinate with other providers at the practice to determine a continued need for CBT-I that could potentially be implemented on a one-on-one basis. One barrier to providing CBT-I implementation for this project specifically was the time of day that weekly sessions were held. Likely if patients could have more access to appointments

during the typical workday of this writer, there may be more opportunity for growth and practice of CBT-I implementation in her practice. Project dissemination can occur at the clinic in which the project was implemented at. A presentation to stakeholders and colleagues can occur to provide stakeholders with evidence of project completion and results and allow colleagues to further understand the positive impact utilization of CBT-I with MI can have on their own patients. It can be equally important to allow more colleagues to obtain certification to implement CBT-I with MI in their own patient base, thus increasing patient access to care, and significantly improving patients with diagnosis like insomnia, depression, and chronic pain quality of life.

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Appendices

Appendix A

Literature Review Summary Table

TITLE OF ARTICLE	AUTHORS	RESEARCH QUESTION OR AIM OF THE ARTICLE	TYPE OF STUDY (DESIGN)	LEVEL OF EVIDENCE	DESCRIPTION OF SAMPLE	OUTCOME MEASURES	RESULTS/KEY FINDINGS
A meta-analysis on the treatment effectiveness of cognitive behavioral therapy for primary insomnia	Isa Okajima, Yoko Komada, & Yuichi Inoue (Okajima et al., 2011)	To examine the therapeutic effectiveness of CBT-I, using meta-analysis focused on the effect sizes of objective sleep parameters, self-rating scales, and the problem of publication bias.	Meta-analysis	Level 4 Good quality	14 RCT studies	Pittsburgh Sleep Quality Index (PSQI); Insomnia Sleep Questionnaire (ISQ); Sleep Impairment Index (SII); Dysfunctional Beliefs and Attitudes about Sleep scale (DBAS); Beck Depression Inventory (BDI); State-Trait Anxiety Inventory (STAI); Self-Efficacy Scale (SES); Profile	● Confirmed findings of the effectiveness of CBT-I ● 14 of the RCT studies found statistical improvements to each of the seven different measurements associated with sleep quality, time, duration, etc. throughout CBT-I implementation. ● Long term positive impacts to sleep were continued to be observed through the 12 month follow up point. Some measured variables showed a small improvement at the conclusion of treatment, and significant improvement at the 12 month follow up, specifically sleep onset latency (SOL). ● While impacts to other diagnoses other than sleep were not the focus of the article, measurements of

						of Mood States (POMS)	depressive symptoms at the beginning and end of CBT-I implementation resulted in a statistical improvement of depressive symptoms. These positive results were also evident at the three month follow up and are thought to be associated with improvements to insomnia symptoms. ● Weighted effect sizes evaluated and found medium to large treatment effectiveness. ● Publication bias was found, but the results still support the effectiveness of CBT-I
Cognitive and behavioral therapies in the treatment of insomnia: A meta-analysis	Annemieke Van Straten, Tanja Van der Zweerde, Annet Kleiboer, Pim Cuijpers, Charles Morin & Jaap Lancee	To quantify the effects of educational, behavioral and cognitive therapies for insomnia, based on all available RCT's and to perform sub group analysis as a function of	Meta-analysis	Level 1 Good quality	87 RCT studies	Insomnia Severity Index (ISI); PSQI	● Using CBT-I either in full or only using some components are shown to still be considered an effective treatment that positively impacts insomnia symptoms. ● 4 Face to face sessions seem to be more effective than self-help or less than 4 face to face sessions. 4 face to face sessions are optimal, but 5 or more sessions are more effective. ● Over 87 studies that included 6,303 patients, all of the measured outcomes resulted with positive statistical

	(Van Straten et al., 2018)	several potential moderators of treatment outcomes.					improvements supporting the efficacy of CBT-I.
Cognitive behavioral therapy for insomnia comorbid with psychiatric and medical conditions	Jade Wu, Erica Appleman, Robert Salazar, & Jason Ong (Wu et al., 2015)	To determine if CBT-I is effective in patients with comorbid insomnia. Additionally, what is the effect of CBT-I on outcomes related to the comorbid condition?	Meta-analysis	Level 1 Good quality	37 RCT's with at least 1 CBT-I arm	ISI; PSQI	● CBT-I is effective for improving insomnia symptoms and sleep parameters for patients with insomnia. ● 36% of patients who completed CBT-I were in remission from their symptoms of insomnia based on the results of the ISI and PSQI ● Of the five measurements associated with sleep, comparing initial patient report to conclusion of CBT-I patient report, all five measurements showed a statistically robust improvement to insomnia related symptoms. ● Larger effects were found in patients with psychiatric conditions compared to medical conditions. ● 2 possible hypotheses: insomnia symptoms may be more strongly related to emotional symptoms and/or greater improvements to psychiatric symptoms may be because patients benefit

							globally from CBT-I elements, which are effective at reducing depression and anxiety as well as improving patient's quality of life.
Cognitive behavioral therapy for insomnia: A meta-analysis of long-term effects in controlled studies	Tanja Van der Zweerde, Lampros Bisdounis, Simon Kyle, Jaap Lancee, & Annemieke Van Straten (Van Straten et al., 2018)	To investigate the long-term effects in 30 RCTs comparing CBT-I to non-active control groups.	Meta-analysis	Level 1 Good quality	30 RCT studies	PSQI	● CBT-I produces clinically significant effects that last up to a year after therapy. ● Established long term effects strengthen claims that CBT-I outperforms pharmacotherapy in the long run and is the preferred treatment for insomnia
Cognitive behavioural therapy for insomnia monotherapy in patients with medical or psychiatric comorbidities:	Fu-Chun Zhou; Yuan Yang; Yuan-Yuan Wang; Wen-Wang	To compare CBT-I monotherapy with active control treatment for insomnia in patients with major	Meta-analysis	Level 1 Good quality	13 RCT studies	ISI; PSQI; DBAS	● Found consistent results of CBT-I use superior overactive control groups for treatment of insomnia. ● Statistical improvement was found in sleep onset, wake after sleep onset, sleep quality, PSQI screening, and DBAS scores. The effect sizes were

A meta-analysis of randomized controlled trials	Rao; Shu-Fang Zhang; Liang-Nan Zeng; Wei Zheng; Chee Ng; Gabor Ungvari; Ling Zhang; Yu-Tao Xiang (Zhou et al., 2020)	medical or psychiatric disorders.					generally smaller than other research studies but continue to prove efficacy. ● Superiority of CBT-I persisted 3 months after treatment completion. ● CBT-I appears to be more effective in treating insomnia patients with psychiatric disorders over patients with medical disorders.
Efficacy of cognitive behavioral therapy for comorbid insomnia: A meta-analysis	Isa Okajima, Yuichi Inoue (Okajima & Inoue, 2018)	To assess the efficacy of CBT-I for both the severity of insomnia symptoms and important disease-related outcomes	Meta-analysis	Level 1 Good quality	30 RCT studies	ISI	● CBT-I effect size was medium, but the effect was significantly larger for psychiatric symptoms than medical symptoms. ● CBT-I for comorbid insomnia seemed to be more effective at improving sleep parameters than control treatments.

		comorbid with psychiatric or medical diseases.					
A meta-analysis of group cognitive behavioral therapy for insomnia	Erin Koffel, Jonathan Koffel, & Philip Gehrman (Koffel et al., 2015)	To use meta-analytic techniques to examine the efficacy of group CBT-I.	Meta-analysis	Level 1 Good quality	8 RCT studies	PSQI; BDI	● Found large treatment gains relative to control groups using group CBT-I implementation. ● Patients had small, but significant improvement with depression symptoms, even though these symptoms were not the target of treatment. ● Positive treatment outcomes were continued at a significant level at post treatment follow up. ● Consistent, continued long term effects shown over several RCTs support aspects of insomnia continue to show improvement over time after CBT-I has been completed. ● Overall, clear findings that group CBT-I is efficacious treatment for insomnia.

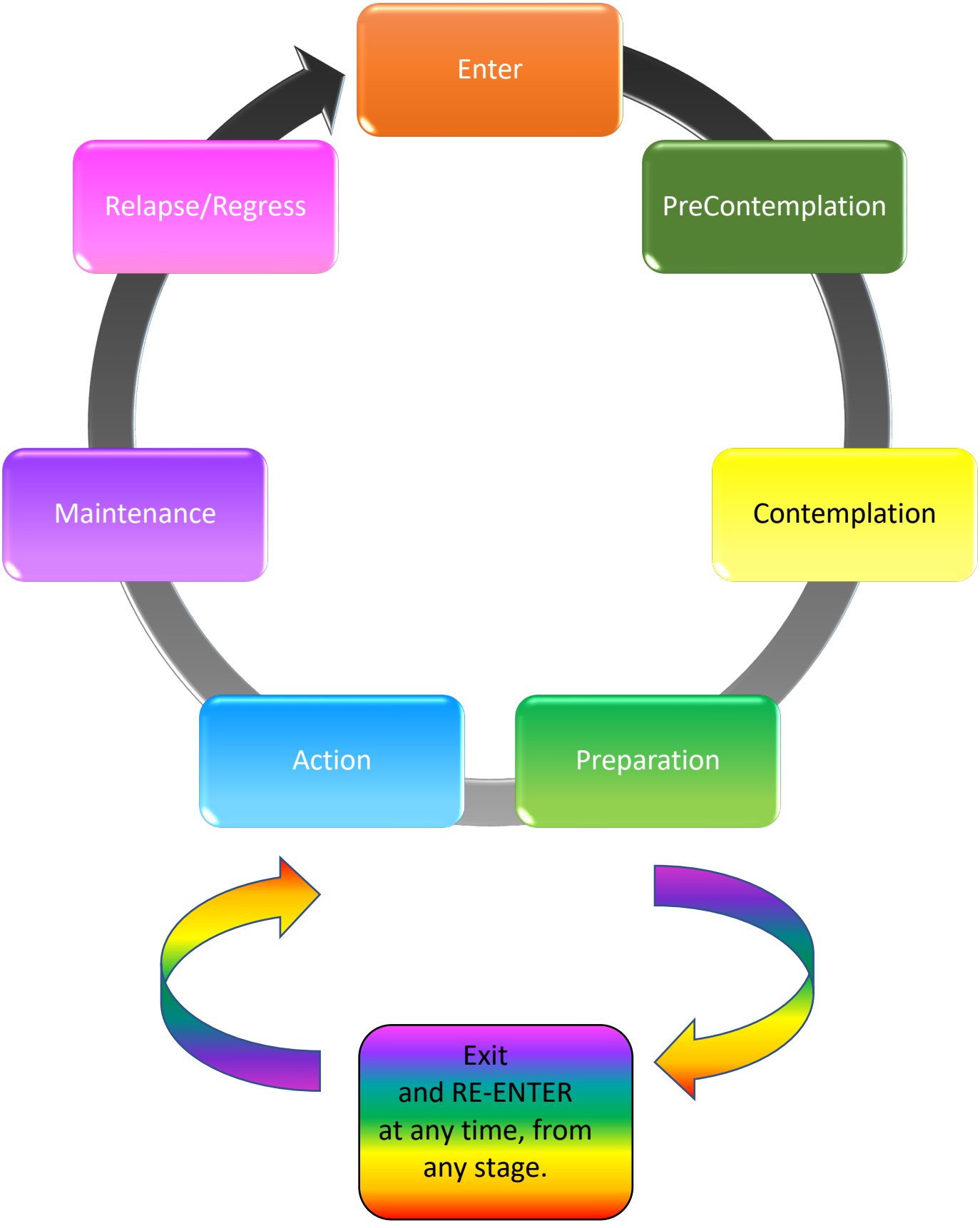
A pilot study of cognitive-behavioral therapy of insomnia in people with mild depression	Daniel Taylor, Kenneth Lichstein, Jeremiah Weinstock, Stacy Sanford, & Jeff Temple (Taylor et al., 2007)	To investigate the effectiveness of treating only the insomnia in participants with both insomnia and depression to see if there is a transfer of gains to depression.	Quasi-experimental study	Level 1 Good quality	10 participants recruited through newspaper advertisements	BDI	● Participants who completed CBT-I, 100% no longer met the definition for insomnia. ● 87.5% had depression scores reduced to the normal range. ● Significant improvements in insomnia studies are consistent with previous research
CBT for insomnia in patients with high and low depressive symptom severity: Adherence and clinical outcomes	Rachel Manber, Rebecca Bernert, Sooyeon Suh, Sara Nowakowski, Allison Siebern, & Jason Ong	To evaluate whether depressive symptoms severity leads to poorer response and perceived adherence to CBT-I and examine the impact of CBT-I on well-being,	Quasi-experimental study review	Level 2 Good quality	Analyzed data gathered from 301 participants, who participated in 7-90 minute sessions of group CBT-I	BDI	● Found that CBT-I works equally well among patients with high vs low depression severity. ● Results suggest that CBT-I positively impacts several non-sleep related aspects of depression, and this did not differ according to depression severity. ● CBT-I additionally has a clinically significant decrease to suicidal ideation

	(Manber et al., 2011)	depressive symptoms severity, and suicidal ideation					
Cognitive-behavioral therapy of insomnia: A clinical case series study of patients with co-morbid disorders and using hypnotic medications	Diana Dolan, Daniel Taylor, Adam Bramoweth, & Leon Rosenthal (Dolan et al., 2010)	Case-series study in a community sleep medicine clinic assessed the effectiveness of an eight-session CBT-I protocol chronic insomnia patients who were allowed to continue their use of hypnotics	Quasi-experimental study review	Level 2 Good quality	Chart review of 48 participants, who participated in over 7 CBT-I sessions, patients not required to stop using their current sleep medications.	ISI; DBAS-16; Sleep-Wake Activity Inventory Excessive Daytime Sleepiness (SWAI-EDS); and Nighttime Sleepiness (SWAI-NS)	● Demonstrated effectiveness of CBT-I in a community sleep medicine clinic ● Significant positive changes were noted in all sleep diary variables with the exception of total sleep time. ● Patients who completed CBT-I had significant behavioral improvements early on in treatment and continued to benefit from both behavioral and cognitive components until treatment ended
Randomized controlled trial of telephone-delivered cognitive	J. Todd Arnet, Leisha Cuddihy, Leslie	To compare the efficacy of telephone-delivered cognitive-	RCT	Level 1 Low quality Outcomes in line with	30 participants, receiving telephone delivered	PSQI; DBAS-16; STAI; Quick inventory of Depressive Symptomatolog	● Findings provide preliminary support for telephone delivered CBT-I compared to pamphlet provided treatment.

behavioral therapy for chronic insomnia	Swanson, Scott Pickett, James Aikens, & Ronald Chervin (Arnedt et al., 2013)	behavioral therapy for insomnia to an information pamphlet control on sleep and daytime functioning at pretreatment, posttreatment, and 12-week follow up.		common evidence; authors need more detailed assessment	CBT-I treatment vs. participants who got pamphlet provided treatment	y Self-Report (QIDS-SR); State-Trait Anxiety Inventory-Trait subscale (STAI-T); Multidimensional Fatigue Inventory (MFI-20); 12-item Short Form Health Survey (SF-12)	● Telephone derived care is feasible and supported by excellent retention rates throughout treatment and the 12 week follow up ● 80% of BCT-I phone patients continued to be classified as "in remission" from insomnia after 12 weeks of completion

Appendix B

Theoretical Model: Transtheoretical Model of Change (LaMorte, 2019)



Appendix C

Logic Model

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
What we invest: resources and contributions	**What we do**	**What we accomplish or produce from the activities**	**Who we reach with our activities**	**The expected changes attainable during the DNP Scholarly Project timeline.**	**The expected changes attainable 6 months - 2 years after the DNP Project is implemented.**	**Fundamental changes for participants or community because of project activities, 3-5 years after project implementation.**

Resources/Inputs	**Activities**	**Outputs**		**Outcomes: Short term**	**Outcomes: Intermediate**	**Outcomes: Long term**
-CBT-I group leader (DNP Student) -Stakeholders (upper management/ownership) -Project champions (clinical providers) -CBT-I certification course -Motivational interviewing course -Selected patient group	-Implement CBT-I in a group setting. -Develop supportive patient engagement content -Develop/utilize patient educational content to further engage patients throughout implementation phase -Utilize motivational interviewing to promote engagement and encouragement throughout implementation phase	-Assessment & evaluation of patient's sleep quality	-Selected patient group, 10 patients based on selection criteria -Patient's sleep partners -Patient's family group -Patient's employment group	1. PO: 80% of the selected group of patients completed CBT-I treatment by attending 8 weekly group implementation sessions that were held between May 2022-August 2022.	9. 3 additional clinicians obtained CBT-I certification to provide CBT-I to a larger patient base throughout the clinic.	12. Patients who participated in CBT-I had an increase to their quality of sleep with significantly reduced use of sleep aid medication.

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
-CBT-I group leader -Selected patient group -PSQI	-Implement CBT-I in a group setting. -Obtain permission to use PSQI screening tool - Utilize PSQI to measure effects of CBT-I prior to CBT-I implementation and after CBT-I implementation -Analyze and record results	-Assessment & evaluation of patient's sleep quality using the PSQI	-Selected patient group, 10 patients based on selection criteria.	2. CO: Participants in CBT-I reduced their Pittsburg Sleep Quality Index (PSQI) score by a mean reduction of 10% after completion of 8 weeks of therapy between May 2022-August 2022.	10. Advertised CBT-I availability at the clinic increased patient self-referral for mental health services.	13. Patients had a positive impact on their comorbid mental health conditions with the use of CBT-I seen reduction to depressive symptoms, reduction to anxiety symptoms, and an increase to their quality of sleep.

Resources/Inputs	**Activities**	**Outputs**		**Outcomes: Short term**	**Outcomes: Intermediate**	**Outcomes: Long term**
-CBT-I group leader -Selected patient group -ISI	-Implement CBT-I in a group setting. -Obtain permission to use the ISI -Utilize ISI to measure effects of CBT-I prior to CBT-I implementation and after CBT-I implementation -Analyze and record results	- Assessment & evaluation of patient's sleep quality using the ISI	-Selected patient group, 10 patients based on selection criteria.	3. CO: Patients who completed 8 weeks of CBT-I implementation therapy, reported a 15% increase in restorative sleep patterns as evidenced by the measured mean between an initial survey in May 2022 and a repeat survey in August 2022 of the Insomnia Severity Index (ISI).	11. Clinic revenue increased by 15% due to offering CBT-I services.	14. Through the use of CBT-I, many patients no longer required the use of potentially addictive medications to obtain quality sleep and have decreased negative side effects from those medications.

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
-CBT-I group leader -Selected patient group -Sleep diary	-Implement CBT-I in a group setting. -Obtain Sleep diary use permission (Free online, just need to verify can use) -Provide each patient a weekly sleep diary that allows them to self-track their sleep medication administration each week throughout CBT-I implementation	-Gain further understanding of patient's individual sleep habits/patterns, use of sleep aids. -Trackable information over time about effects of implementation of CBT-I	-Selected patient group, 10 patients based on selection criteria.	4. CO: During their 8-week CBT-I implementation therapy, patients that used sleep aid medication, were able to reduce nightly use of sleep aid medication by 10% per weekly self-report of their sleep aid administration between May 2022-August 2022.		15. Of the patients who were unable to fully discontinue the use of sleep aid medication, many reported a continued overall reduction to the use of sleep aid medication, a decrease in depressive symptoms, and an increase to the use of skills learned in CBT-I to achieve restorative sleep.

Resources/Inputs	**Activities**	**Outputs**		**Outcomes: Short term**	**Outcomes: Intermediate**	**Outcomes: Long term**
-CBT-I group leader -Selected patient group -Sleep diary	-Implement CBT-I in a group setting. -Obtain Sleep diary use permission (Free online, just need to verify can use) -Provide each patient a weekly sleep diary that allows them to self-track their total sleep time each week throughout CBT-I implementation.	-Patient's nightly total sleep time improves -Trackable information over time about effects of implementation of CBT-I	-Selected patient group, 10 patients based on selection criteria.	5. CO: Patients who completed 8 weeks of CBT-I implementation therapy were able to increase their total sleep time by 20% as evidenced by their weekly sleep diary measured between May 2022-August 2022.		16. The clinic is maintaining a regular, rotating patient base seeking and engaging in CBT-I implementation, aiding many patients in Oregon with restorative sleep, without the use of sleep aid medication

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
-CBT-I group leader -Selected patient group -PHQ-9	-Implement CBT-I in a group setting. -Obtain permission to use PHQ-9 measurement tool -Measure PHQ-9 prior to CBT-I implementation and after CBT-I implementation	-Assessment and evaluation of patient's level of depressive symptoms using the PHQ9.	-Selected patient group, 10 patients based on selection criteria. -Patient's sleep partners -Patient's family group -Patient's employment group	6. CO: Patients with a co-occurring depressive diagnosis, who participated in 8 weeks of CBT-I implementation therapy, reported a mean reduction in depressive symptoms by 10% as evidenced by the use of the PHQ-9 measurement tool initially in May 2022 and repeated in August 2022.		

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
-CBT-I group leader -Patient group -Develop survey (Survey Monkey)	-Implement CBT-I in a group setting. -Provide a survey upon initiation and completion of CBT-I that questions patient's subjective confidence level related to their ability to sleep.	-Patient's confidence surrounding ability to sleep improves	- Selected patient group, 10 patients based on selection criteria.	7. CO: Patients who completed 8 weeks of CBT-I implementation therapy reported a 20% increase to their level of confidence related to the patient's ability to sleep as evidenced by the patient's self-report comparing reports from May 2022 and August 2022.		

Resources/Inputs	Activities	Outputs		Outcomes: Short term	Outcomes: Intermediate	Outcomes: Long term
CBT-I group leader -Patient group -Develop survey (Survey Monkey)	-Implement CBT-I in a group setting. -Provide a survey upon initiation and completion of CBT-I that questions patient's subjective level of motivation to begin/continue CBT-I as implementation of CBT-I became difficult.	-Patient's level of engagement or confidence in beginning/continuing with CBT-I is maintained or improved.	- Selected patient group, 10 patients based on selection criteria.	8. PO: At least 50% of patients indicated throughout group sessions and email contacts they felt motivated by the group leader to continue through the CBT-I implementation process as evidenced by the patient's self-report via post implementation Likert scale answers of "agree" or "strongly agree".		

Adapted from: Logic Model Foundation Development Guide, pg 4.
http://www.wkkf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide

Appendix D

Outcomes Evaluation Table

Outcome	Data Collection Instrument / Data	Analysis Goal	Analytic Technique
1. PO: 80% of the selected group of patients completed CBT-I treatment by attending 8 weekly group implementation sessions that were held between May 2022-August 2022.	**Instrument:** Weekly patient attendance documented via spreadsheet. **Data:** Attendance is an important part of CBT-I intervention. This data will aid the project to support tracking of patient participation in weekly meetings to further support the evidence-based efficacy of CBT-I.	To generate quantitative data to document patient attendance to aid in support of continued patient engagement related to efficacy of CBT-I.	Tracking attendance of how many sessions of CBT-I are offered vs. how many sessions each patient attended throughout implementation.

2. CO: Participants in CBT-I reduced their Pittsburg Sleep Quality Index (PSQI) score by a mean reduction of 10% after completion of 8 weeks of therapy between May 2022-August 2022.	**Instrument:** Pittsburg Sleep Quality Index (PSQI) is a standardized assessment questionnaire used to measure sleep quality and disturbances in clinical populations. This questionnaire has established reliability and validity.
	• Nineteen individual items to obtain a combined score of 0-21 (0 indicating no difficulty; 21 being most severe) based on seven "component" scores assessing:
	  ○ Subjective sleep quality
	  ○ Sleep latency
	  ○ Sleep duration
	  ○ Habitual sleep efficiency
	  ○ Sleep disturbances
	  ○ Use of sleep medication
	  ○ Daytime dysfunction
	Data: The sum of the seven components yields one global score to aid in determination of "improvement" or "regression" comparing scores pre and post CBT-I
		To generate quantitative data to evaluate patient sleep improvement or lack of over time, through the intervention of CBT-I using a standardized scale.	Descriptive Statistics: Mean change
			
			The results of each patient's PSQI will provide one piece of descriptive statistical data that can be used to evaluate the effectiveness and impact of CBT-I on participating patients.

	intervention. PSQI is a valid measurement tool described as "good" with a sensitivity of 89.6% and a specificity of 86.5% of patients versus control subjects. Reliability of the scale is considered good with Cronbach's alpha of 0.83 for the total score.		

3. CO: Patients who completed 8 weeks of CBT-I implementation therapy, reported a 15% increase in restorative sleep patterns as evidenced by the measured mean between an initial survey in May 2022 and a repeat survey in August 2022 of the Insomnia Severity Index (ISI).	**Instrument:** Insomnia Severity Index (ISI) is a standardized assessment questionnaire used to identify individuals with clinically significant insomnia in primary care settings. This questionnaire has established reliability and validity.
	
	• Seven item self-report Likert scale used to rate each item to obtain a combined score of 0-28 (0-7 indicating no clinically significant insomnia; 22-28 indicating severe clinical insomnia) assessing:
	  ○ Sleep onset
	  ○ Sleep maintenance
	  ○ Early morning awakening
	  ○ Sleep dissatisfaction
	  ○ Interference of sleep problems with daytime functioning
	  ○ Noticeability of sleep difficulties by others
	  ○ Distress caused by sleep difficulties
	
	Data: The sum of the seven scored self-scored items yields one global score to aid in determination of the severity of assigning an insomnia diagnosis, based on DSM-5 criteria, to a patient. This assessment can also be used to resolve a diagnosis of insomnia. ISI is a valid measurement tool described as "optimal" with a sensitivity of 82.4% and a specificity of 82.1% for detecting clinical insomnia. Reliability of the scale is considered excellent with Cronbach's alpha of 0.92.
		To generate quantitative data to evaluate patient's resolution of lack of resolution related to symptoms of insomnia through the intervention of CBT-I using a standardized scale.	Descriptive Statistics: Mean change
			
			The results of each patient's ISI will provide one piece of descriptive statistical data that can be used to evaluate the effectiveness and impact of CBT-I on participating patients.

4. CO: During their 8-week CBT-I implementation therapy, patients that used sleep aid medication, were able to reduce nightly use of sleep aid medication by 10% per weekly self-report of their sleep aid administration between May 2022-August 2022.	**Instrument:** Sleep diary **Data:** Diary is completed each morning and evening by filling in information about sleep quality, time slept, sleep quality, disturbing factors, caffeine intake, exercise, naps, alcohol intake, and medications. Data categories measured: sleep duration, quality, disturbances, caffeine intake, exercise, naps, alcohol intake, and medications. Validity and reliability has not been calculated, but during the original development of the Standardized Sleep Diary, focus groups were completed and patient/subject feedback was obtained about question content. Sleep diaries must be augmented with other tools allow for a broader assessment of sleep.	To generate qualitative data that provides descriptions of patient's identifiable local contexts related to sleep, medication interventions, and subsequent impact to their sleep.	Descriptive Statistics: Measure of Frequency (percent) plotted. The results of each patient's weekly sleep diary will provide one piece of descriptive statistical data that can be used to evaluate the effectiveness and impact of CBT-I on participating patients.
5. CO: Patients who completed 8 weeks of CBT-I implementation therapy were able to increase their total sleep time by 20% as evidenced by their weekly sleep diary measured between May 2022-August 2022.	**Instrument:** Sleep diary **Data:** Diary is completed each morning and evening by filling in information about sleep quality, time slept, sleep quality, disturbing factors, caffeine intake, exercise, naps, alcohol intake, and medications. Data categories measured: sleep duration, quality, disturbances, caffeine intake, exercise, naps, alcohol intake, and medications. Validity and reliability has not been calculated, but during the original development of the Standardized Sleep Diary, focus groups were completed and patient/subject feedback was obtained about question content. Sleep diaries must be	To generate qualitative data that provides descriptions of patient's identifiable local contexts related to sleep, environment, disturbing factors, and subsequent impact to their sleep.	Descriptive Statistics: Measure of Frequency (percent) plotted. The results of each patient's weekly sleep diary will provide one piece of descriptive statistical data that can be used to evaluate the

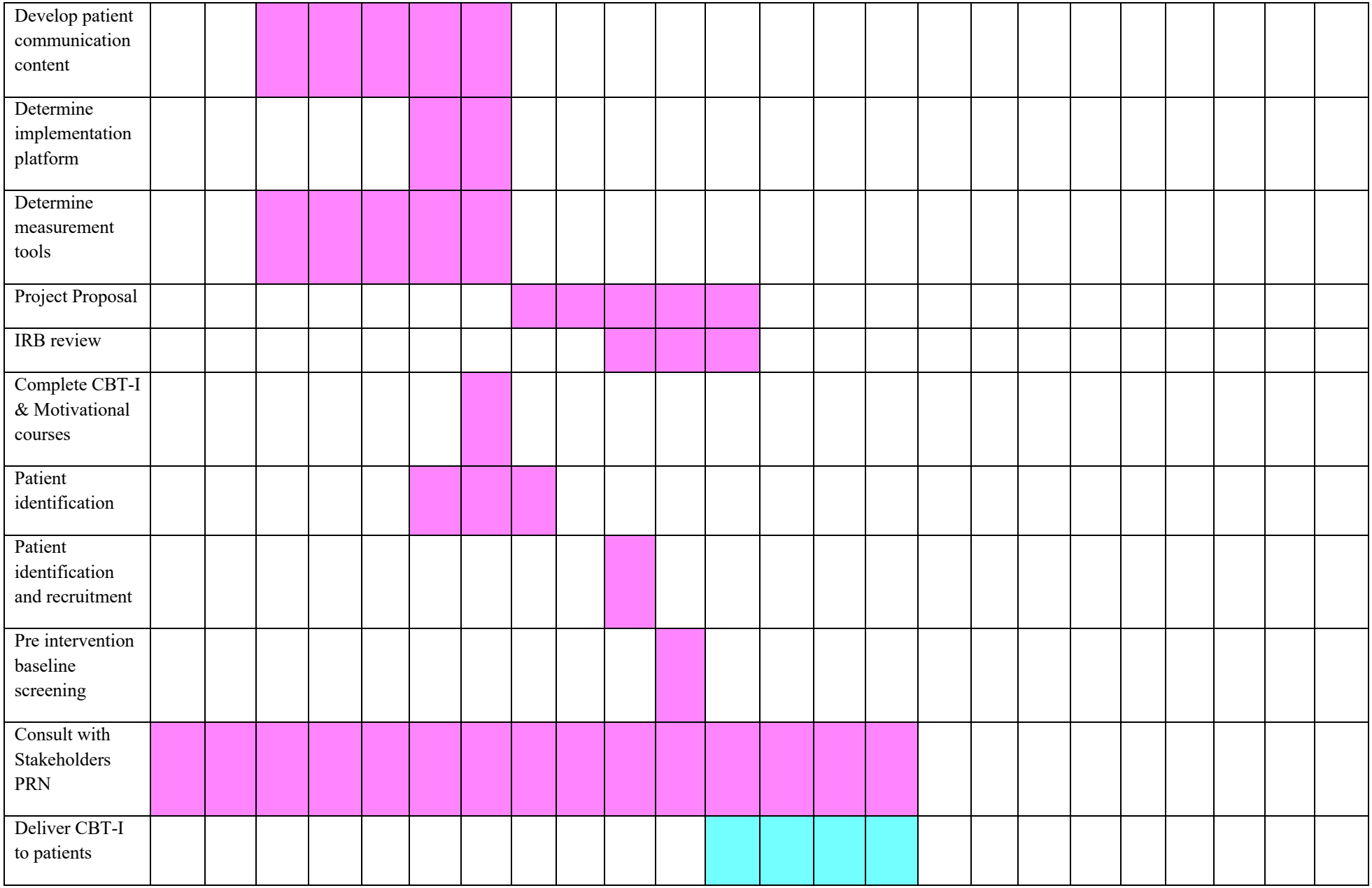
	augmented with other tools allow for a broader assessment of sleep.		effectiveness and impact of CBT-I on participating patients.
6. CO: Patients with a co-occurring depressive diagnosis, who participated in 8 weeks of CBT-I implementation therapy, reported a mean reduction in depressive symptoms by 10% as evidenced by the use of the PHQ-9 measurement tool initially in May 2022 and repeated in August 2022.	**Instrument:** Patient Health Questionnaire (PHQ-9) is a standardized assessment questionnaire used to identify depressive symptoms related to the diagnostic criteria of Major Depressive Disorder in the DSM-5. This questionnaire has established reliability and validity. • Nine item self-report Likert scale used to rate each item to obtain a combined score of 0-27 (0-4 indicating minimal depression; 20-27 indicating severe depression) assessing: o Interest o Hope o Sleep o Energy o Appetite o Concentration o Suicidal ideations **Data:** The sum of the nine scored self-scored items yields one global score to aid in determination if the patient meets criteria for a diagnosis of depression and the severity, based on DSM-5 criteria. PHQ9 is a valid measurement tool described as "excellent" with a sensitivity of 81.1% and a specificity of 90.7% for diagnosing Major Depression. Reliability of the scale is considered excellent with Cronbach's alpha of 0.89.	To generate quantitative data to evaluate the patient's improvement or lack of improvement specifically related to symptoms of depression through the intervention of CBT-I using a standardized scale.	Descriptive Statistics: Mean change The results of each patient's PHQ-9 will provide one piece of descriptive statistical data that can be used to evaluate the effectiveness and impact of CBT-I on participating patients.

7. CO: Patients who completed 8 weeks of CBT-I implementation therapy reported a 20% increase to their level of confidence related to the patient's ability to sleep as evidenced by the patient's self-report comparing reports from May 2022 and August 2022.	**Instrument:** Self developed Likert scale (1-3 questions) **Data:** Assessing patient confidence surrounding their ability to initiate sleep, maintain sleep, and obtain restful sleep pre and post CBT-I intervention. Not independently valid or reliable, however valid or reliable questions will be redeveloped to be applicable to this project.	To generate quantitative data that is specific to current project implementation that assesses patient confidence surrounding sleep pre and post CBT-I implementation.	The results provides clinicians with direct information regarding patient confidence pre and post CBT-I implementation, and gives a direct comparison of actual to projected outcome to level of patient confidence surrounding patient's independent ability to sleep.
8. PO: At least 50% of patients indicated throughout group sessions and email contacts they felt motivated by the group leader to continue through the CBT-I implementation process as evidenced by the patient's self-report via post implementation Likert scale answers of "agree" or "strongly agree".	**Instrument:** Self developed Likert scale (1-3 questions) **Data:** Assessing patient motivation surrounding initiating, continuing, and completing CBT-I based on leader's contact throughout the program and ability to motivate patients. Obtains patient perception of usefulness of MI techniques utilized throughout 8 weeks of CBT-I project implementation, to determine if patients felt supported and encouraged to continue their participation. Not independently valid or reliable, however valid or reliable questions will be redeveloped to be applicable to this project.	To generate quantitative data that is specific to current project implementation supporting the use of MI to encourage patient engagement and continued participation throughout project timeline.	The results of the use of MI in conjunction with CBT-I aids clinicians with supporting patients more thoroughly in CBT-I implementation. Provides comparison of actual to projected outcome increase to level of motivation.

Appendix E

Timeline

Project: Implementing Cognitive Behavioral Therapy for Insomnia in the Mental Health Setting																								
	Month/Year																							
Activity	June 21	July 21	Aug 21	Sept 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	June 22	July 22	Aug 22	Sept 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23
Scholarly Project Proposal																								
Logic Model Development																								
Literature Review Finalization																								
Research CBT-I courses																								
SWOT analysis																								
Organizational assessment																								
Budget Development																								
Develop patient implementation timeline																								
Develop implementation work schedule																								


Develop patient communication content
Determine implementation platform
Determine measurement tools
Project Proposal
IRB review
Complete CBT-I & Motivational courses
Patient identification
Patient identification and recruitment
Pre intervention baseline screening
Consult with Stakeholders PRN
Deliver CBT-I to patients

Post intervention screening																							
Data analysis																							
Final project report																							
DNP project presentation																							

Appendix F

Scholarly Project Expense Report

					Grand Total	**$ 7,665.97**
Expense Category	**Expense Description**	**Explanation of Expense**	**Type of Cost (variable/fixed)**	**Volume**	**Cost per Unit**	**Total**
Personnel	CBT-I group leader (PMHNP)	PMHNP facilitating CBT-I group therapy. Hourly rate is an average based on organizational HR data.	Variable	1 PMHNP group leader = 20 hrs.	$85/hr	$1,700.00
Personnel	CBT-I group leader (PMHNP)	1 group leader Leader wages for technical preparation, organization of delivered content, initiation of HIPAA compliant electronic communication platform (G-Suite), initiation of SurveyMonkey platform and develop survey content, selection of patient group, obtain permissions for use of assessment tools, initiate assessment tools in IntakeQ, disseminate program content electronically	Variable	1 PMHNP group leader = 40 hrs.	$80/hr	$3,200.00
Material & Supplies	Paper	Miscellaneous forms/information that needs to be printed	Fixed	1 ream of paper	$18.49/3 reams	$18.49
Material & Supplies	Printer Ink	Miscellaneous forms/information that needs to be printed	Fixed	1 ink cartridge	49.89/1 cartridge	$49.89
Equipment	Computer	Computer for group sessions, dissemination of content, electronic communication, obtain consent for use of assessment tools	Fixed	1 Computer	$500/1 computer	$500.00
Equipment	Cell Phone	Verbal communication between patient and provider	Fixed	1 Cell Phone for 4 months	$120/month	$480.00
Equipment	Printer	Print out forms/information if needed for patients	Fixed	1 Printer	$120/printer	$120.00

Equipment	Internet Access	Access for virtual group sessions, dissemination of content, electronic communication	Fixed	Internet access for 4 months	$50/month	$200.00
IT	CBT-I training course	Certification for educating/implementing CBT-I	Fixed	Training access for 1 user	$175/user	$175.00
IT	Motivational Interviewing course	Supplement CBT-I motivation	Fixed	Training access for 1 user	$178.99/user	$178.99
IT	HIPAA compliant G-Suite	Patient communication, educational information dissemination, tele-group therapy	Fixed	1 suite user	$144/year per user	$144.00
IT	Survey Monkey	Patient surveys	Fixed	1 suite user	$300/year per user	$300.00
IT	IntakeQ	Standardized assessment tool in electronic format	Fixed	1 suite user	49.90/mo	$199.60
Assessment tools	Sleep diary, PSQI, ISI, PHQ9 or BDI permission	Use license if needed	Variable	3-4 standardized assessment tools	$50/tool	$200.00
Marketing	Project Poster Board	Describe and display DNP project information	Fixed	1 professionally printed poster board	$200	$200.00

2-3 Year Budget				
Yearly Totals:	**$ 7,665.97**	**$ 9,387.40**	**$ 9,707.20**	
Expense Category	**Year 1**	**Year 2**	**Year 3**	**Rationale**
Personnel	$ 4,900.00	$ 5,047.00	$ 5,198.41	Assumes ongoing PMHNP facilitation and group leadership investment is maintained over a 3-year period to ensure adoption and sustainability. A 3% increase in salary each year is included for years 2 & 3 (Statisa Research Department, 2021).
Material & Supplies	$ 68.38	$ 71.80	$ 75.39	Assumes materials and supplies needed remain constant over a 3-year period. A 5% annual increase is included for years 2 & 3 (U.S. Bureau of Labor Statistics, 2021).
Equipment	$ 1,300.00	$ 2,142.00	$ 2,249.00	Purchase price of 1 computer budgeted in Year 1 only. Assumes a 5% annual increase to internet and cell phone service is included for years 2 & 3 (U.S. Bureau of Labor Statistics, 2021).
IT	$ 997.59	$ 1,926.60	$ 1,984.40	Assumes 2 new certified users each year. A 3% annual access increase for certification, courses, surveys, communication & assessment platforms is included for years 2 & 3 (Statisa Research Department, 2021).
Assessment tools	$ 200.00	$ 200.00	$ 200.00	Tools will be used across the 3 years. According to the contact terms, no increase will be incurred once permissions are obtained in year one.
Marketing	$ 200.00	$ -	$ -	Describe and display information regarding DNP project implementation and information from year one only.

References

Statisa Research Department. (2021). *Projected inflation rate 2010-2026*. https://www.statisa.com/statistics/244983/projected-inflation-rate-in-the-united-states/

U.S. Bureau of Labor Statistics. (2021). Consumer Price Index rose 5.3 precent over the year ending August 2021. The Economics Daily. https://www.bls.gov/opub/ted/2021/consumer-price-index-rose-5-3-percent-over-the-year-ending-august-2021.htm

Statement of Operations		
Operating Income		**$0**
	Revenue Total	**$ 17,665.97**
Source	**Description**	**Amount**
No revenue- this is a subsidized project with no associated revenue. In-kind contributions outlined are provided by the DNP student and the sponsoring organization.	In-kind Personnel	$4,900.00
	In-kind Materials	$68.38
	In-kind Equipment & IT	$2,297.59
	In-kind Assessment tools	$200.00
	In-kind Marketing	$200.00
	Insurance billings	$10,000.00
	Expenses Total	**$ 17,665.97**
Expenses	**Description**	**Amount**
Personnel		$4,900.00
Material & Supplies		$68.38
Equipment & IT		$2,297.59
Assessment tools		$200.00
Marketing		$200.00
In-kind Insurance billings		$10,000.00

Appendix G

Educational Plans and Materials

Week 1

Balloon:

- Slow build throughout the day, building your sleep drive
- Blowing up a balloon throughout the day, so you have your balloon nice and full and taught
- Think about what happens when you then let go of a blown up balloon. Lots of pressure released right away, and then a slow dribble at the end.
    - The release of that disperses the chemical that has built up all day, which accomplishes Slow Wave Sleep or Deep Sleep. This stage is associated with your deep sleep for the first half of your nightly sleep!
    - Not related to clock time, it's related to the amount of buildup that you have.
- Many people with insomnia are fatigued. So going to bed early can impact your balloon. Results in less pressure, less deep sleep and translates more as a very efficient nap for the first part of the night, and usually awakening happens in the middle of the night.

Young Children

- If you have young children or know friends/family members that do, the importance of a schedule is huge.
- Imagine having a dinner party with someone who has a young child and dinner is at 8pm. Why would this be an issue?
- There is a huge unlikelihood that mom is going to allow their child to come, due to the timing of the dinner itself. The child's schedule will likely be off, will interfere with bedtime, disrupt the routine. We typically understand that we don't disrupt a child's routine and throw hugely discrepant ques to it. And we think we outgrow this????

Week 2

1. Go to bed only when sleepy
- No set bedtimes
- Good sleepers don't say "Oh no it's 10, I have to go to bed!" They say, "I'm sleepy, oh no wonder, it's 10pm."

When we talk about sleepy, we are not talking about
-I'm tired
-I'm bored
-I'm done with this day
-I'm fighting with my spouse

Sleepy is: A propensity to fall asleep in a short amount of time
-droopy eyes
-yawning
-rereading information

-Missing info in tv show
2: If you can't sleep, stop trying. Get up go to the nest
-Create a cozy nest outside the bed and bedroom
-Chair, couch, bed in another room
-Use blankets
-Remote, magazines, kindle
Only return when feeling sleepy again.
3. Bed/bedroom should be a shrine to sleep. Doing wind down activities in bed, can be training those activities to be wakeful activities. No phone, no tv, no clocks that can be seen. Blackout curtains, temperature regulation.
4. No napping. We nap for sleepiness, not for sleep. Safety first. Driving & drowsy-pull over and take a nap. Operating a chain saw later and sleepy? Take a nap.
5. Not forever, not a lifestyle change. But good sleepers typically get up about the same time with or without an alarm. Only while in tx and we are trying to restore the body's natural sleep system so this is temporarily necessary. Mostly, this is amount the clock. Aiding to eliminate social jetlag (sleeping in/laying in) and giving our body clocks a fixed point of reference to hang on to.

What should I do when I get out of bed?

- Rationale: getting out of bed when you can't sleep is not about returning to sleep more quickly. It's an investment in the future. It's amount retraining the brain that bed=sleep. Sleep related effort or "trying to sleep/sleep effort" is almost never effective and is usually counterproductive.
-Sleep is one of the only things in life that the harder you work at it, the worse you're going to do. Sleep does not reward effort. You don't get an A for trying.
-Best activities to do in your nest are mildly pleasant and not arousing. Don't want to do something that will become worrisome: paying bills, work, compose break up letter. But also don't want it to be so enjoyable that the next thing you know, your alarm is going off.
--Favorite nest activities: Reading, watching tv. Shorter rather than longer.
-We tell you don't get back in bed until you're sleepy.
--also don't want you sitting up for hours and hours. Try watching an episode of something, or reading a chapter of a book and then try bed again. Think about it as a reboot. Unless you are super anxious/aroused you may need more time.

Staying up later

I'm bored, I'm tired, I'm not thinking clearly, I'm fighting with my spouse.
Helpful
-Evening light exposure: can help people who struggle to stay up to activate that alerting signal and help it persist a little bit later. This helps to reset the body clock for jet lag situations, and aids in continuing to stay up later. Currently we are lucky that it's spring/summer and it's lighter later! After dinner you could take a walk or sit on the patio in the light to help with evening stimulation with light to help with staying up later.
-Activity: Coming home by 5:30, putting on pajamas and on the couch with a blanket by 7pm watching tv, this is not going to help with staying up later. Schedule activities in the evening. Run errands in the evening, plan activities with friends. Back load your schedule so you have activities to do.

-Social support: Enlist those around you to help. If possible, have people in your household help you to stay up until your bedtime.

LIGHT:
In the media there's always this thing about light and blue light and red light and tablets and this interfering with our circadian rhythm. There is kind of a misnomer about evening activation as the thinking is that during stim control, we shouldn't schedule anything at night, it should be all in the dark, because oh no we can't have any lights on.
It is suggested that we "activate" in the evening, that we should use light in the evening to stay up later. The research on tablets and the different types of light is good research, but it's research that is done on young adult males who are good sleepers, not on people with insomnia. Young adults is an important part of that research information because of puberty, young adults are more photo sensitive. In the research, these patients are kept in constant dim light throughout the day and into the evening. When that is the environment, that's going to inhibit the release of melatonin. Then, more importantly when in that environment your circadian system is poised for any signal that tells it what time it is when we deprive our system like that, which can result in a difference of sleep cycle. For adults, our eyes are different than young adults. Pupils narrow over time, cataracts form over time, and lenses are yellowing as well. Yellow plus blue (blue light is what sleep phase shifts us the most) equals green and green is an ineffective phase shifter! This is good research, but it's not really applicable to adults with insomnia.

Myth of sleep hygiene
-That in and of itself it is an effective treatment for insomnia.
-However, healthy sleep practices are helpful but not sufficient.
Some suggestions:

1. Avoid substances that interfere with sleep, such as alcohol, caffeine or nicotine
2. Exercise regularly but not too close to bedtime
3. Schedule quiet time before bed
4. Keep bedroom quiet, dark, and cool
5. Avoid consuming a heavy meal too close to bedtime. If you get hungry at night, try a light bedtime snack containing protein such as milk, peanut butter, or cheese.

-Evidence suggests if people are consistent with getting out of bed when waking up, and getting back into bed when they are sleepy, they can start to reassociate bed with sleep in about 2 weeks time!
-How long should I stay in bed, before I get out of bed and if I get back in bed and I'm not sleepy, how long do I keep trying?
--It's not about time, or subjective time (thinking it's been about 20 minutes), it's about EFFORT! Do I feel like I'm trying too hard? Get out of bed to pee and sometimes you're like "oh this is good! I'm really drowsy" and that's the last thing you remember. Other times, you get back in bed and you can feel you're going to be up for a little bit and you're like "oh great, this is going to be one of those kinds of nights?" That's where we want to say I'm going to get out of bed. We want to avoid the negative affect in bed.
Come up with a menu of things that you enjoy doing that are possibilities outside of TV and reading. Listen to music? Knit or crochet? Play a hand of solitaire? Crosswords? Come up with 3-4 other items.

Week 7

Increasing TIB rx:

- Excessive daytime sleepiness
    - Sleeping good at night, but now falling asleep at red lights
- Subjective report they are falling asleep very quickly, under 10 minutes per night
    - Have restored sleep drive at bedtime. Can still have some insomnia in the later part of the night
- Sleeping 90% of the night or better most nights. Subjective report is "I feel like I could use more sleep"
- Allot 15-30 minutes added at a time.
    - Most people the morning is set, extension typically is added at bedtime.

SLIDE 2

Huge overlap in chronic pain and chronic insomnia. People who have chronic pain, often have disturbed sleep. It's a relationship that goes in both directions. Chronic pain condition: There are awakenings due to pain, issues with getting comfortable in bed, which leads to fragmented nighttime sleep. If you have insomnia: In turn, you're going to have decreased pain tolerance, increased pain, Less growth hormone secretion because there is less deep sleep so it creates a vicious cycle. Among individuals with chronic pain, upwards of about 90% have a concurrent insomnia complaint.

SLIDE 3

There is a large body of evidence that supports unmodified implementation of CBT-I works well in chronic pain patients! It actually works as well in patients with chronic pain as it does in patients who are pain free! Research has been done and shows that patients with chronic pain like Rheumatoid Arthritis, Cancer associated pain, Fibromyalgia, Osteoarthritis, and Chronic neck & back respond well with CBT-I implementation.

There is a lot of awareness of wakefulness with pain at night. With a chronic pain condition, the awakenings are more likely attributed to pain vs insomnia. "I woke up because my shoulder hurts, or my back hurts."

We know that if the buildup of sleep drive occurs through:

- Being awake, active, and out of bed
- Do sleep restriction therapy, through our TIB RX
- Do stimulus control through getting out of bed unless sleeping.

Often, the awareness of awakenings go away. It may be less about pain waking you up and more about insomnia waking you up and then creating awareness and memory of having been in pain.

SLIDE 4

People with insomnia and chronic pain have really significant stimulus control issues.

Resting is a reasonable coping strategy for people with chronic pain. We do want to support effective management of pain by alternating between periods of activity, and periods of rest.

Resting is always ok, but it is better somewhere other than in the night bed. Also, understanding the thought process of "I really should just stay in bed when I'm awake at night, at least I'm resting my body". Resting in the bed means that you could be creating a conditioned association between the bed and bedroom, and pain and suffering. It's especially important for chronic pain patients that the bed is not used as a place to lay down because you are in pain.

SLIDE 5

What about issues with sleeping too well. "I wake up more stiff and sore if I sleep too well." Spending excessive time in bed can contribute to increased feelings of pain. This is where it is important to adhere to the sleep prescription because that is what aids the increase to sleep hormone! Remember we talked about growth hormone secreted during almost exclusively in stage 3 deep non REM sleep. Shorter night, less time in bed means a longer, more active day. Longer more active day = More sleep drive for the balloon. More sleep drive = less wakefulness, more stage 3 sleep. More stage 3 sleep = more growth hormone. More growth hormone = feeling better the next day/less pain.

Week 8

So how do we continue treatment?

- Treatment has gone well measured by:
  - Have shown an increase in TST
  - Time it takes to initiate sleep!
- Can possibly start to engage in more behaviors in the bedroom other than sleep & sex
  - Reading
  - Watching TV
- Do a slow, continued titration of TST
  - Can consider current bedtimes and wake times as guideposts opposed to rules
  - Try adjusting 15-30 minutes at a time – Find the balance!
  - Deviating from the schedule doesn't automatically translate to a relapse.
  - Consider that 1 night of a rigid schedule didn't fix the sleep issues, and a night off is unlikely to cause regression.
  - Try 1-2 nights per week where there doesn't need to be an alarm set and you can sleep a bit longer.
    - Remember it is important to return to a regular schedule for the majority of the week
    - Will likely feel more "normal"
    - Should only sleep in on predetermined days like weekend

- Never sleep in following a bad night of sleep. Extending sleep following a poor night's sleep perpetuates the jet lag
- Extra sleep amount should be about 60-90 minutes.
- You may find that you wake up closer to your usual time anyway!

- Remember not to stay awake in bed for long periods of time, try to limit to 15-20 minutes still
- Leave the bed when you've got that wide awake feeling or the irritation about being awake
- TST is expected to naturally increase over time, but find the balance between increasing TST and causing wakefulness during the night. It may take some trial and error and flexibility for adjustment.

If insomnia recurs

- You know what to do about it!
- It is likely that we will have pockets of time where we have exacerbated sx of insomnia associated with what's going on in our lives. This doesn't necessarily mean that chronic insomnia has returned.
- Some protective measures can be:
  - Don't compensate for a bad night sleep by sleeping in late or napping
  - Remember to get out of bed if awake, or not falling asleep quickly
  - Restart your sleep prescription if your sx continue beyond 5 days.
    - Complete for 2-3 weeks, and then reassess.
    - Treatment gains really do continue over time, with continued good habits. Evidence shows that returning to the same behaviors perpetuate a longer bout of insomnia.
    - Don't ignore your insomnia sx if they start to creep back in.
    - The awesome news is that if you do have to reinitiate your sleep prescription, patients who have already gone through CBT-I exhibit an accelerated recovery response and typically only need a few weeks of prescription again!
    - Advice is "Don't let the small burning embers of transient insomnia accelerate into a blaze"

Good mantra to remember: If not tonight-then tomorrow night. I may sleep poorly tonight, but tomorrow night I'm increasingly likely to sleep well!

Appendix H

Participant Consent Form

I am asking you to participate in a doctoral project titled "Cognitive Behavioral Therapy for Insomnia with Motivational Interviewing in the Mental Health Setting". I will describe this study to you and answer any of your questions. I am Kassandra Ransom, MSN, PMHNP-BC, the project manager. The **Faculty Advisor for this project is** Dr. Cara Gallegos, PhD, RN, at Boise State University.

What the project is about

The purpose of this project is to implement group Cognitive Behavioral Therapy for Insomnia (CBT-I) for participants with mental health diagnosis of insomnia, major depressive disorder, generalized anxiety disorder, and/or post-traumatic stress disorder. CBT-I and Motivational Interviewing (MI) will be used during CBT-I group sessions, as well as between sessions, to aid in participant continuation and engagement. MI is a therapy approach that aids in patient behavior change by helping patients explore and resolve uncertainty.

What we will ask you to do

I will ask you to participate in weekly group sessions that will last from 30-60 minutes for 10 weeks. There will be assessment surveys for you to complete before and after the 10 weeks and, weekly sleep diaries to complete. The pre and post CBT-I assessments/surveys should take approximately 30 minutes to complete. I ask that you provide a reliable email address for communication purposes, and are willing to send me weekly documentation (sleep diary form) on a consistent/regular basis throughout the project.

Risks and discomforts

Emotional Risks

Every effort will be made to reduce your risk and discomfort while participating in this project. Understanding that initially CBT-I can be challenging, it is important to recognize that it is possible to experience:

- Increased feelings of tiredness, Increased feelings of irritability, Increased feelings of sadness or anxiety, and Decreased ability to concentrate

As your participation continues throughout this project, evidence in CBT-I efficacy has shown to positively impact the above listed items.

Social Risks

Every effort will be made to reduce your risk while participating in this project. Understanding that no guarantee can be made, it is important to recognize that it is possible to have a loss of confidentiality during this project.

Working with a group of participants, it is expected that each member guard the confidentiality of others in the group environment. You as a participant have the option to create an alternative Google email account with alternative information (without your legal name) to de-

identify you in group meeting sessions. Additionally, it will not be required for participants to have their camera on during virtual group sessions to allow further support of maintaining your confidentiality.
Each participant will be assigned a random 4 digit number. This number will only be associated with your true first and last name in one document that will be stored on Boise State's encrypted and password protected Google Drive. Only myself and my Faculty Advisor, Dr. Cara Gallegos will have access to this document and it will be stored for the federally required timeline of 3 years post project completion.
Boise State University mandates that I inform you:
For this project, I am requesting demographic information such as: gender, age range, and race. Due to the make-up of Oregon's population, the combined answers to these questions may make an individual person identifiable. I will make every effort to protect your confidentiality. However, if you are uncomfortable answering any of these questions, you may leave them blank.

Benefits
Benefits to participants in CBT-I are reported. Participants are expected to experience direct benefits like: an increase in total sleep time and quality of sleep, a reduction to depressive symptoms, an increased ability to cope with daily life, and an increased level of confidence in one's ability to sleep regularly. Indirect benefits of participation are: information from this project will benefit my mental health practice knowledge and aid in my continued education.

Compensation for participation
There is no compensation for participation to project participants.

Audio/Video Recording & Photography
There is no audio/video recording or photography expected during this project duration.

Privacy/Confidentiality/Data Security
Protection of participants privacy, confidentiality and data security are of upmost importance.

- De-identification of data will occur by using a random 4 digit number on all participant submissions of information.
- Identifying information will only be in one document that includes participants first and last name correlated with their random 4 digit number. This document will only be stored on Boise State's encrypted and password protected Google Drive. This document will be stored for the federally required timeline of 3 years post project completion. Your confidentiality will be kept to the degree permitted by the technology being used.
- All assessment and survey information will be completed online and will have your unique number for identification.
- All consent forms will be reviewed and electronically signed in IntakeQ, a company not affiliated with Boise State University, and with its own privacy and security policies that you can find at its website. We anticipate that your participation in the review and signing of the consent form presents no greater risk than everyday use of the internet.

- De-identified data from this project may be shared with other faculty or students from Boise State University. I will remove any personal information that could identify you before information is shared to ensure that no one will be able to identify you from the information that is shared. Despite these measures, I cannot guarantee anonymity of your personal data.

Taking part is voluntary
Project participant's involvement is voluntary. You as the participant may refuse to participate before the project begins, discontinue at any time, or skip any questions/procedures that may make you feel uncomfortable, with no penalty to you. Your withdrawal or lack of answering assessment/survey questions will not impact my academic standing, record, or relationship with Boise State University and/or (NAME REDACTED).

If you have questions
The project manager conducting this project is Kassandra Ransom, a graduate student at Boise State University. Please ask any questions you have now. If you have questions later, you may contact Kassandra Ransom at (EMAIL REMOVED FOR PRIVACY) or Dr. Cara Gallegos at (EMAIL REMOVED FOR PRIVACY). If you have any questions or concerns regarding your rights as a participant in this project, you may contact the Institutional Review Board (IRB) for Human Participants at 208-426-5401 or access their website at https://www.boisestate.edu/research-compliance/contact-us/. The IRB contact is the Assistant Director, Francine Winkle.

If you would like a copy of this consent form, please indicate that here:
Yes
No

Statement of Consent
I have read the above information. I consent to take part in the project.

Your Signature_____ Date_____

Your Name (printed)_____
_____

Signature of person obtaining consent_____ Date_____
_____

Printed name of person obtaining consent_____
_____

Appendix I

Data Analysis Tables, Graphs, & Charts

Figure 1

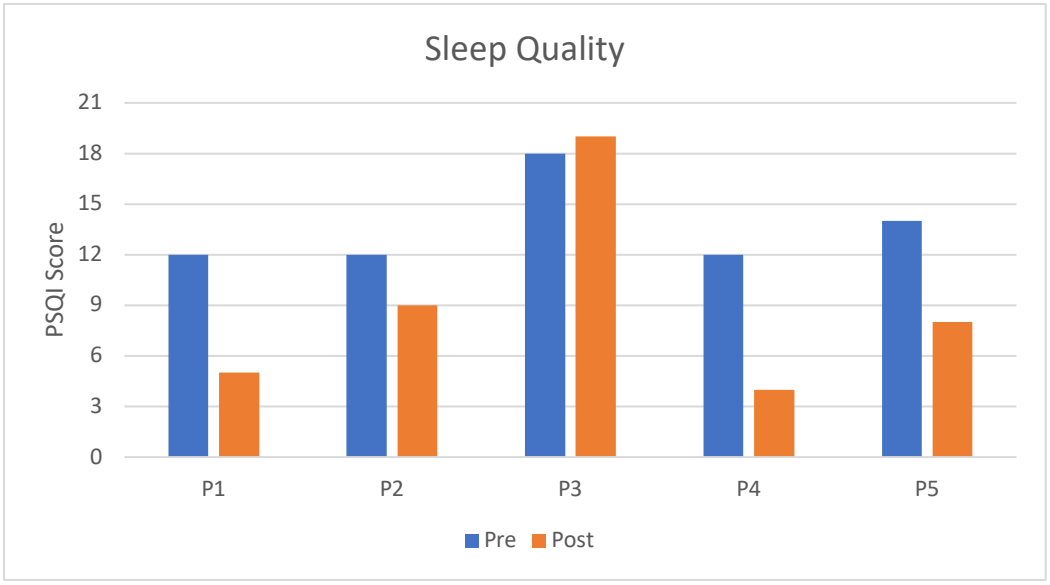


Figure 2

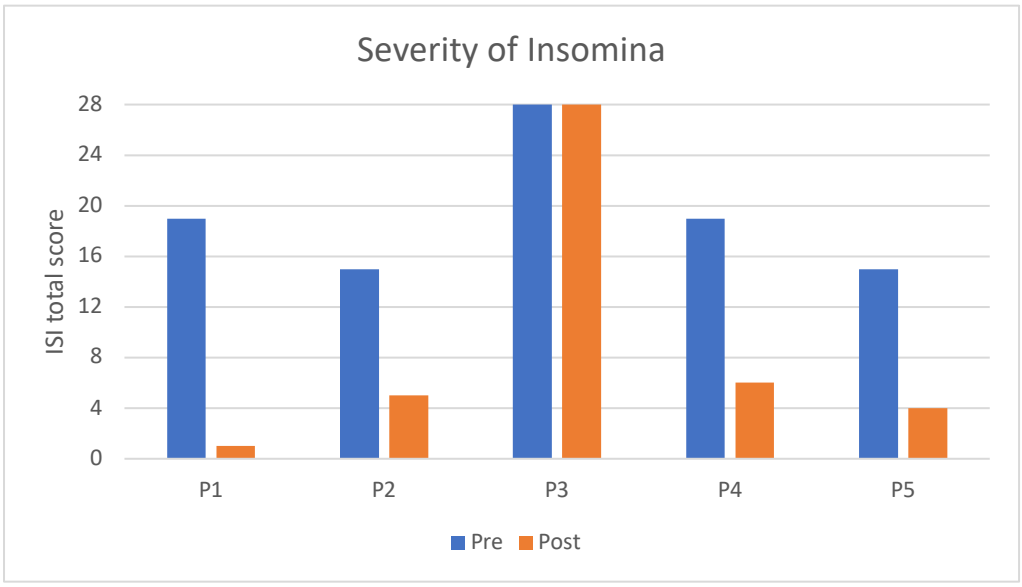


Figure 3

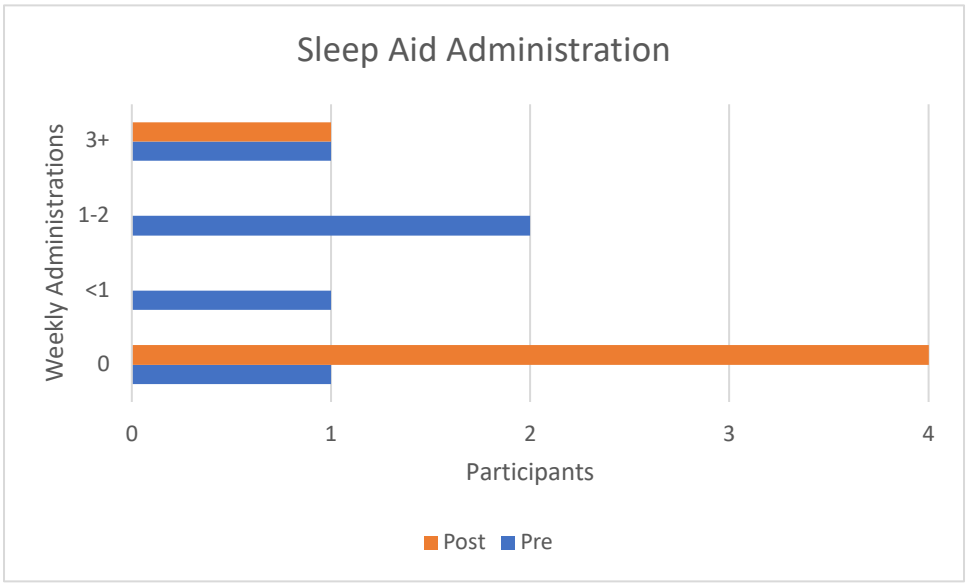


Figure 4

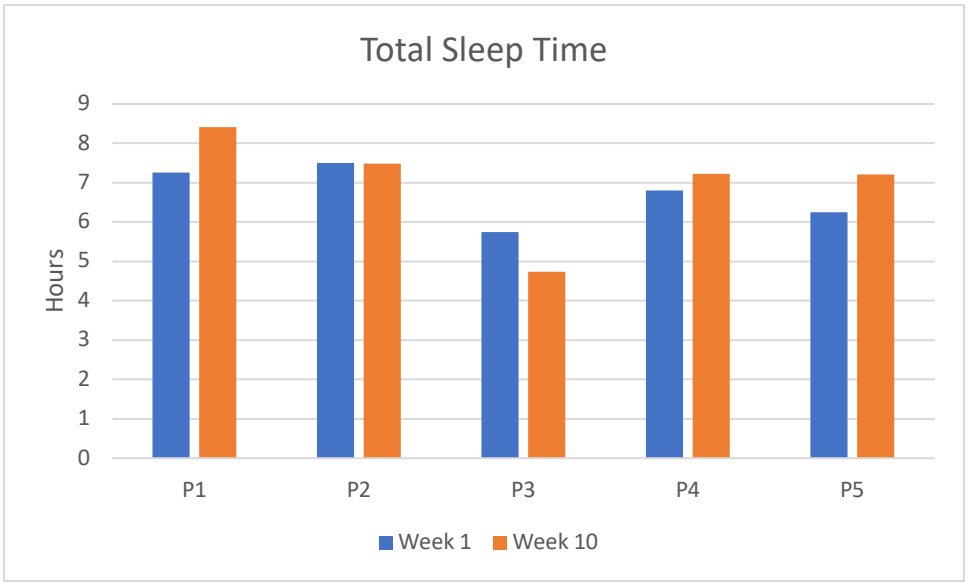


Figure 5

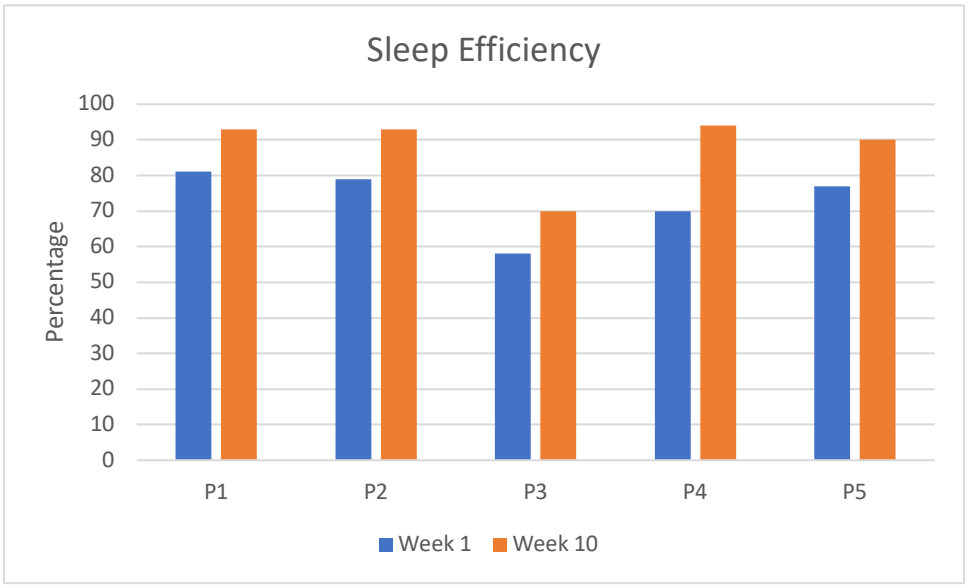


Figure 6

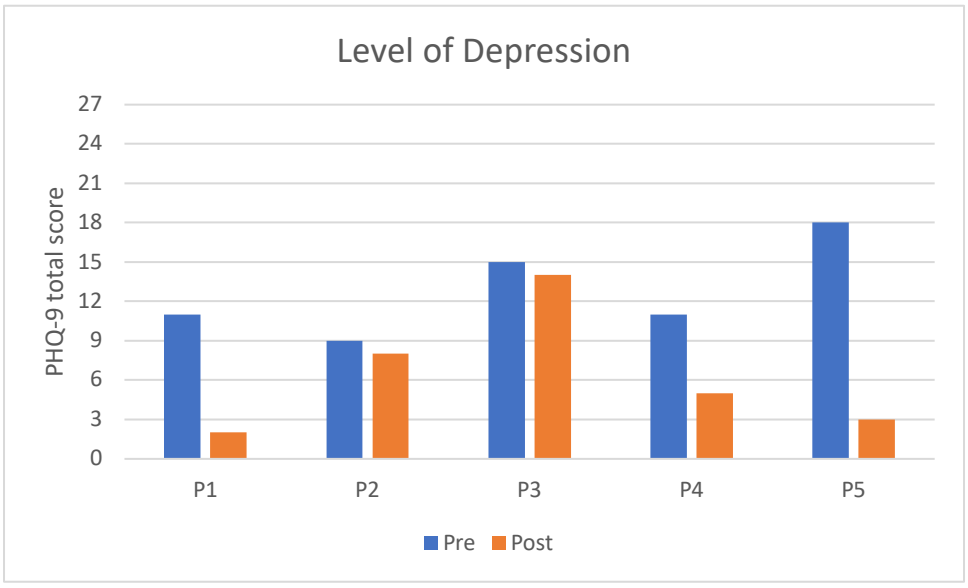
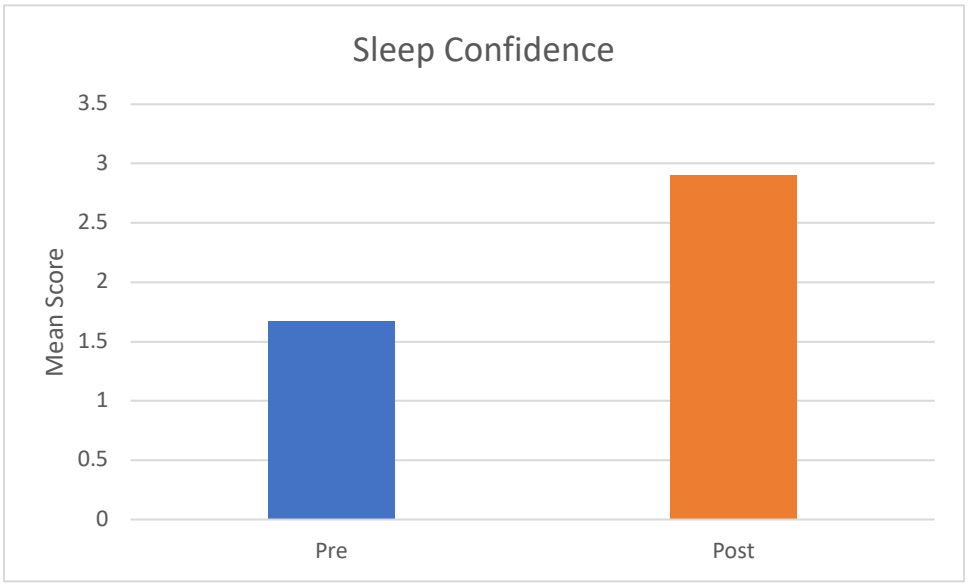


Figure 7



Data Collection Tools/instruments

Subject's Initials_____ID#_____Date_____Time_____AM PM

PITTSBURGH SLEEP QUALITY INDEX

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

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

   BED TIME _____

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

   NUMBER OF MINUTES _____

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

   GETTING UP TIME _____

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

   HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

a) Cannot get to sleep within 30 minutes

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

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

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

c) Have to get up to use the bathroom

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

d) Cannot breathe comfortably

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

e) Cough or snore loudly

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

f) Feel too cold

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

g) Feel too hot

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

h) Had bad dreams

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

i) Have pain

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

j) Other reason(s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this?

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

6. During the past month, how would you rate your sleep quality overall?

Very good _____

Fairly good _____

Fairly bad _____

Very bad _____

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

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

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

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

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____

Only a very slight problem _____

Somewhat of a problem _____

A very big problem _____

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 past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

b) Long pauses between breaths while asleep

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

c) Legs twitching or jerking while you sleep

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

d) Episodes of disorientation or confusion during sleep

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

e) Other restlessness while you sleep; please describe_____

_____

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

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

1

Insomnia Severity Index (ISI)

Subject ID: _____ **Date:** _____

For each question below, please circle the number corresponding most accurately to your sleep patterns in the **LAST 2 WEEKS.**

For the first three questions, please rate the **SEVERITY** of your sleep difficulties.

1. Difficulty falling asleep:

None	Mild	Moderate	Severe	Very Severe
0	1	2	3	4

2. Difficulty staying asleep:

None	Mild	Moderate	Severe	Very Severe
0	1	2	3	4

3. Problem waking up too early in the morning:

None	Mild	Moderate	Severe	Very Severe
0	1	2	3	4

4. How **SATISFIED**/**DISSATISFIED** are you with your current sleep pattern?

Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
0	1	2	3	4

5. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g., daytime fatigue, ability to function at work/daily chores, concentration, memory, mood).

Not at all Interfering	A Little Interfering	Somewhat Interfering	Much Interfering	Very Much Interfering
0	1	2	3	4

6. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

Not at all Noticeable	A little Noticeable	Somewhat Noticeable	Much Noticeable	Very Much Noticeable
0	1	2	3	4

7. How **WORRIED/DISTRESSED** are you about your current sleep problem?

Not at all	A Little	Somewhat	Much	Very Much
0	1	2	3	4

ISI – Canada/English - Mapi.
ID044977 / ISI_AU2.1last-2-weeks_eng-CA-USori.doc

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

ID #: _____ **DATE:** _____

Over the last *2 weeks,* how often have you been bothered by any of the following problems?
(use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite – being so figety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
	add columns	+	+	

(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card). TOTAL:

10. If you checked off *any problems,* how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?

- Not difficult at all _____
- Somewhat difficult _____
- Very difficult _____
- Extremely difficult _____

A2663B 10-04-2005

Sleep Diary

SleepFoundation
A OneCare Media Company

Complete in the Morning							
Start date: Day of week:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
What time did you get into bed?	PM AM	PM AM	PM AM	PM AM	PM AM	PM AM	PM AM
What time did you try and go to sleep?	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM
How long did it take you to fall asleep?	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.
What time did you wake up this morning?	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM	AM PM
How many times did you wake up during the night?							
No. of times							
No. of minutes							
Last night I slept a total of:	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.	HRS. MINS.
How would you rate your sleep quality?							
Very Poor	○	○	○	○	○	○	○
Poor	○	○	○	○	○	○	○
Fair	○	○	○	○	○	○	○
Good	○	○	○	○	○	○	○
Very Good	○	○	○	○	○	○	○
Was your sleep disturbed by any factors? If so, list them here (ex. allergies, noise, pets, discomfort/pain, etc.)							
Any other comments about your sleep worth noting?							

Complete in the Evening							
Day of week:	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
I consumed caffeinated drinks in the: (M)orning, (A)fternoon, (E)vening, (N/A)							
M / A / E / NA							
How many?							
How much exercise did you get today?							
No. of minutes							
Time of day (morning, afternoon, evening, night)							
Did you take a nap? (circle one)	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
If Yes, for how long?							
List all Medications you took today							
Approximately 2-3 hours before going to bed, I consumed:							
Alcohol	○	○	○	○	○	○	○
A heavy meal	○	○	○	○	○	○	○
Caffeine	○	○	○	○	○	○	○
Not applicable	○	○	○	○	○	○	○
In the hour before going to sleep, my bedtime routine included: List activities including reading a book, using electronics, taking a bath, doing relaxation exercises, etc.							

Permission Letters for use of Data Collection Tools

BOISE STATE UNIVERSITY

Kassandra Ransom <kassandraransom@u.boisestate.edu>

Request to use sleep measure/instruments (PSQI)

1 message

Gasiorowski, Mary <GasiorowskiMJ@upmc.edu> Tue, Nov 30, 2021 at 5:49 PM
To: "\"kassandraransom@u.boisestate.edu\"" <kassandraransom@u.boisestate.edu>

Sent on behalf of Dr. Buysse

Dear Ms. Ransom,

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 Measures/Instruments tab. Please ensure that the PSQI is accurately reproduced in any on-line version (including copyright information). We request that you do cite the 1989 paper in any publications that result.

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.

Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.

Professor of Psychiatry and Clinical and Translational Science

University of Pittsburgh School of Medicine

Mapi Research Trust

SPECIAL TERMS

These User License Agreement Special Terms ("Special Terms") are issued between Mapi Research Trust ("MRT") and Kassandra Ransom ("User").

These Special Terms are in addition to any and all previous Special Terms under the User License Agreement General Terms.

These Special Terms include the terms and conditions of the User License Agreement General Terms, which are hereby incorporated by this reference as though the same was set forth in its entirety and shall be effective as of the Special Terms Effective Date set forth herein.

All capitalized terms which are not defined herein shall have the same meanings as set forth in the User License Agreement General Terms.

These Special Terms, including all attachments and the User License Agreement General Terms contain the entire understanding of the Parties with respect to the subject matter herein and supersedes all previous agreements and undertakings with respect thereto. If the terms and conditions of these Special Terms or any attachment conflict with the terms and conditions of the User License Agreement General Terms, the terms and conditions of the User License Agreement General Terms will control, unless these Special Terms specifically acknowledge the conflict and expressly states that the conflicting term or provision found in these Special Terms control for these Special Terms only. These Special Terms may be modified only by written agreement signed by the Parties.

1. **User information**

User name	Kassandra Ransom
Category of User	Student
User address	1910 W University Dr. Boise 83725 United States of America
User VAT number	
User email	kassandra.ransom@gmail.com
User phone	5039493769
Billing Address	1910 W University Dr. Boise 83725 United States of America

2. **General information**

Effective Date	Date of acceptance of these Special Terms by the User
Expiration Date ("Term")	Upon completion of the Stated Purpose
Name of User's contact in charge of the request	Kassandra Ransom

3. **Identification of the COA**

Mapi Research Trust

Name of the COA	ISI - Insomnia Severity Index
Author	Morin CM
Copyright Holder	Morin Charles M
Copyright notice	ISI : © Morin, C.M. (1993 and 1996)ISI-Clinian version: © Morin, C.M. (1993, 1996, 2000, 2006)
Bibliographic reference	Morin, C.M. (1993). Insomnia : Psychological assessment and management. Guilford Press, New York. Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2001 Jul;2(4):297-307 (PubMed Abstract) Yang M, Morin CM, Schaefer K, Wallenstein GV. Interpreting score differences in the Insomnia Severity Index: using health-related outcomes to define the minimally important difference. Curr Med Res Opin. 2009 Oct;25(10):2487-94 (PubMed Abstract) Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011 May 1;34(5):601-8 (Full Text Article)
Modules/versions needed	ISI-Last 2 weeks

4. **Context of use of the COA**

The User undertakes to use the COA solely in the context of the Stated Purpose as defined hereafter.

4.1 Stated Purpose

Other project

Title	Cognitive Behavioral Therapy for Insomnia using Motivational Interviewing techniques to enhance patient engagement.
Disease or condition	Insomnia
Planned Term*	Start: 05/2022; End: 08/2022
Description (including format or media)	Doctorate of Nursing Practice intervention project using patients at a small, private mental health clinic in Portland, Oregon.

4.2 Country and languages

Mapi Research Trust

MRT grants the License to use the COA on the following countries and in the languages indicated in the table below:

Version/Module	Language	For use in the following country
ISI-Last 2 weeks	English	the USA

The User understands that the countries indicated above are provided for information purposes. The User may use the COA in other countries than the ones indicated above.

5. **Specific requirements for the COA**

- The Copyright Holder of the COA has granted ICON LS exclusive rights to translate the COA in the context of commercial studies or any project funded by for-profit entities. ICON LS is the only organization authorized to perform linguistic validation/translation work on the COA.

- In case the User wants to use an e-Version of the COA, the User shall send the Screenshots of the original version of the COA to MRT or ICON LS for review and approval. The Screenshots review may incur additional fees.

- In case the User wants to use an e-Version of the COA, ICON LS shall update (if needed) and populate the COA translations into the User's or IT Company's system and the User shall send the Screenshots of the translations of the COA to ICON LS for approval. The update (if needed), population of translations and the Screenshots review may incur additional fees.

By accepting these Special Terms, the User acknowledges and confirms that it has read and approves the User Agreement General Terms.

BOISE STATE UNIVERSITY

Kassandra Ransom <kassandraransom@u.boisestate.edu>

Re: Sleep diary

1 message

Contact Inbox <contact@sleepfoundation.org> Tue, Nov 30, 2021 at 10:40 AM
To: Kassandra Ransom <kassandraransom@u.boisestate.edu>

Hi Kassandra,

Thanks so much for your email. Feel free to use the sleep diary, with proper attribution to SleepFoundation.org.

Best,
Logan

Go Broncos!

On Mon, Nov 29, 2021 at 7:10 PM Kassandra Ransom <kassandraransom@u.boisestate.edu> wrote:

> Hello! I'm Kassandra Ransom and I am a Doctoral student at Boise State University. I am completing my Doctoral project using Cognitive Behavioral Therapy for Insomnia as a patient intervention for Insomnia. I would like to use the Sleep Diary posted on your website for my project. I would not modify it in any way. Is it possible to obtain permission for this purpose?
> Thank you for any information!
> -Kassandra Ransom

Scholarly Project IRB Letter of Determination

BOISE STATE UNIVERSITY
RESEARCH AND ECONOMIC DEVELOPMENT
Research Compliance

Date: May 02, 2022

To: Cara Gallegos cc: Kassandra Ransom

From: Social & Behavioral Institutional Review Board (SB-IRB)
c/o Office of Research Compliance (ORC)
Subject: SB-IRB Notification of Approval - Original - 186-SB22-064
Implementing Cognitive Behavioral Therapy for Insomnia in the Mental Health Setting

The Boise State University IRB has approved your protocol submission. Your protocol is in compliance with this institution's Federal Wide Assurance (#0000097) and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Protocol Number: 186-SB22-064 Received: 4/14/2022 Review: Expedited
Expires: 5/1/2023 Approved: 5/2/2022 Category: 7

Your approved protocol is effective until 5/1/2023. To remain open, your protocol must be renewed on an annual basis and cannot be renewed beyond 5/1/2025. For the activities to continue beyond 5/1/2025, a new protocol application must be submitted.

ORC will notify you of the protocol's upcoming expiration roughly 30 days prior to 5/1/2023. You, as the PI, have the primary responsibility to ensure any forms are submitted in a timely manner for the approved activities to continue. If the protocol is not renewed before 5/1/2023, the protocol will be closed. If you wish to continue the activities after the protocol is closed, you must submit a new protocol application for SB-IRB review and approval.

You must notify the SB-IRB of any changes to your approved protocol and the committee must review and approve these changes prior to their commencement. You should also notify the committee if your activities are complete or discontinued.

Current forms are available on the ORC website at http://goo.gl/D2FYTV
Please direct any questions or concerns to ORC at 426-5401 or humansubjects@boisestate.edu. Thank you and good luck with your research.

1910 University Drive Boise, Idaho 83725-1139
Phone (208) 426-5401 orc@boisestate.edu

Memorandum of Understanding from Organization

This document has been withheld at the request of the partnering organization for privacy purposes, as it contains identifiable information. The DNP project manager has retained a signed copy for recordkeeping.

Other Project Specific Materials

Participants were emailed 1-2 times per week beginning after session 2 until session 10, outside group therapy sessions, with encouraging quotes or motivating them to continue through their CBT-I journey.

Email blast 1: "Get enough sleep every night. An exhausted mind is rarely productive." – Unknown. We all know what it's like to wake up the next morning after sleeping poorly or not at all. Just do your best, and we will work together to find resolutions as issues come up.

Email blast 2: "I've always envied people who sleep easily. Their brains must be cleaner, the floorboards of the skull well swept, all the little monsters closed up in a steamer trunk at the foot of the bed." – David Benioff. Doesn't it sometimes feel that we can't get those little insomnia monsters back in their trunks? Keep working at incorporating the sleep changes into your routine, and it will make it easier!

Email blast 3: "Sleep is an investment in the energy you need to be effective tomorrow." – Tom Roth. It's important to remember to invest in ourselves! Keep working at your sleep prescription. It can often be a big adjustment, but it will pay off!

Email blast 4: "Remember that in order to be productive you also have to focus on relaxation." – Bogdan Ivanov. Think of some of those sleep hygiene topics we discussed this week. Have you used relaxation to help with your bedtime routine?

Email blast 5: "Better to get up late and be wide awake than to get up early and be asleep all day." – Unknown. While this is a common opinion as many of us are "snoozers", remember how important it is to wake up at the consistent time each day on your sleep prescription.

Email blast 6: "Discover the great ideas that lie inside you by discovering the power of sleep." – Arianna Huffington. Some people claim to have their best ideas after a good night's sleep. You can have both improved sleep and good ideas! Keep working at your sleep prescription!

Email blast 7: "Rest when you're weary. Refresh and renew yourself, your body, your mind, your spirit. Then get back to work." – Ralph Marston. I know you're likely still feeling rather weary, and would love the feeling of being refreshed. Keep working at your sleep prescription! It's coming!

Email blast 8: "Dear Mind, please stop thinking so much at night, I need sleep." —Unknown. Are you starting to have this negotiation with your mind less and less??

Email blast 9: "Happiness consists of getting enough sleep. Just that, nothing more." — Robert A. Heinlein. Sometimes people make sleeping sound just so easy! Those of you who consistently struggle with sleep know this is not necessarily a simple task. Keep using your tools and think about your barriers so we can work to make sleep easy for you too!

Email blast 10: "Not being able to sleep is terrible. You have the misery of having partied all night… without the satisfaction." — Lynn Johnston. I know this program has been a large shift in your sleep behaviors. I hope you're finding some increased satisfaction to your sleep!

Email blast 11: "Sleep is that golden chain that ties health and our bodies together." – Thomas Dekker. Sleep is something that impacts so many other things in our lives. Remember you are over half way through this program, and you've likely come a long way since the beginning in your sleep. Be proud of where you're at!

Email blast 12: "I think insomnia is a sign that a person is interesting." - Avery Sawyer. I think some of you would have appreciated being a little less interesting at points in time if it meant you could sleep.

Email blast 13: "The best bridge between despair and hope is a good night's sleep." – E. Joseph Cossman. Are you finding it easier to get a good night's sleep at this point in the program? Keep up your hard work!

Email blast 14: "A little insomnia is not without its value in making us appreciate sleep, in throwing a ray of light upon that darkness." – Marcel Proust. How much do you appreciate your ability to sleep a little easier now?

Email blast 15: "My day starts backwards … I wake up tired and go to bed wide awake." — Unknown. Remember these days? Are you glad they are behind you?

Email blast 16: "Don't fight with the pillow but lay down your head And kick every worriment out of the bed." — Edmund Vance Cooke. Don't forget to get out of bed if you're fighting sleep.